PBL Netherlands Environmental
Assessment Agency

Keeping track of adaptation in the Dutch Delta

Design of a reflexive monitoring and evaluation framework for the Delta Programme

Policy Study

Keeping track of adaptation in the Dutch Delta

Design of a reflexive monitoring and evaluation framework for the Delta Programme

Policy Study

Keeping track of adaptation in the Dutch Delta. Design of a reflexive monitoring and evaluation framework for the Delta Programme

The Hague, 2016
PBL publication number: 2557

This publication is a summary of the Dutch PBL report: *Koers houden in de delta. Ontwerp van een monitorings- en evaluatiekader voor het Deltaprogramma* (Ligtvoet et al., 2016).

Corresponding author
willem.ligtvoet@pbl.nl

Authors
Willem Ligtvoet, Eva Kunseler and Ron Franken (PBL), with contributions by Anne Loeber and David Laws (University of Amsterdam), Leon Hermans, Arienne Naber and Tineke Ruijgh-van der Ploeg (Delft University of Technology), and Wilfried ten Brinke (Blueland)

Graphics
PBL Beeldredactie

Production coordination and English-language editing
PBL Publishers

PBL Netherlands Environmental Assessment Agency is the national institute for strategic policy analysis in the fields of the environment, nature and spatial planning. We contribute to improving the quality of political and administrative decision-making by conducting outlook studies, analyses and evaluations in which an integrated approach is considered paramount. Policy relevance is the prime concern in all of our studies. We conduct solicited and unsolicited research that is both independent and scientifically sound.

Contents

MAIN FINDINGS

Summary and Findings

The Delta Commissioner's Office requested PBL Netherlands Environmental Assessment Agency to formulate a proposal for a monitoring and evaluation framework for the Delta Programme. PBL was asked, in collaboration with the University of Amsterdam and the Delft University of Technology, to combine three perspectives in the framework design:

- *learning through collaboration* in a participatory environment;
- *adaptive management* for a timely response to changing circumstances; and
- *shared accountability* to keep track of the implementation of the Delta Programme and verify where goals are being reached and where they may need to be revised, based on experience.

The Delta Programme is a nation-wide initiative with a complex network structure involving many parties, including provincial authorities, municipalities, regional water boards, societal organisations and private stakeholders. These organisations, together with citizens, form the delta community. The main themes of the Delta Programme are flood risk management, freshwater supply, and spatial adaptation. In the current implementation stage, the Delta Programme aims to promote adaptive management — given the uncertainties that lie ahead — and seeks to ensure that a diverse groups of stakeholders participate in a process that is sufficiently open and integrated to draw together their ambitions and initiatives.

In line with the characteristics of the Delta Programme mentioned above, the full report presents the design of a monitoring and evaluation framework based on a 'reflexive approach'. The principles of this approach are: (a) the joint effort by all stakeholders to achieve adequate monitoring and evaluation during the implementation process, and (b) balanced commitment with regard to shared learning and shared accountability.

This approach contributes to ongoing *policy improvement*, while also tapping into the *energy* and *the innovation drive* of all stakeholders involved during the implementation of the programme. A reflexive approach demands that monitoring and evaluation procedures keep one eye on the dynamics of implementation practices developed *within* the Delta Programme (*internal dynamics*) and another on the scientific and social environment *outside* the programme (*external dynamics*). Monitoring and evaluation, thus, structure practices within the Delta Programme in such a way that strategies can be revised and actions can be adapted in an informed and timely fashion ('adaptive delta management').

Recommendations

Starting from a reflexive approach, the study yielded the following four recommendations.

Reinforce the Delta Programme's capacity to promote learning by:

- establishing a core group to organise a 'Community of Practice' on implementation, monitoring, and evaluation, with explicit attention for the internal and external dynamics that shape outcome and development of the various processes;
- identifying, authorising, and supporting the work of individuals who serve as knowledge brokers in the Community of Practice;
- developing an umbrella assessment programme geared towards collective learning, redesign, and shared accountability with regard to the main themes of the Delta Programme.

Secure adaptive management by:

- developing a system for monitoring relevant external changes of a social and scientific nature (the external dynamics) and relevant internal changes in the implementation practice of the Delta Programme (internal dynamics);

- taking up opportunities to link to other initiatives, while connecting planning processes, and drawing on these links to identify integrated responses to problems that emerge during implementation;
- creating a group that is responsible for identifying relevant signals in the world outside the Delta Programme, by conducting regular reviews and exploring the possible implications for the work of the Delta Programme.

Create a basis for shared accountability by:
- developing and specifying appropriate goals for flood risk management, freshwater supply and spatial adaptation, and establishing the reference situation in these areas;
- developing a system to assess the degree of integration of plans and measures that have been achieved in practice;
- developing a system for revising goals and plans, for when evidence suggests a rethink of initial commitments is needed;
- developing a common format for monitoring and evaluation reports.

Create a basis for trust and transparency by:
- clearly dividing responsibilities for the organisation and planning of monitoring and evaluation efforts (who does what, and when), and ensuring that adequate checks and balances are in place;
- making clear arrangements about the use of information related to monitoring and evaluation with a view to decision-making on possible adjustments to the strategy or the implementation process;
- establishing an accessible information system that shows how monitoring and evaluation are organised, presents monitoring results, and facilitates the exchange of experiences.

Delta Programme in international perspective

Water- and climate-related challenges are high on the global agenda. The Delta Programme operates on the frontline of developments around participatory, adaptive and integrated planning and policy implementation in delta areas. To date, no experience has been gained about monitoring and evaluation approaches that integrate these aspects, according to recent surveys by several organisations, including the European Environment Agency (EEA), The Organisation for Economic Co-operation and Development (OECD) and PBL Netherlands Environmental Assessment Agency.

The development of the Delta Programme has attracted considerable international attention. The implementation phase of the Delta Programme has only just started, so possibilities for monitoring and evaluation are still limited. At this early stage, it is therefore all the more important to focus on joint efforts to further develop the monitoring and evaluation system and process.
The reflexive approach, which is the basis for the monitoring and evaluation framework as developed for the Delta Programme, may also be relevant for the development of monitoring and evaluation activities in other countries and deltas, and in city and delta networks. These networks involve many stakeholders, and the exchange of knowledge and experience is at the heart of the joint ambition towards more sustainable development. Sharing the experience in the Delta Programme in international networks, such as the Delta coalition, may stimulate and contribute to the set-up of integrated, participatory and adaptive monitoring and evaluation processes within and between countries and deltas.

FULL RESULTS

Introduction

Setting: the Netherlands as a densely populated urbanised delta

The Netherlands is one of the most densely populated, urbanised deltas in the world. It is facing complex challenges with respect to managing the effects of climate change and providing a safe and prosperous environment for the Dutch population, economy and ecosystems. The Netherlands forms a delta where four European rivers (Rhine, Meuse, Scheldt and Ems) meet and flow into the North Sea (Figure 1). The quantity and quality of the Dutch national waters, thus, are heavily influenced by land use and water management in the upstream countries Germany, Switzerland, Austria, Belgium, Luxembourg and France. The Netherlands is a country largely consisting of man-made water bodies. Low-lying areas are made habitable with constructions such as dykes, dams, sluices and pumps, and through major alterations to the natural morphology and hydrodynamics of water courses. Benefiting in many ways from its location in the delta, the Netherlands has the highest concentration of people, industry, livestock and transport in Europe. However, this situation also means that it is vulnerable to the consequences of climate change, such as sea level rise, changing river discharges, intensified rainfall as well as increased risk of heatwaves and drought (PBL, 2012). Major climate-related characteristics of the Netherlands are:

- 26% of the land area is below sea level (by up to 7 metres) and about 60% of the country is susceptible to flooding, either from the sea or the rivers;
- The flood-sensitive areas are densely populated and account for about 70% of the country's GDP;
- Further population growth and urbanisation is expected for the coming decades, primarily in flood-sensitive areas, further increasing the flood risk;
- Extreme precipitation events over the last years have led to frequent disruptions in urban areas and to unprecedented high economic damage for the agricultural sector in the southern part of the Netherlands;
- Although in normal, or even dry years, the availability of fresh water is not a major bottleneck, water shortages will increase, depending on the development of water demand in the Netherlands and water management in upstream countries.

The Dutch Delta Programme: towards a joint strategy and implementation

Following an advice by the second Delta Committee (Deltacommissie, 2010) in 2010, the Delta Programme was launched (Delta Programme 2011). The Delta Programme is aimed at creating a safe and attractive Netherlands, now and in the future (Delta Programme 2011). By way of the Delta Programme and acknowledging socioeconomic developments, the Dutch Government seeks to ensure long-term certainty about flood risk management, sufficient supply of fresh water and a climate-proof spatial development. The Delta Programme is a nation-wide programme with a complex network structure that involves many parties, such as provincial authorities, municipalities, regional water boards, social organisations and private stakeholders. Together, they form the delta community. The main themes of the Delta Programme are flood risk management, freshwater supply and spatial adaptation (Figure 2). Its implementation stage is aimed at adaptive management, given the uncertainties that lie ahead, and seeks to ensure the participation of numerous parties and the adoption of a broad and integral approach to unite the ambitions and efforts of a wide range of stakeholders. The Delta Programme is directed by the government-appointed Delta Commissioner.

Since its start in 2010, the Delta Commissioner has coordinated a five-year joint, fact-finding process, for the national themes of flood risk management, freshwater management, spatial adaptation, as well as for the regional programmes (Figure 2), involving all stakeholders. The joint fact-finding process encompassed: i) the assessment of the challenges,

Figure 1
Geography of the Netherlands focusing on the most important national waters

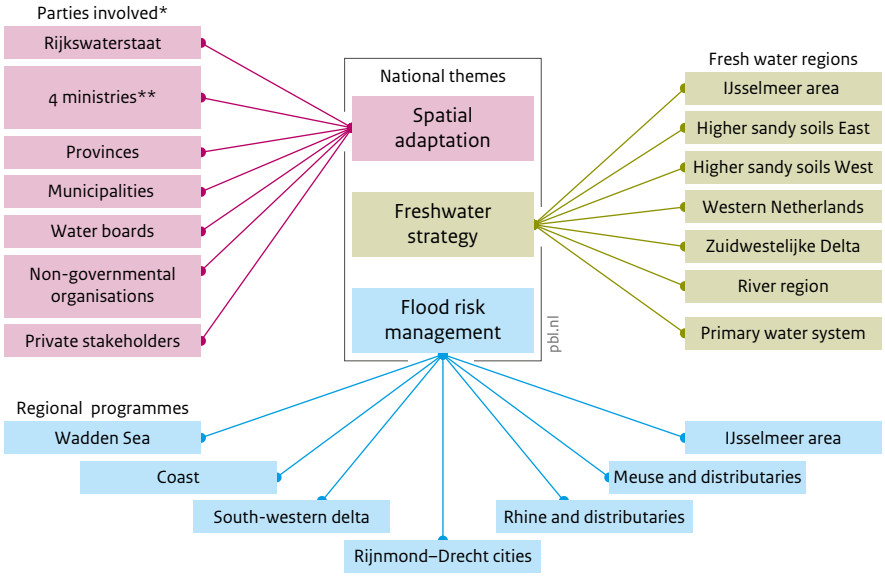
Source: PBL

The Netherlands is a densely populated urbanised delta. The delta encompasses four major rivers from international river basins, large lakes in the north and both freshwater and saltwater bodies in the south-western region. The population is concentrated in the west, with its main cities of Amsterdam, Rotterdam and The Hague.

both now and in the future; ii) the exploration of potential solutions and strategies; iii) deducing potential solutions to a number of realistic options; and iv) selecting 'preferred solutions and strategies' This process resulted in five joint 'delta decisions', presented in the Delta Programme 2015:

1. Delta Decision on Flood Risk Management: new approach to protecting people and the economy against flooding;
2. Delta Decision on the Freshwater Supply Strategy: a new approach to limiting water shortages and the optimum use of water, both in the economy and by public utilities;
3. Delta Decision on Spatial Adaptation: a new, targeted approach to water-robust and climate-proof development and redevelopment of the built environment and critical infrastructure;
4. Delta Decision on the Rhine–Meuse Delta: structuring choices with respect to flood risk management in the highly urbanised Rhine–Meuse Delta, with Rotterdam as its major city;
5. Delta Decision on the IJsselmeer Region: structuring choices with respect to flood risk management and freshwater supply for the northern part of the Netherlands.

Figure 2
Structure of the Delta Programme



* These parties are also involved in the regional programmes and the freshwater regions

** IenM Ministry of Infrastructure and the Environment
EZ Ministry of Economic Affairs
OCW Ministry of Education, Culture and Science
VenJ Ministry of Security and Justice

Source: PBL

The Delta Programme has a complex structure involving many parties, and several sub-programmes with overlapping thematic areas. The flood risk management theme includes seven regional programmes and the freshwater theme covers six freshwater regions. The figure does not specify local programmes for the spatial adaptation theme where interaction takes place through projects and in collaboration with Rijkswaterstaat, provinces, municipalities, water boards, social organisations and private stakeholders. These parties are also involved in the regional programmes and the freshwater regions.

Supplementary to the above, the Delta Commissioner has drawn up a proposal for the approach to beach nourishment along the North Sea coast: the strategic Decision on Sand. The Dutch Government has embedded the Delta Decisions in its national policy, legislation and administrative agreements (Ministry of Infrastructure and the Environment, 2015).

A monitoring and evaluation framework for the Delta Programme

The publication of the *Delta Programme 2015* (specifying its goals, commitments, approach and available resources) marked the start of the implementation of the Delta Programme. Currently, a system is needed for monitoring and evaluation of the implementation as it progresses. The Delta Commissioner has requested PBL Netherlands Environmental Assessment Agency to develop a monitoring and evaluation framework for the Delta Programme, in collaboration with the University of Amsterdam and the Delft University of Technology.

They were asked to combine three perspectives in the framework design:

- *learning through collaboration* in a participatory environment;
- *adaptive management* for a timely response to changing circumstances;
- *shared accountability* to keep track of the implementation of the Delta Programme and verify where goals are being reached or where they may need to be revised, based on experience.

This report presents the design of a reflexive monitoring and evaluation framework for the Delta Programme, along with input for the anticipated challenges. The framework's design is based on monitoring and evaluation throughout the implementation process, and links the focus on learning with the focus on accountability. Reflexive monitoring and evaluation is understood to represent an approach in which parties jointly review monitoring results, survey and assess

changes in the implementation and the external environment of the Delta Programme, compare the results with the original assumptions and principles and, where warranted, adapt actions, working assumptions, and goals. Together, these components enable the timely adaptation of the Delta Programme's strategies and measures.

Keeping track of adaptation in the Dutch Delta

Designing a monitoring and evaluation framework

In accordance with its legally defined tasks, the Delta Commissioner's Office is responsible for the development of a system to monitor and evaluate the performance of the Delta Programme. In the *Delta Programme 2016*, this is referred to as the 'MWH system' (which stands for 'measuring–knowing–acting'). As a first step, the Delta Commissioner's Office requested PBL Netherlands Environmental Assessment Agency, the University of Amsterdam, and Delft University of Technology to develop a monitoring and evaluation framework for this MWH system. Development of this framework was coordinated by the MWH core team, consisting of participants from the Directorate General of Spatial Planning and Water Management (DGRW), Rijkswaterstaat (RWS), the Delta Commissioner's Office and PBL Netherlands Environmental Assessment Agency. Meetings were held with the MWH feedback group, formed by representatives from organisations dedicated to the national themes flood protection, freshwater supply and spatial adaptation, regional programmes, DGRW, RWS, and the Flood Protection Implementation Programme. Several umbrella organisations of decentralised authorities (provinces, municipalities, water boards) participated as non-attending members.

The following questions formed the starting point for the study:

- *What shape should a monitoring and evaluation framework for the Delta Programme take, if it is to allow stakeholders to keep track of progress, so they will know that implementation efforts are on the right track? What information, reflection, and forms of interaction are needed between the parties involved, in order to maintain confidence and support during implementation?*
- *Under what conditions can the implementation of such a monitoring and evaluation structure contribute to learning through practical collaboration, and to adaptive and integrated management in the delta community?*

Three perspectives

In response to the first question, a reflexive approach was chosen as the basis for the elaboration of a monitoring and evaluation framework. This approach is in line with the character of the Delta Programme, as is also explained below. The framework was developed from the three following starting points:

1. *learning through collaboration* in a participatory environment;
2. *adaptive management* methods that can respond swiftly to changing conditions;
3. *shared accountability* to keep track of the implementation of the Delta Programme, and to verify whether targets are being reached or should be revised, based on experience.

In answer to the second question, PBL formulated a series of specific recommendations for the development of the MWH system, focusing on both content (what to look at) and process (how to do that).

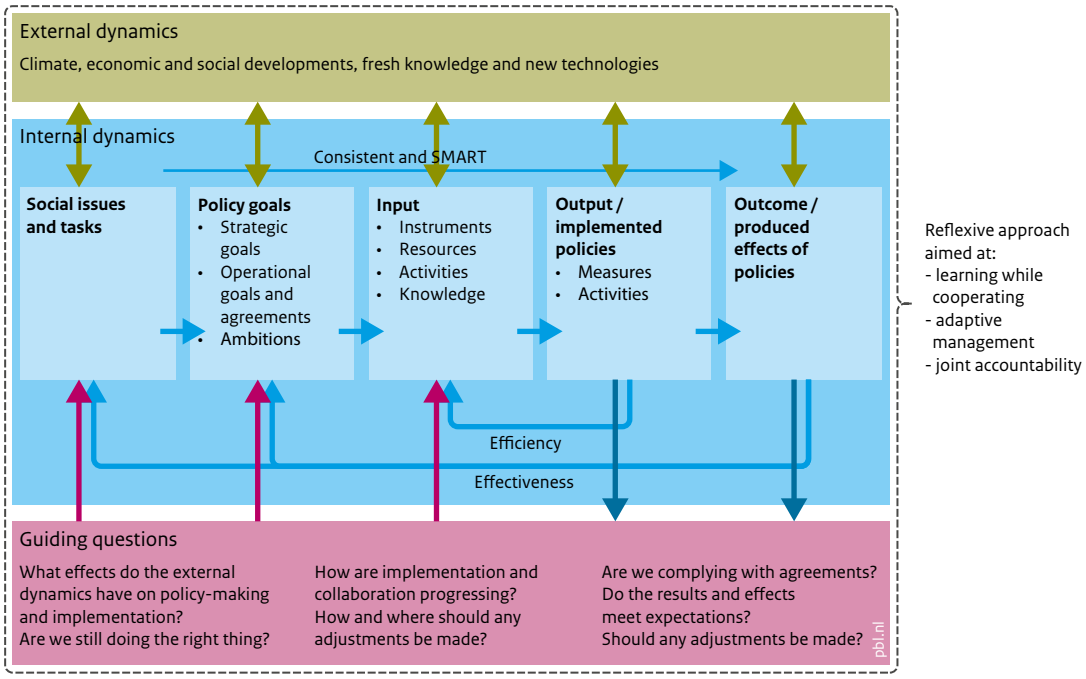
The added value of reflexive monitoring and evaluation

Reflexive monitoring and evaluation requires a joint effort by all stakeholders. This has the potential of improving the Delta Programme's policies during the implementation process, by engaging and feeding the energy and innovation drive of participating stakeholders. The design of a monitoring and evaluation framework based on the three perspectives mentioned above conforms to the following three features of the Delta Programme:

1. *The ambition of participation and integration*. This provides a starting point for learning through collaboration (the first perspective). A large number of stakeholders are involved in the Delta Programme. They take part in relation to the themes of flood risk management, freshwater supply, and spatial adaptation (Figure 1). For each theme, the government, provincial authorities, municipalities, water boards, private stakeholders, and social organisations all work together.

Figure 3

Conceptual framework for monitoring and evaluation of the Delta Programme based on a reflexive approach



Source: PBL

The reflexive approach applies to the entire process of learning while cooperating, adaptive management and joint accountability. Staying on course during implementation requires considerable insight into external and internal dynamics to enable a timely response to changes.

2. *The ambition of adaptive delta management*. This provides a framework for adaptive ways of operating (the second perspective). Reflection on targets, instruments and problems (policy theory), and their significance in the light of changing circumstances, are all part of adaptive management.
3. *The ambition of balancing learning and accountability*. This provides starting points for joint responsibility (the third perspective). On the one hand, accountability is crucial for the effectiveness and efficiency of the Delta Programme. On the other, the energetic delta community needs to be encouraged and supported during an implementation phase that remains open in important ways. This can be achieved by organising accountability as a learning process in which joint reflection is the main principle and interim results as treated as 'anchor points' that form a basis for decisions and adjustments.

The conceptual framework linking the three perspectives

The conceptual framework of this study is presented in Figure 3. The traditional policy chain is the basis for monitoring and systematically tracking the implementation progress as well as results.

An evaluation serves to confirm whether social requirements are being met as foreseen (effectiveness), using the resources available (efficiency). It may also serve to reflect on whether goals can be sustained and whether the assumptions underlying the adaptation strategy prove to be correct in practice.

Under adaptive delta management, monitoring and evaluation make it possible to adapt the implementation process as internal and external conditions change. The internal dynamics are derived from the implementation efforts and, therefore, cover the entire policy chain, as shown in Figure 3, as well as the experiences and reflections of stakeholders involved in this chain. The external dynamics are the result of external changes outside the policy system and, therefore, are depicted outside the policy chain area in Figure 2, while still interacting with it.

Reflexive monitoring and evaluation are shaped by bringing the three perspectives together within a set of guiding questions that steer the process, in light of the developing sense of the problem and of the goals. Questions concerning effectiveness (Are we doing the right thing?) go hand in hand with questions on learning

while cooperating (How are implementation and collaboration progressing?) and adaptive management (Are adjustments necessary?). Learning through collaboration, joint accountability, and adaptive management are made possible by the reflexive approach. In this way, the effort to balance learning and accountability becomes part of the implementation process, in the Delta Programme. In Figure 3, this is represented by the frame that surrounds the diagram. In practice, a reflexive approach of this kind requires clear agreements on the division of responsibilities and the organisation of monitoring and evaluation within the delta community.

Learning through collaboration

Principles

The interpretation of reflexive monitoring and evaluation arises from knowledge about learning, including that of policymakers. We distinguish three forms of learning: technical learning, social learning and the umbrella notion of systems learning.

Technical learning involves acquiring and exchanging data and knowledge, paired with critical debate on the process itself. It enlarges the knowledge base underlying policy choices and measures. Social learning develops through joint reflection on experience, results, and the consequences of actions taken. Such reflection may lead to practical adjustments or to strategic actions. It may also lead to the revision of the assumptions, principles, and values that underlie those actions. Organisational routines are the subject of reflection in systems learning, which addresses the questions of whether routines, standards, and procedures provide scope for learning and whether the organisational culture is sufficiently equipped to initiate and sustain learning. Reflecting on the organisational culture makes monitoring and evaluation itself both a vehicle to promote reflexivity within the Delta Programme and a practice that must itself be reflected upon.

Important conditions for learning through collaboration are an open attitude by the parties involved (curiosity about implementation progress and about how other people's roles and our own are shaping the process). Open reflection may provide insights into the questions of *where and how learning is taking place* and, importantly, where *large gaps* might exist and interfere with the exchange of knowledge and experiences and the reflection on these experiences.

An important starting point for organising knowledge sharing (technical learning) and social learning is that of having an overview of the knowledge network, including its main nodes and connections. For systems learning on an organisational level, a group of people is needed to take responsibility for organising the exchange of knowledge among various administrative bodies and to organise the setting needed for reflection on this knowledge and the related commitments. The efforts by such knowledge brokers may help initiate a knowledge network that can, potentially, coalesce into a 'Community of Practice' (CoP). A CoP is a form of cooperation in which experiences from (implementation) practice are shared, discussed, and debated among stakeholders in an effort to learn more about their own competences and those of others, and the factors that limit such competences. However, not all things can be anticipated; some will be discovered during the implementation process.
The development of such a CoP may be facilitated, among other things, by identifying and authorising knowledge brokers, by performing joint process evaluations, by designing an information system, and by drawing up informal rules for cooperation and knowledge exchange.

Efforts to reinforce the learning potential in the Delta Programme

Many networks and initiatives already exist around the thematic programmes of flood risk management, freshwater supply, and spatial adaptation. Focusing to a greater or lesser extent on technical and social learning, they include pilot projects on multilayered safety, exploration of the flood risk management programme beyond the level of the delta project, joint fact-finding processes in the freshwater theme, CoPs in the spatial adaptation theme, and partnerships such as the Action and Learning Alliance. Joint process evaluations are also being carried out, in which the parties involved review and seek to agree on how to shape the implementation process.

The Delta Programme has already scheduled process evaluations for the areas of fresh water (interim evaluation of water availability in 2018) and spatial adaptation (first in 2017 and then once every three years). In addition, a process evaluation is planned for Water and Space in 2017; it will to focus on integration, and particularly on the interaction between tasks concerning water and spatial planning. These process evaluations have scope for technical and social learning and for identifying successes or shortcomings in this area.

Systems learning, aimed at strengthening the learning capacity of the delta community as a whole, is not yet receiving explicit attention in the Delta Programme. Nor is there a structure in place for organised knowledge flows between themes, areas and regions. As a result, it is difficult to detect any gaps in knowledge exchange. Attention for monitoring and evaluation during the

implementation process may serve as a vehicle to reinforce the learning capacity in the Delta Programme. The following section deals with suggestions to promote systems learning.

Establishing a core group and appointing knowledge brokers to bridge the gap

Several initiatives already support technical learning and social learning by bringing people together along with their knowledge and experience within and between subjects and areas. A good example is the Delta Programme Knowledge Network. To complement the existing situation, an initiative is needed that serves as a bridge to systems learning. An interesting option would be that of a core group that functions as a bridge between the various programmes, on both national and regional levels (Figure 3). In the policy development phase of the Delta Programme, an important role was played by such a core group, which was disbanded during the transition towards implementation.

A core group for monitoring and evaluation could employ or be composed of knowledge brokers who occupy strategic positions in implementation networks that enable them to establish and safeguard key links in the CoP. Knowledge brokers might be responsible for collecting knowledge, for making it available, and for facilitating the sharing of experiences, allowing working professionals to reflect on its significance and to explore its implications for the distinct organisational setting in which they work. Representatives from thematic programmes and area programmes are among those who are in a position to create structural links between initiatives on regional and programme levels. Knowledge brokers may provide monitoring data on internal dynamics, over the course of policy implementation. Appointing knowledge brokers entrusted with formal tasks concerning monitoring and evaluation enable the construction of a knowledge network structure.
By setting up a core group and appointing knowledge brokers, the Delta Programme underlines the importance of monitoring and evaluation.

Developing an evaluation programme

A Community of Practice for monitoring and evaluation would benefit from a well-designed evaluation programme that includes a set of evaluations and sub-evaluations specifically geared to each other.
These evaluations will help to gain insight into the process and the collaboration and output of relevant implementation processes within the Delta Programme. They may include self-assessments (mainly focusing on processes) and recurring appraisals (mainly focusing on results) that relate to the individual agendas and requirements of the parties involved.

Several roles need to be fulfilled, in order to run an evaluation programme; for example, that of evaluators who are able to facilitate an open and adequate reflection process within the Delta Programme, and those with an independent outlook who can make a critical assessment of the need for adjustments and how these should be made.

Experience has shown that complications arise when both roles are fulfilled by the same individual, as they must try to balance being a coach, a facilitator and an advisor, as well as the more distant position of appraiser. Therefore, it might be advisable to limit such combinations of roles and give the core group and the knowledge brokers in the Delta Programme the task of providing guidance as coaches, facilitators and advisors. The role of appraiser could be assigned to independent evaluation specialists who provide periodical support. Such independent parties could collate and interpret the results of self-assessments. By separating the many different roles as much as possible, any tension between learning and accountability can be kept to a minimum.

Finally, it is important to secure the quality of the evaluation programme, as a whole, by designing self-assessments that include trust, cooperation, knowledge integration, and social stability, keeping in mind the right conditions for learning. External evaluation specialists with expertise on the subjects of reflexive monitoring, reflective dialogues, and evaluations, may help to facilitate development along this line. Another possibility is to consider involving outsider feedback groups representing administrative and/or social parties, who do not participate directly in the process, but do have affinity with the political and administrative dynamics of the Delta Programme.

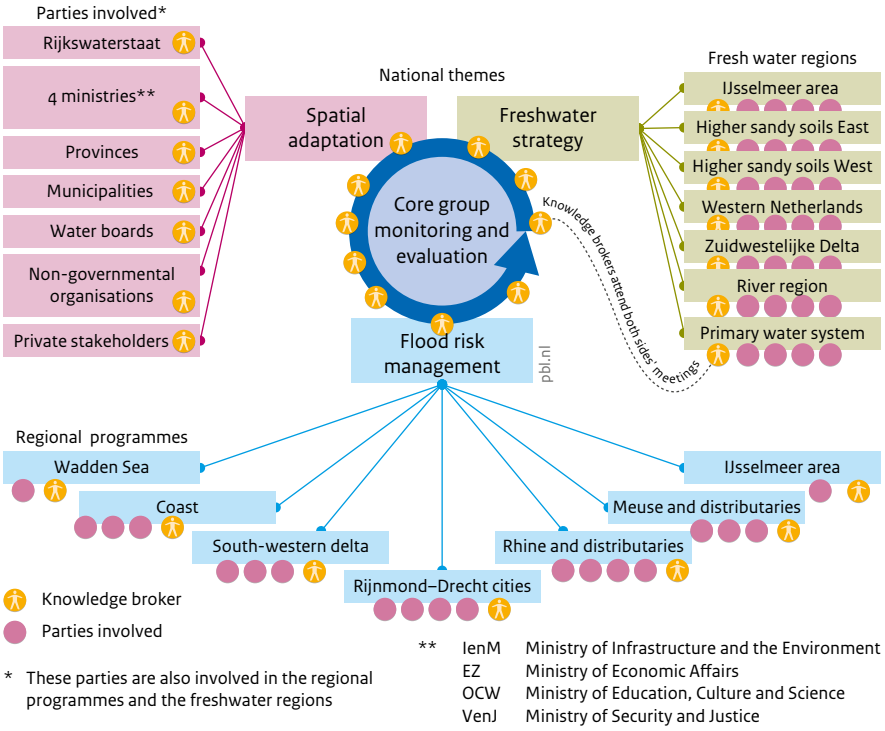
Adaptive management

Principles

We distinguish three aspects of adaptive management: acting in the light of uncertainty about the *external* and *internal dynamics* (Figure 3) and the search for *opportunities to link to other initiatives*. A reflexive approach towards monitoring and evaluation systematically dedicates attention to such uncertainties and opportunities.
The adaptive delta management system, with its preferred strategies and range of adjustment paths, makes it possible to reflect on policy implementation and the underlying assumptions and principles when faced with expected and unanticipated changes.

The external dynamics include the uncertainties outside the Delta Programme. Over the duration of the Delta Programme, new insights will be gained into climate

Figure 4
Position of the core group for monitoring and evaluation in the Delta Programme



Source: PBL

A core group for monitoring and evaluation, containing knowledge brokers who are team members or associates, may provide a powerful stimulus to systems learning in the Delta Programme. Knowledge brokers operating from within national thematic programmes and regional programmes can play an important role in the exchange of both knowledge and experience.

change, socio-economic developments, and the preferences of civil society; new knowledge and new technology will also become available. Information about these external dynamics will become available mainly through parties and bodies that operate outside the formal auspices of the Delta Programme, such as the Royal Netherlands Meteorological Institute (KNMI), the government policy assessment agencies CPB, SCP and PBL, universities, other knowledge institutes and engineering companies.

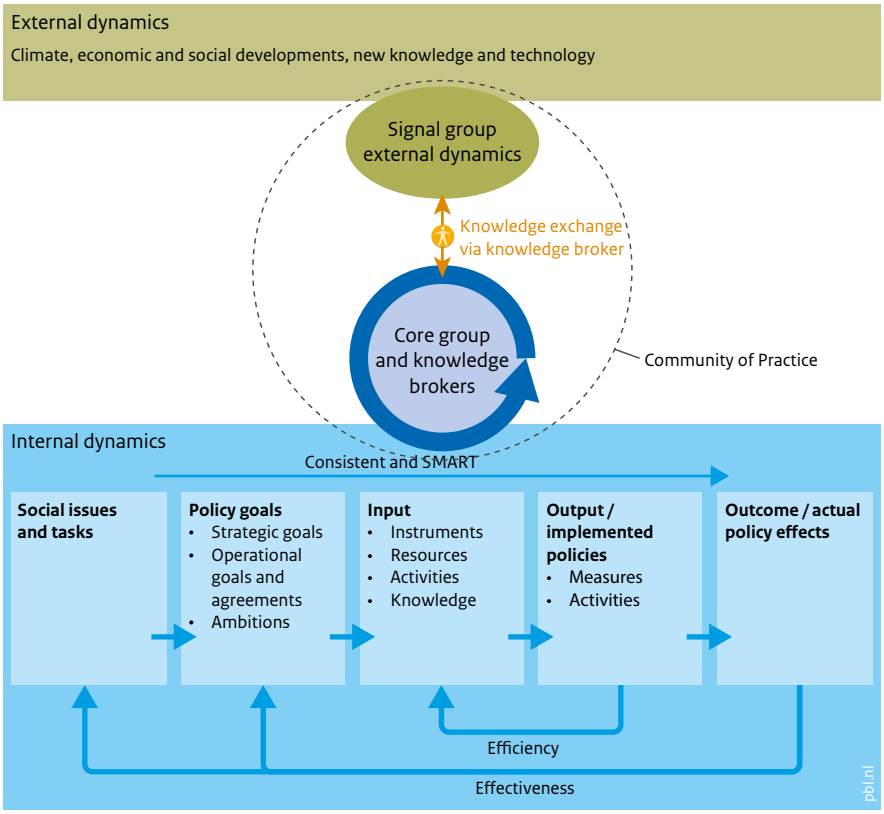
The internal dynamics encompass the processes within the Delta Programme and take into account insights from technical learning and, particularly, from social learning during the implementation of the Programme. Learning can lead to adjustments to the principles and values underlying the goals and instruments, and the way problems are framed (the policy theory). Technical learning can be driven by experiential knowledge gained during programme implementation and by targeted research linked to the Delta Programme. Social learning can be backed by insights into the dynamics of multi-actor operations and by reflection on the influence of administrative support in the regions and cooperation within programme themes and areas.

Devising a system to monitor internal and external dynamics

Our study suggests an approach of explicitly, and as much as possible, specifying the categories of uncertainty about external and internal dynamics and developing signposts within each category that signal and capture how these uncertainties evolve over time. To facilitate this, the full report provides the following categories of external dynamics: climate change, socio-economic developments, new knowledge, new technology and the dynamics of society. With regard to internal dynamics, we distinguished the following categories: unforeseen circumstances during implementation, experiential knowledge and innovation during implementation, the dynamics of multi-actor operations, and changing values and preferences.

Based on the signals related to the external dynamics, periodically, the need to make adjustments to the chosen adaptation path (the preferred strategy) or switching to

Figure 5
Signal group and core group in the Delta Programme



Source: PBL

Important positions for consolidation and the exchange of both knowledge and experience are those of the core group and the knowledge brokers who monitor and evaluate the implementation and internal dynamics of the Delta Programme, and the signal group 'external dynamics'. Well-organised interaction between the two is necessary to ensure relevant information about the external and internal dynamics is being fed into the monitoring and evaluation process, in an adequate and timely fashion.

another should be contemplated. For example, such adjustments would need to be made if climate change were to evolve in a currently unforeseen way, or at a faster rate than expected. The signals from internal dynamics can lead to adjustments to the implementation strategy.

Establishing a signal group 'external dynamics'

We suggest to create a signal group with the task to monitor and identify relevant signals outside the Delta Programme and analyse the possible consequences of the external dynamics for the Delta Programme (Figure 5). As mentioned, the signals outside the Delta Programme refer to new insights in climate change and its effects, new knowledge and technology, and economic, societal and political developments. The members of this group could work through internal knowledge brokers to stay in contact with the Delta Programme knowledge network and the proposed core group (Figure 4), which will play a pivotal role in joint learning about monitoring and evaluation. Adaptive management thus could be secured organisationally within the Delta Programme, in a structural and visible way.

Paying attention, early on, to opportunities for linking to other initiatives

The third aspect of adaptive management relates to the search for opportunities to create links between the objectives and implementation of the Delta Programme on the one hand, and the goals and implementation programmes of other parties, such as provincial authorities, municipalities, water boards, private parties and societal organisations, on the other.

To be able to link to other initiatives, at an early stage, parties must search for connections between their own and other actors' long-term ambitions and short-term goals. Stakeholders, thus, should be well aware of the

goals and long-term ambitions of their organisations, and ensure other parties are sufficiently informed, so that possible combinations with the goals and ambitions of the Delta Programme can be explored (see also Figure 6). Establishing these interactions and explorations is quite complicated in the early stages of the planning process. Therefore, an early overview is needed of the parties' time frames with respect to deciding on their long-term strategies and short- term investments, before they can address differences and find ways to unite competing goals and ambitions.

Shared accountability

Principles

Shared accountability means that the parties involved create an understanding of the extent to which implementation fits in with prior commitments and of how feasible it will be to achieve the Delta Programme's goals, in both the short and the long term. Should the implementation process be found to jeopardise the achievement of these goals, adjustments will need to be made.

This means that the goals must be specified as concretely as possible, and that the changes resulting from policy action must be mapped. In this way, changes can be assessed in the context of the goals and the ambitions expressed (effectiveness and efficiency), and the goals (and working assumptions) can be reflected on in light of the experience gained while acting on those goals (learning and adaptation). This produces the following anchor points for monitoring and evaluation:

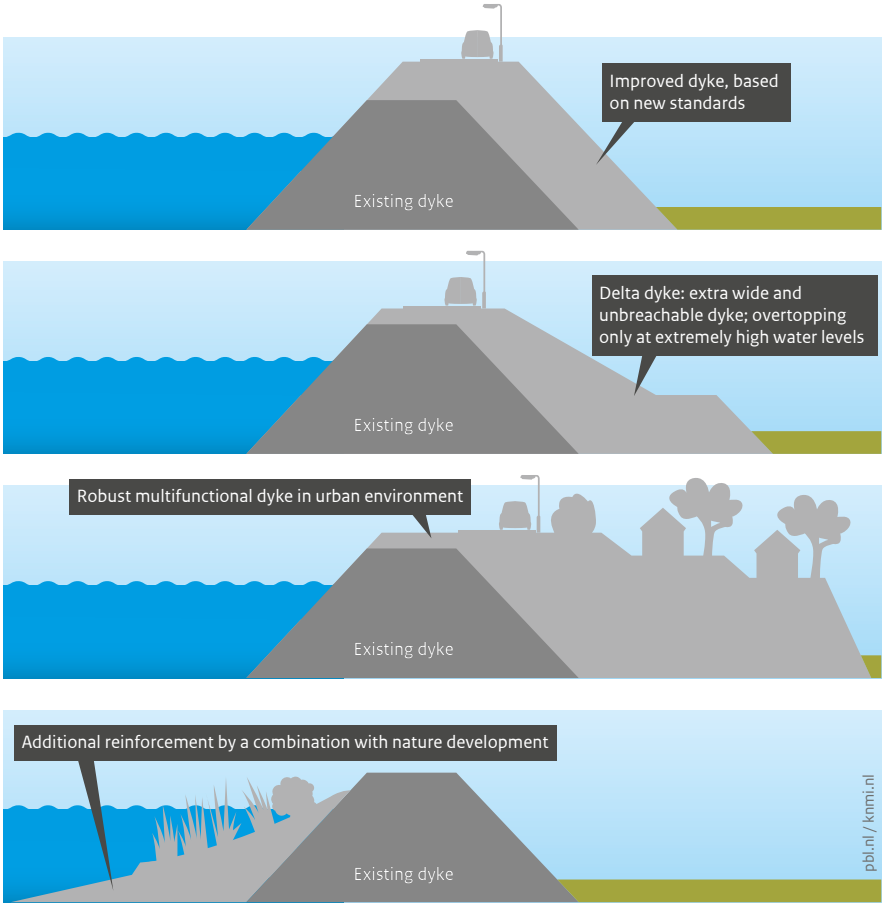
1. *Setting goals and principles*: Set monitoring and evaluation goals and principles in agreement with the formal documents underpinning the policy. If necessary, specify them further as the policy is elaborated.
2. *Determining input*: Determine the input required for implementation, in terms of instruments, capital, cooperation, and opportunities to link to other initiatives.
3. *Implementation progress*: Monitor the progress (output) through process agreements, physical measures, types of integration, links to other initiatives and expenditure (Are we on schedule and doing what was agreed on?).
4. *Implementation effects*: At regular intervals, provide overviews of the effects of policy action (outcomes) in terms of physical measures, types of integration, and links to other initiatives (What are the results of our efforts?). Use these overviews to indicate the effectiveness and efficiency of the measures used (Is what we are doing working, in light of the goals we have set? Are we using resources efficiently?).
5. *Remain adaptive*: Make an overview of the signals received on both external and internal dynamics that are relevant for judging the effectiveness and efficiency of implementation efforts, in both the short and the long term (Are we still doing the right thing? Is there a need to adjust?).
6. *Learning through collaboration*: Use the documentation of experience described above to reflect on goals and working assumptions. Do we still have the same goals and priorities? Do we still understand these goals in the same way? Did unexpected situations occur and where has experience led us to question and revise our assumptions? Such reflective paragraphs may help to draw out the lessons learned from implementation that are relevant to participatory and adaptive implementation of policies (How are execution and collaboration progressing? Where is there a need and scope for changes that express the learning that has occurred?).

Elaborating the goals and determining the reference situation

The starting point for shared accountability is that of the goals and agreements set forth in the *Delta Programme 2015*. These deal with the delta decisions, preferred strategies and the Delta plans for flood risk management and freshwater supply. Together, they include numerous process agreements and measures to be implemented.

The goals and agreements must be defined as clearly as possible, in terms of both their content and the relevant time frame. Without clear goals and clear agreements concerning ways to measure and assess how those are being achieved, it is not possible to adequately monitor the implementation of the Delta Programme and account for the efforts that have been undertaken. Moreover, it is not possible to test, develop or adapt these goals if they remain vague or ambiguous. For several of the thematic areas covered by the Delta Programme, clear goals and agreements have not yet been formulated. In the months ahead, the definition of these goals will be specified in more detail through a participatory process. Even if no further operational goals are formulated (e.g. for spatial adaptation), it is important to enter into agreements on how the strategic goal for the Netherlands (of creating a country that is adequately prepared to address the effects of climate change) could be measured and assessed using selected indicators. For this step, it is essential to determine the starting point: what is the reference situation against which the results of implementation efforts will be measured? Is that a scenario with no additional effort, one in which the maximum amount of effort is being applied, or one with only a moderate, additional effort? Working with such implementation scenarios can also stimulate technical

Figure 6
Basic types of dyke-reinforcement designs in the Netherlands



Source: PBL

Implementing the Delta Programme flood risk strategy in the Netherlands, millions of euros will be invested in dyke reinforcement, in the period up to 2050. The ambition is to combine these investments, where possible, with other plans and investments made by provinces, municipalities and private investors, in order to create more value. Developing a typology of different combinations and designs will provide a basis for joint reflection and discussion about the results during planning and implementation. This figure presents examples of four basic types of spatial design for dykes, which could be further elaborated.

and social learning, because they offer the opportunity to exchange views, ideas and knowledge from a variety of groups and organisations that have a stake in the Delta Programme. Expectations about the influence of external dynamics can also be included in the process.

As the implementation phase of the Delta Programme has only just begun, monitoring and evaluation of the impacts of physical measures are expected to be rather limited in the first few years. What they say about longer term effects will remain open for even longer. It is therefore important that, during the initial stages, sufficient attention is awarded to jointly elaborating goals and indicators, establishing the reference situation, developing alternative implementation scenarios (e.g. variants with limited, substantial or maximum effort) and monitoring and evaluating process agreements.

Developing a method for assessing integrated plans and projects

A major ambition of the Delta Programme is that of strengthening the interaction between water and spatial development by linking, where appropriate and possible, with the initiatives and plans of other regional and local parties during policy implementation. The underlying rationale is that combined investments can produce greater social value. The ambition applies to the areas of flood risk management, freshwater supply and spatial adaptation. It is crucial to produce an overview of the opportunities to link to other initiatives, at an early stage, so that advantage can be taken of actual possibilities. Then, agreements must be entered about how to assess the integrated plans and the realization in projects, and about how the results could be evaluated.

We suggest to develop within the Delta Programme a typology of integration reflecting relevant characteristics of the interaction between water and spatial quality. As an example we refer to a typology that has been developed within the national Flood Protection Programme, representing different combinations of flood protection structures and spatial development in river areas. It ranges from low-level integration (the standard dyke) to a highly advanced spatial integration of various functions that is applied when dykes are reinforced in certain locations (Figure 6). Such a typology can provide a basis for joint reflection and discussion about the results during the planning process and after the implementation process. For the river areas a basic typology is available as a starting point. For coastal areas and on the themes of freshwater supply and spatial adaptation, such typology is not yet available.

Devising a common format for reports

Given the range of themes and the large number of parties involved, an important condition for setting up an effective monitoring and evaluation system is that of having a common vision on the features to be monitored, on updating and reporting methods. Based on the considerations mentioned above, and in view of the design and goals specified in the *Delta Programme 2015*, the six anchor points relevant to monitoring and evaluation were used in developing a reporting format:

- Anchor point 1 (laying down goals and principles): Keep track of goals as they are specified initially, and when they are subsequently elaborated and adapted. Monitor these goals against the criteria 'in development/available' and 'significance for the implementation process'.
- Anchor point 2 (determining input): Track input that is important for implementation. These elements include instruments, knowledge and partnerships, exploration of opportunities to link to other initiatives, and the availability of the funding from the Delta Fund and other parties. This anchor point can also be monitored against the criteria 'in development/available' and 'significance for the implementation process'.
- Anchor point 3 (implementation progress): Track the output of process agreements, physical measures, types of integration, links to other initiatives and expenditures, all of which form a basis for considering whether adjustments in plans for implementation will be required.
- Anchor point 4 (implementation effects): follow the outcomes and the effectiveness and efficiency of implemented physical measures and of types of integration and types of links to other initiatives that have been put into practice. This provides the basis for considering whether adjustments to implementation are required.
- Anchor point 5 (remain adaptive): Keep track of the signals from the internal and external dynamics to assess whether adjustments are required to the implementation methods or to the strategy itself.
- Anchor point 6 (learning through collaboration): Reflect on implementation practices. Is there any evidence about practical measures needing adjustment? Is there any evidence of goals and/or priorities having changed or of working assumptions not fitting in with experience? Is there any evidence of the mode of cooperation needing adjustment itself?

These six anchor points can be used as a reporting format for the national themes of flood risk management, freshwater supply and spatial adaptation, as well as for the regional programmes and freshwater regions.

Common conditions: clear-cut division of responsibilities and transparent organisation

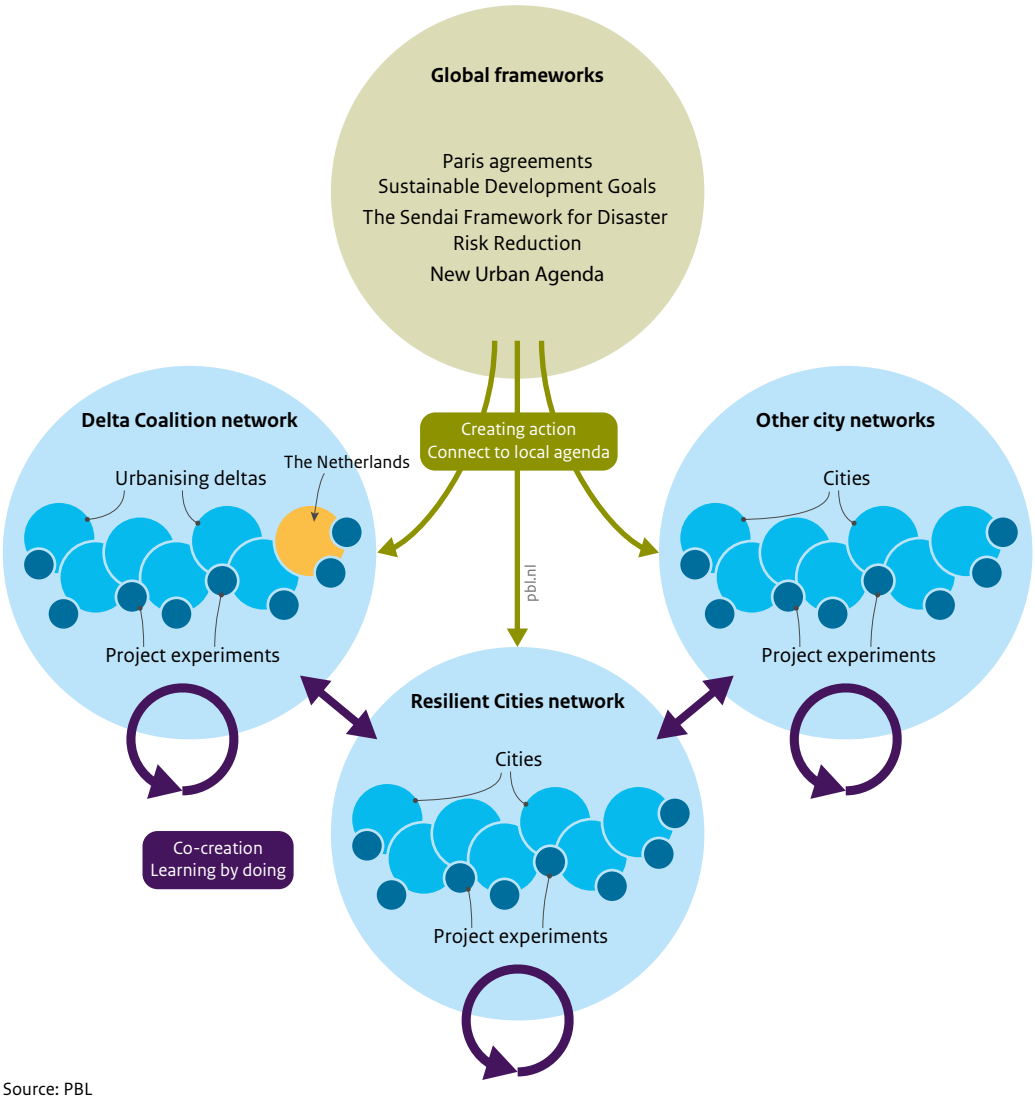
If the process of monitoring and evaluation is to be used as the basis for learning through cooperation, adaptive action and shared accountability, it is crucial that all the parties involved have a clear picture of the characteristics of the monitoring and evaluation process, as well as of how, and by whom, adjustment decisions will be taken. To this end, clear arrangements are required concerning:

1. the monitoring data to be gathered, and the party responsible for doing this;
2. who performs the analyses;
3. the availability of data, analyses and conclusions for the parties involved;
4. how reflection on the observations and analyses will be organised and about the party responsible for doing this;
5. how and by whom final decisions will be taken.

The core group referred to above, the knowledge brokers, and the external dynamics signal management group can each play an important role in working out the agreements in the Community of Practice to be created (Figure 5). From three perspectives, conditions have been specified that relate to effectiveness, reliability, transparency, and organisational flexibility:

- Paying attention to *effectiveness* offers the involved parties a proper balance between efforts made and results achieved.
- Paying attention to *reliability* ensures a clear and workable division of responsibilities and solid arrangements.
- Paying attention to *transparency* brings about easy access to data and information on all relevant subjects and at all stages of the process.

Figure 7
Learning networks: connecting global challenges to local strategies and projects



Source: PBL

Creating action: the experience in the Delta Programme with participative policy development and 'creating action' by joint decisions on the flood risk management strategy, freshwater strategy and spatial adaptation strategy, may be of value for comparable processes in other deltas, cities or networks. The Paris Agreement 2015, Sustainable Development Goals, the Sendai Framework for Disaster Risk Reduction and the New Urban Agenda, in combination with local challenges, provide the inspiration for goal setting, policy development and implementation of projects in cities and deltas. The exchange of both knowledge and experience in networks may foster fast learning in this creative participative process.

– Paying attention to *flexibility* ensures there will be enough room to adjust to specific requirements from the national themes or the regional programmes (Figure 2), and to make adjustments over time as the goals and requirements for monitoring and evaluation continue to evolve.

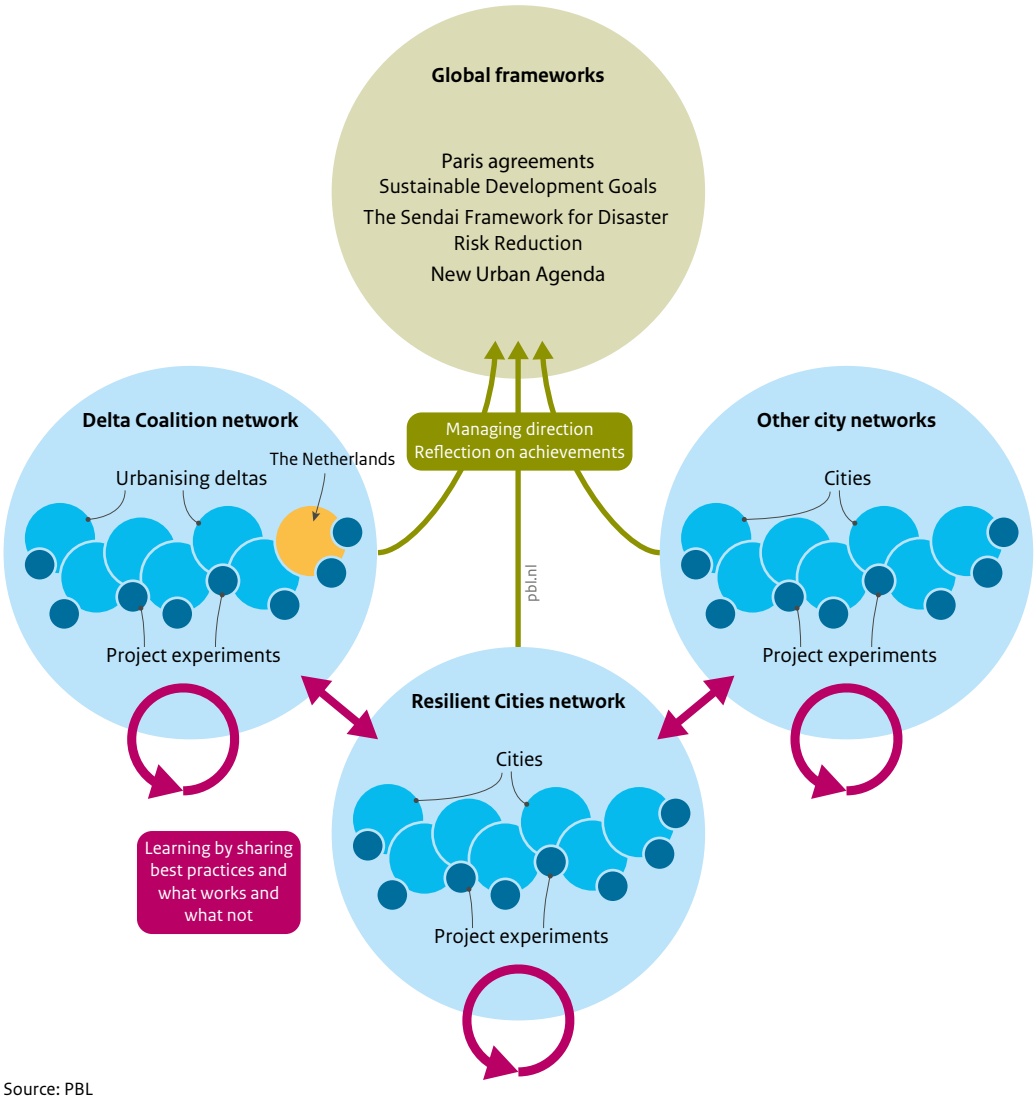
Tension may arise between learning and accountability as well as between public processes and efficiency. Such tension could be eased by making clear arrangements about the organisation of the monitoring and evaluation process and by organising a reflection process that would enable the parties involved to have a say.

Delta Programme in international perspective

Sustainable development, disaster risk reduction and adaptation to climate change have both global and local dimensions. The World Economic Forum, for instance, in their risk reports of 2015 and 2016, warns that water crises and the failure to adapt to climate change may destabilise the global economic system. But reducing the vulnerability of regions, countries and cities, following

Figure 8

Learning networks: joint reflection on local achievements and global challenges



Source: PBL

Managing Direction: the developed method for reflexive monitoring and evaluation of the implementation of the Delta Programme may be of value for comparable processes in other deltas, cities or networks. The strategic goals emerging from the Paris Agreement 2015, Sustainable Development Goals, the Sendai Framework for Disaster Risk Reduction, in combination with local goals, provide the direction. In each network, though, the monitoring and evaluation framework and organisation will need to be elaborated by the actors and stakeholders involved, and adjusted to the specific challenges and processes.

the road to sustainable development, and building resilient communities all require operations on several scales, ranging from river basins, to countries and cities or even neighbourhoods. On a global level, adoption of the Paris Agreement 20015, the sustainable development goals (SDGs), the Sendai framework on disaster risk reduction, and the New Urban Agenda all provide inspiration and direction for actors and communities operating on different scales (Figures 7 and 8). At the same time, following the globalising trend, city and delta networks are developed to stimulate collaboration and the exchange of both knowledge and experience between countries, deltas and cities. On a global level, UN organisations form important networks, and on lower levels, additional delta and city networks are being developed or already operational, such as the Delta Coalition, Delta Alliance, Delta Cities, ICLEI, 100 Resilient Cities and the Human Cities network.

The participatory, adaptive and integrated approach of the Delta Programme's policy development phase has drawn international attention. The participative approach

to delta planning, as developed in the Netherlands, is also being used in delta areas, such as those of Vietnam, Bangladesh and Myanmar (IenM, 2014). Together with Japan and Colombia, in 2015, the Netherlands also founded the already mentioned Delta Coalition. This collaborative initiative, on a government level, is aimed at sharing both knowledge and experience around water issues and the consequences of climate change in delta and coastal areas. Currently, 12 countries are participating in the Delta Coalition.

As shown by the Delta Programme, 'creating action' in such a complex participative environment requires a well-organised participative policy development phase, while 'managing direction' requires a reflexive approach in the implementation phase, involving the same actors and stakeholders as those participating in the policy development phase.

To date, little experience has been gained in monitoring and evaluation approaches to these issues, according to recent surveys held by several organisations, such as the European Environment Agency (EEA), The Organisation for Economic Co-operation and Development (OECD) and PBL Netherlands Environmental Assessment Agency (see EEA, 2014; OECD, 2014; PBL, 2014).

The implementation phase of the Delta Programme has only just begun. Therefore, possibilities for monitoring and evaluation for are still limited. However, at this point in time, it is very important to focus on joint efforts to further develop the monitoring and evaluation system and organisation for 'managing direction' within the Delta Programme.

Working together in cities, deltas, countries and networks on sustainable development and adaptation involves challenges that are similar to those of working together in the Delta Programme in the Dutch delta. Many actors and stakeholders participate, and there is a need for joint development of long-term strategies, defining short-term goals and opportunities, designing adequate implementation strategies, and ways of monitoring good intentions and the right direction; what are the achievements of all the efforts, acknowledging both local challenges and global strategic goals. Both the experiences with the participative policy development creating action and the reflexive approach for managing direction in the implementation, may be relevant for the development of monitoring and evaluation activities in other countries and deltas, and in city and delta networks, where many stakeholders are involved and where the exchange of knowledge and experience is at the heart of the joint ambition towards more sustainable development. Sharing the experience gained during the Delta Programme with international networks, such as the Delta Coalition, may stimulate and contribute to the set-up of integral, participatory and adaptive monitoring and evaluation processes within and between countries and deltas.

References

Argyris C. (1992). On Organizational Learning. Blackwell Publ., Cambridge, Massachusetts.

Argyris, C. & D.A. Schön (1996), Organizational Learning II. Theory, Method, and Practice. Addison-Wesley Publishing Company, Reading, Massachusetts.

Arkesteijn M, Van Mierlo B and Leeuwis C. (2015). 'The need for reflexive evaluation approaches in development cooperation'. Evaluation 21(1) 99–115.

Burt RS. (1992). Structural Holes. Cambridge, Mass.: Harvard University Press.

Crabbé A, Gysen J and Leroy P. (2006). Vademecum mileiubeleidsevaluatie, Brugge: Van den Broele.

CPB and PBL (2015). Toekomstverkenning Welvaart en Leefomgeving. Nederland in 2030 en 2050:Twee referentiescenario's. PBL Netherlands Environmental Assessment Agency and CPB Netherlands Bureau for Economic Policy Analysis.

De Bruijn H. (2007). Managing performance in the public sector. Second edition. Routledge, London.

Delta Programme (2011). Working on the delta. Investing in a safe and attractive Netherlands, now and in the future. Dutch Ministry of Infrastructure and the Environment & Ministry of Economic Affairs, The Hague.

Delta Programme (2015). Working on the delta. The decissions to keep the Netherlands safe and liveable. Dutch Ministry of Infrastructure and the Environment & Ministry of Economic Affairs, The Hague.

Delta Programme (2016). Working on the delta. And now we are starting for real. Dutch Ministry of Infrastructure and the Environment & Ministry of Economic Affairs, The Hague.

Deltares, KNMI, PBL, CPB and LEI Wageningen UR (2013). Deltascenario's voor 2050 en 2100. Nadere uitwerking 2012-2013. Deltares, Delft.

Deltares (2016). Knikpunt in zicht: op zoek naar signalen voor tijdige adaptatie. Een 'indicatoren & drempelwaarden' benadering ten behoeve van de implementatie van Adaptief Deltamanagement in het Deltaprogramma Zoetwater. Rapportnr. 1220104-005. Deltares, Delft.

Deltares, KNMI and PBL (2016). Verkenning actualiteit Deltascenario's. Note, April 2016. Deltares, Delft.

Dewar JA, Builder CH, Hix WM and Levin MH. (1993). Assumption-Based Planning. A planning tool for very uncertain times. RAND Report MR-114-A. Santa Monica, CA: RAND.

Edelenbos J and Van Buuren A. (2005). 'The learning evaluation. A theoretical and empirical exploration'. Evaluation Review, 29, 591–612.

EEA (2014). National adaptation policy processes in European countries – 2014. European Environment Agency, Copenhagen. http://www.eea.europa.eu/publications/national-adaptation-policy-processes.

Friedman VJ. (2001). 'Designed blindness. An action science perspective on program theory evaluation'. American Journal of Evaluation, 22(2), 161–181.

Functowicz SJ and Ravetz R. (1993). 'Science for the Post-Normal Age'. Futures 25(7), pp.739–756.

GIZ/IISD (2014). Monitoring and Evaluating Adaptation at Aggregated Levels: A Comparative Analysis of Ten Systems. Publication authors: Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH and International Institute for Sustainable Development.

Haasnoot M, Van Deursen W, Middelkoop H, Van Beek E and Wijermans N. (2012). 'An integrated assessment Metamodel for developing adaption pathways for the Rhine Delta in the Netherlands'. In: International Environmental Modelling and Software Society (iEMSs), 2012-07-01 – 2012-07-05, Leipzig, Germany (pp. 1743–1751).

Haasnoot M, Kwakkel JH, Walker WE and Ter Maat J. (2013). 'Dynamic adaptive policy pathways: A method for crafting robust decisions for a deeply uncertain world'. Global Environmental Change 23, 485–498.

Hay C and Wincott D. (1998). 'Structure, agency and historic institutionalism'. Political Studies, 46: 951–7.

Hermans LM, Haasnoot M and Kwakkel JH. (2014). 'Next stop, implementation: collaborative monitoring to inform adaptive policy-making and implementation'. In: A. Castellarin, S. Ceola, E. Toth & A. Montanari (eds.), Evolving Water Resources Systems: Understanding, Predicting and Managing Water-Society Interactions. Proceedings of ICWRS2014, Bologna, Italy, June 2014 (IAHS Publication 364). Pp. 374–379.

Hermans L, Naber A and Ruijgh-van der Ploeg T. (2016). Monitoren en Evalueren ten behoeve van leren voor Adaptief Deltamanagement. Delft University of Technology, Delft.

Hertting N and Vedung E. (2012). 'Purposes and criteria in network governance evaluation: How far does standard evaluation vocabulary takes us?' Evaluation 18(1): 27–46.

IenM (2014). Ontwerp Nationaal Waterplan 2016-2021. Dutch Ministry of Infrastructure and the Environment & Ministry of Economic Affairs, The Hague.
IenM, UvW, Vewin and VNG (2011). Bestuursakkoord water. Dutch Ministry of Infrastructure and the Environment, https://www.rijksoverheid.nl/documenten/rapporten/2011/06/07/bestuursakkoord-water.
Jorissen R. (2015). 'Meekoppelen met het HWBP'. Presentation Hoogwaterbeschermingsprogramma (high water level protection programme), 21 September 2015.
Klostermann J, Van de Sandt K, Harley M, Hilden M, Leiter T, Van Minnen JG, Pieterse N and Van Bree L. (2015). Towards a framework to assess, compare and develop monitoring and evaluation of climate change adaptation in Europe. Mitig Adapt Strateg Glob Change DOI 10.1007/s11027-015-9678-4 http://link.springer.com/article/10.1007/s11027-015-9678-4#/page-1.
KNMI (2014). KNMI'14-klimaatscenario's voor Nederland. Leidraad voor professionals in klimaatadaptatie. Royal Netherlands Meteorological Institute (KNMI), De Bilt.
Laws D and LoeberA. (2011). 'Sustainable Development and Professional Practice: Dilemmas of action and strategies for coping'. Engineering Sustainability, Special Issue on Human Dimensions of Engineering Sustainability, 164 (ES1): 25–33.
Lindblom CE. (1990). Inquiry and Change. The Troubled Attempt to Understand and Shape Society. New Haven: Yale University Press.
Ligtvoet W, Kunseler E, Franken R, Loeber A, Laws D, Hermans L, Naber A and Ruigh-van der Ploeg T. (2016). Koers houden in de delta. Ontwerp van een monitorings- en evaluatiekader voor het Deltaprogramma. PBL Netherlands Environmental Assessment Agency, The Hague.
Loeber A and Laws D. (2016). Samenwerkend leren. Participatie en leren als basis voor monitoring en evaluatie in het Deltaprogramma. Amsterdam: University of Amsterdam.
NSOB and PBL (2014). Leren door doen. Overheidsparticipatie in een energieke samenleving. Netherlands School of Public Administration (NSOB) & PBL Netherlands Environmental Assessment Agency, The Hague.
OECD (2014). Monitoring and Evaluation of Climate Change Adaptation. OECD Environment Working Paper No. 74, Paris. http://www.oecd-ilibrary.org/environment/monitoring-and-evaluation-of-climate-change-adaptation_5jxrclrontjd-en.
PBL (2015). Ontwerp voor een nationale adaptatiemonitor. Een monitorings- en evaluatiesysteem voor de Nationale Adaptatie Strategie. PBL Netherlands Environmental Assessment Agency, The Hague.
Regeer BJ, De Wildt-Liesveld R, Van Mierlo B and Bunders JFG. (2016). 'Exploring ways to reconcile accountability and learning in the evaluation of niche experiments'. Evaluation (22)1: 6–28.
RHDHV (2011). Lerend evalueren. Reflecteren, leren en verbeteren. Strategiereeks nr.5. Royal Haskoning SMC – Strategy and Management Consultants.
RHDHV (2013). Quick Scan Datamanagement in het Deltaprogramma. Jan Baltissen and Aris Witteborg, by order of Rijkswaterstaat DID, February 2013.
Rhodes RAW. (1997). Understanding governance: policy networks, governance, reflexivity and accountability, Maidenhead (UK), Philadelphia (US), Open University Press.
RVW (2009). Witte zwanen, zwarte zwanen. Advies over proactieve adaptatie aan klimaatverandering. [former] Dutch Council for Transport and Water Management, June 2009.
Sabel C. (1993). 'Constitutional Ordering in Historical Context'. In: F.W. Scharpf (ed.), Games in Hierarchies and Networks. Boulder: Westview Press, pp. 65–123.
Schön DA. (1983). The Reflective Practitioner: How professionals think in action. Basic Books, New York.
Staatscourant (2014). Regeling van de minister van Financiën van 15 augustus 2014 houdende regels voor periodiek evaluatieonderzoek (Regeling Periodiek Evaluatieonderzoek); No. 27142.
Taleb NN. (2010). The Black Swan. The Impact of the Highly Improbable. Revised Edition. Penguin Books, London.
UKCIP (2014). Monitoring & evaluation for climate change adaptation and resilience: A synthesis of tools, frameworks and approaches. Oxford (UK), http://www.seachangecop.org/node/3258.
Van Buuren A and Teisman GR. (2014). Samen verder werken aan de delta: de governance van het nationaal Deltaprogramma na 2014, Erasmus University, Rotterdam. With contributions by J. Verkerk and M. Eldering.
Van Herk S. (2014) Delivering integrated Flood Risk Management. Governance for collaboration, learning and adaptation. Delft University of Technology, Delft.
Van de Kerkhof M and Wieczorek A. (2005). 'Learning and stakeholder participation in transition processes towards sustainability: Methodological considerations'. Technological Forecasting and Social Change, 72(6), 733–747.
Van Rhee G. (2012). Handreiking Adaptief Deltamanagement. By order of the Deltacommissaris. Stratelligence, Leiden.
Van Thiel S and Leeuw FL. (2002). 'The Performance Paradox in the Public Sector'. Public Performance & Management Review 25 (3): 267–281.

Wenger E. (1998). Communities of Practice. Learning, Meaning, and Identity. Cambridge University Press, Cambridge.
Wildavksy A. (1987). Speaking Truth to Power. The Art and Craft of Policy Analysis. Second edition. Third printing, 1992. New Brunswick, NJ: Transaction Publishers.
World Economic Forum (2015). Global Risks 2015. World Economic Forum, Geneva.
World Economic Forum (2016). Global Risks 2016. World Economic Forum, Geneva.

PBL Netherlands Environmental Assessment Agency

Mailing address
PO Box 30314
2500 GH The Hague
The Netherlands

www.pbl.nl/en

November 2016