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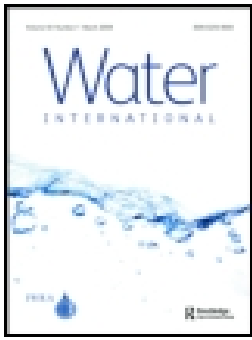
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Strategies for climate change adaptation: lessons learnt from long-term planning in the Netherlands and Bangladesh

Jos van Alphen^a, Jaap de Heer ^b and Ellen Minkman ^c

^aDutch Delta Commissioner, The Hague, the Netherlands; ^bTwynstra Gudde Holding B.V, Amersfoort, the Netherlands; ^cFaculty of Technology, Policy and Management, Technical University Delft, Delft, the Netherlands

ABSTRACT

This paper evaluates long-term climate change adaptation strategies in the Netherlands and Bangladesh using the Organisation for Economic Co-operation and Development's (OECD) Principles of Good Water Governance. Deltas face complex challenges, and adequate long-term planning is essential for these regions. However, experience with these long-term planning efforts and linkages with theoretical frameworks on water-related policy and strategy development remain limited. Both countries politically approved significant investment portfolios for a durable adaptive strategy. This paper highlights the similarities and differences in the resulting strategies. Using the learning assessment methodology, we propose to add risk-based approaches and long-term strategic perspectives as additional OECD Principles in the conclusion.

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Climate adaptation; water governance; long-term planning; the Netherlands; Bangladesh

Introduction

Deltas are geomorphological areas situated in the transitional zone between the marine and riverine environments and largely defined by their flat low-lying surface form. Low-lying delta areas derive their special and dynamic character by the ongoing interaction between the supply of fresh water, sediment and nutrients by the rivers and tidal dynamics and salt intrusion from the sea. Deltas have always been attractive places to live, resulting in a concentration of people and business centres in delta cities. Nowadays, deltas face multiple and complex challenges, including rapid population growth, loss of ecosystems, land subsidence and salt intrusion, which are aggravated by climate change. When insufficiently addressed, the risks of property damage, economic loss and human casualties increase (Ahmed & Suphachalasai, 2014). Existing planning practices are focused on the short to medium terms, while addressing present and future challenges of urban deltas requires a perspective of multiple decades to accommodate for climate change and tailor future developments to changing circumstances. However, these long timescales also entail uncertainty about future conditions, design of interventions and development pathways, posing challenges to policymakers and planners. Moreover, adequate planning also requires solid institutional arrangements, continued funding

and stakeholder commitment. Long-term planning in urban deltas thereby entails dealing with the uncertainty related to climate change induced threats.

A promising approach for such long-term planning is adaptive delta management (ADM). To date, ADM has been applied in a limited set of cases (Bloemen et al., 2018, 2019) and existing studies were mainly *ex ante* assessments of its potential value (e.g., Dewulf & Termeer, 2015; Zevenbergen et al., 2018), descriptions of ADM policies (Van Alphen, 2016); or *ex post* evaluations of a particular project implemented under the ADM flag, such as the (hydrological) suitability of de-poldering in the Netherlands (Van Staveren et al., 2014). However, no blueprint exists and as such:

ADM is not an approach that can be transferred easily from one country to another as it demands a fundamental change in institutional capacity at multiple levels including new knowledge and skills, relationships and policy frameworks, and, hence, depends on the local socio-economic characteristics, culture and governance. (Zevenbergen et al., 2018, p. 299)

ADM needs to be tailored to fit existing institutions (e.g., Minkman & Van Buuren, 2019), but the question remains how to introduce and develop the principles of ADM into an existing planning practice with its institutional arrangements and governance modes. This paper therefore explores how a long-term adaptive planning approach, indicated as ADM, can be institutionalized by examining two well-documented examples of ADM in the Netherlands and Bangladesh. In addition, we investigate whether the present international frameworks in the field of water management (notably the Organisation for Economic Co-operation and Development's (OECD) Principles on Water Governance) can adequately account for the future challenges of deltas and, if not, how they can be improved.

The remainder of the paper is structured as follows. It will next present a more detailed account of ADM and the OECD Principles on Water Governance as an analytical framework. The third section highlights how we used participant observations to reflect on the process of introducing and integrating ADM in planning practices. The fourth and fifth sections explore how the ADM approach is adopted in both cases and they reflect on that process from the theoretical frameworks on the OECD Principles. The paper concludes with drawn lessons for introducing ADM and suggests extending the OECD Principles with risk-based approaches and long-term perspectives.

Theoretical framework: a holistic approach to water management

For the existence of delta countries, adequate planning and water management are vital. At the start of this century, international organizations and national governments embraced integrated water resource management (IWRM). This novel approach 'promotes the coordinated development and management of water, land, environmental and related resources, in order to maximize the economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems' (GWP 2000, as cited in Allouche, 2016, p. 412). IWRM-based policies and measures thus focus primarily on the management of water resources, meaning that IWRM cannot fully account for climate change adaptation. Climate change is likely to increase the frequency, intensity, extent and impact of extreme event disasters. Although its precise impact on societies is

still highly uncertain, climate change already now affects water management in terms of floods, droughts and sea-level rise. This uncertainty challenges deciding on strategic investments in water-related infrastructure, spatial planning and land use as well as making these, often large, investments future-proof. Thus, this requires a much broader, more holistic and, by consequence, multi-sectoral and multi-stakeholder scope. ADM is such a holistic, long-term approach.

Adaptive delta management (ADM)

Strategies (and their related measures) have a design lifetime and might be no longer suitable when conditions change and additional or different measures may be needed to achieve the desired objectives. ADM broadens the scope of IWRM practices with methodology and tools to manage future uncertainty regarding the planning and design of future delta-related strategies and investments. Scenarios describe several narratives of possible futures regarding external, and thus hard-to-influence, conditions, such as climate or socioeconomic development. As such, scenarios act as a framework for the development of a range of strategy pathways. Specific threshold conditions or emerging trigger points determine when to change from one strategy to another (Kwadijk et al., 2010). Adaptive strategies try to avoid ‘lock in’ and ‘pathway dependency’ by maintaining the option to take future measures when necessary (Delta Commissioner, 2010, 2012; Marchand & Ludwig, 2014; Van Rhee, 2012).

ADM proposes a holistic approach, which requires the alignment of policy and investments in different sectors (e.g., water, land use and disaster management). Authorities at different government levels jointly explore different pathways, use scenarios to evaluate these pathways and design an adaptive plan. Such plans will consist of short-term actions with direct impact, long-term strategic options and a related research agenda. The decision to take the next step of a pathway or plan adjustment is based on the monitoring of signals of tipping points (Haasnoot et al., 2013). For example, while a traditional response to sea-level rise would involve heavy investments in structural measures, an adaptive strategy may consist of beach nourishments, which are intensified or reconsidered only when sea-level rise exceeds a certain threshold (e.g., 10 mm/year). Hence, ADM requires continuity in institutions that are responsible for the planning, implementation, maintenance, monitoring and evaluation tasks. The principles of ADM are summarized in Table 1.

Table 1. Principles of adaptive delta management (ADM).

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- (1) Adopt a long-term approach, including a vision, scenarios and adaptive strategies to manage future uncertainties and to connect short-term decisions with long-term objectives
 - (2) Perform a holistic delta analysis of the issues, challenges and knowledge gaps with an awareness of the need for multi-sectoral planning and stakeholder involvement; explore opportunities for linkages between (public and private) investment agendas on different sectors, levels and stakeholders
 - (3) Arrange institutionalized ownership and stimulate coherence
 - (4) Guarantee progress and financial and institutional continuity of implementation and updating
-

Sources: Based on De Heer and Aartsen (2019); and Bloemen et al. (2019).

OECD Principles on Water Governance as an analytical tool

Due to large diversity between and even within countries, there is no one-size-fits-all solution to water and climate challenges (OECD, 2014, 2015). The interdisciplinary nature of climate change adaptation requires the involvement of multiple authorities and stakeholders. Coping with current and future challenges requires robust public policy and strategy-making, which includes the identification of measurable objectives in predetermined time schedules at the appropriate scale, a clear task division among responsible authorities, and regular monitoring and evaluation (OECD, 2015). In short, governance should adhere to a set of basic principles, and be customized to site-specific water challenges and socioeconomic conditions.

The OECD Principles on Water Governance (OECD, 2015) (Table 2) contribute to these tangible and outcome-oriented public policies. Although several frameworks have been developed by policymakers, advisors and scientists, the OECD Principles have been embraced by both scientists and practitioners (Neto et al., 2018), based on three mutually reinforcing and complementary dimensions of water governance: effectiveness, efficiency, and trust and engagement. Effectiveness refers to ‘the contribution of governance to define clear sustainable water policy goals and targets at all levels of government, to implement those policy goals, and to meet expected targets’, while efficiency denotes ‘the contribution of governance to maximize the benefits of sustainable water management and welfare at the least cost to society’. Finally, trust and engagement means ‘the contribution of governance to building public confidence and ensuring inclusiveness of stakeholders through democratic legitimacy and fairness for society at large’ (OECD, 2015, p. 3). The OECD Principles facilitate the development of ‘good water governance’, thereby acknowledging there is a wide range of options to anticipate water and climate-related challenges. These principles further allow for reflexive learning, whereby training

Table 2. OECD Principles on Water Governance.

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- (1) Allocate and distinguish the roles and responsibilities for water management and foster co-ordination across these responsible authorities;
 - (2) Manage water at the appropriate scale(s) [...] to reflect local conditions, and foster co-ordination between the different scales;
 - (3) Encourage policy coherence through effective cross-sectoral co-ordination, especially between policies for water and the environment, [...] agriculture, spatial planning and land use;
 - (4) Adapt the level of capacity of responsible authorities to the complexity of water challenges to be met, and to the set of competencies required to carry out their duties;
 - (5) Produce, update, and share timely, consistent, comparable and policy-relevant water and water-related data and information, and use it to guide, assess and improve water policy;
 - (6) Ensure that governance arrangements help mobilize water finance and allocate financial resources in an efficient, transparent and timely manner;
 - (7) Ensure that sound water management regulatory frameworks are effectively implemented and enforced in pursuit of the public interest;
 - (8) Promote the adoption and implementation of innovative water governance practices across responsible authorities, levels of government and relevant stakeholders;
 - (9) Mainstream integrity and transparency practices across water policies, water institutions and water governance frameworks for greater accountability and trust in decision-making;
 - (10) Promote stakeholder engagement for informed and outcome-oriented contributions to water policy design and implementation;
 - (11) Encourage water governance frameworks that help manage trade-offs across water users, rural and urban areas, and generations
 - (12) Promote regular monitoring and evaluation of water policy and governance where appropriate, share the results with the public and make adjustments when needed
-

Source: OECD (2015).

and real-life action are combined to break through existing paths to strengthen governance approaches (Seijger et al., 2018). Overall, the OECD Principles can be used to design water governance structures as well as evaluate existing frameworks. In this paper we will do the latter by evaluating the application of ADM in Bangladesh and the Netherlands with reference to these OECD Principles.

Methodology

This paper presents the experiences with the implementation of ADM principles in the Netherlands and Bangladesh. These cases were selected because they are, to our knowledge, the only two examples where these principles transformed nationwide delta management and penetrated to the core governance system. We analyse, on an equal level, how different organizations in both countries managed to develop adaptive strategies, built institutional frameworks that are necessary for successful implementation and fitted these in their respective settings.

This analysis was performed using the OECD Principles, following the learning assessment methodology to analyse water programmes as developed by Seijger et al. (2018). This method consists of four steps, starting with a problem definition for the assessment, including objectives and focus. Here, the scope of the analysis concerns the governance of the Dutch Delta Programme and Bangladesh Delta Plan 2100, as described in detail in the fourth section.

The second step is to assess the governance of these programmes according to the OECD Principles. Detailed, inside knowledge of the process is needed to analyse the application of ADM in these two cases. Reconstructing this process in retrospect by external researchers is therefore challenging. To overcome these challenges, a specific type of action research was applied, whereby the first two authors introspectively scrutinized the process in which they had participated from their role as practitioners. They participated in the process of preparing these plans in the Netherlands and Bangladesh from the early start until approval and start-up of implementation. In the Netherlands this occurred between 2010 and 2014, and in Bangladesh between 2014 and 2018. Presently (2021) they are involved in the implementation (the Netherlands) or the start of implementation (Bangladesh) of these plans. Besides their practical involvement, both authors regularly exchanged experiences and critically reflected on their mutual challenges during this process. This was done in one-on-one sessions and in meetings with other experts from the Netherlands or Bangladesh. Following the approach of Neto et al. (2018, p. 63), we assessed alignment with the OECD Principles in the objectives, implementation, on the ground results and policy impact, and scored them with a Likert-scale ranging from 1 to 5 (Appendix Table B1). Neto et al. (2018) studied the OECD Principles on Water Governance and assessed several applications. In this contribution we add the assessment for the Netherlands and Bangladesh. Two challenges were encountered in applying this framework. First, both delta plans have a time horizon until 2100. Implementation and on-the-ground results, but especially policy impact, cannot be fully evaluated yet. Second, the Dutch Delta Programme was established some five years before the Bangladesh Delta Plan, preventing a one-on-one comparison. We have addressed both issues by placing an emphasis on alignment and implementation

in our analysis. In addition, we have stretched the interpretation of implementation by also including preparations to and intentions for implementation.

The third step is external validation. For this purpose, we involved a third author who specialized in policy transfer of ADM from the Netherlands to Asian countries. She was involved in order to reflect on these experiences from an external point of view. The results of this step are described in the fifth section. The fourth and final step is to systematically reflect on the lessons learnt (see the sixth section).

Results

Delta challenges in the Netherlands

The Netherlands is situated in the deltas of the transboundary rivers Rhine, Meuse and Scheldt. More than half the territory is flood-prone, mainly due to storm surges at sea or high water levels in the rivers. The western part of the country consists of polder systems, located several metres below the main sea level. Until the 1950s, floods regularly caused widespread damage and fatalities. Dams were then constructed to reduce the coastline's length by closing-off estuaries and high flood-protection standards (up to 1/10,000 - per year) were established (Van Alphen, 2016). In addition, a strong water-related decentralized governance system developed, with effective regional and national water authorities, well-equipped knowledge institutes and innovative private parties, supported by adequate funding and legislation. As a result, the Dutch delta is well protected against floods (OECD, 2014). Climate change now introduces new challenges, including sea-level rise, increased river flooding and droughts.

Formulating the Dutch Delta Programme

Previous transformative plans, such as the Delta Works, needed a disastrous event as a primary driver (Verduijn et al., 2012). In 2007, the Dutch government commissioned the Second Delta Committee for advice on the future of the Dutch delta while anticipating climate change. The committee's advice was presented in 2008 and consisted of a long-term holistic vision for the Dutch delta and presented recommendations on long-term, adaptive strategies, measures and governance to achieve this vision (Delta Committee, 2008). In order to implement such an adaptive strategy, they proposed to establish a new investment programme, called the Delta Programme. The advice received broad political support, and the Delta Programme was started in 2010.

The Delta Programme has the objective to create and maintain a safe and attractive the Netherlands, now and in the future, by providing adequate flood-risk management and a fresh water supply (Van Alphen, 2016). Developing and implementing such a programme has three main prerequisites: a multi-governmental approach, dealing with future uncertainty and a guarantee of long-term continuity. As such, a special commissioner was installed to coordinate the development and implementation of the Delta Programme. This commissioner is a high-level senior government official responsible for the preparation of the Delta Programme and advising the Cabinet on necessary actions. He is an a-political figure in order to ensure continuity regardless of every-day politics. An annual budget of €1.2 billion (the Delta Fund) is available for implementing the Delta Programme at national and regional levels. In the Netherlands, three ministries,

12 provinces, 21 regional water authorities, 355 municipalities and 25 safety regions are responsible for water, land use and disaster management. The proposed strategy thus required intensive collaboration between different governmental levels. The required changes in the governance system were formalized in the Delta Act, which was adopted unanimously by the Dutch Parliament in 2011.

The Delta Commissioner extended the long-term holistic vision and advice of the Second Delta Committee into a fully fledged policy and investment programme. The three water-related challenges that are dealt with are flood-risk management, fresh water supply, and water and climate proofing of the urban environment. Baseline studies and problem analyses were jointly produced by a diverse set of stakeholders. This participatory process means that representatives from authorities, stakeholder organizations, private companies and knowledge institutes were invited to regional design workshops to co-decide upon the available knowledge, uncertainties involved, and research and measurements needed for decision-making. Annual progress reports of the Delta Commissioner to Cabinet and Parliament created an urgency to proceed.

The preparation phase resulted in proposals for policy frameworks ('Delta Decisions'), regional strategies and related investment and research programmes dealing with flood-risk management, fresh water supply, and water-robust and climate proof urban development. These proposals were adopted by all involved authorities and approved by Cabinet and Parliament in 2014. Eventually, the national frameworks and regional strategies became official policy in the National Water Plan (Rijksoverheid, 2015) and related regional and local policy documents, and are translated into investment plans on flood risk management, fresh water supply and spatial adaptation.

Implementing the Delta Programme

After the Delta Decisions were approved, implementation of the Delta Programme started in 2015 with the translation of these policies and strategies into legal instruments, local and regional water management, and land-use plans, and with the preparation and execution of concrete measures, pilots and research programmes. Gradually the accent of the efforts shifted to the regional level, while the Delta Commissioner and his staff remained focused on coherence between the regions and progress. Regarding the latter, a monitoring and evaluation system was developed to establish whether the implementation of measures was still on track or if the external trends in climate change made acceleration or transition to other measures necessary (Haasnoot et al., 2018). In 2020 the first six-year recalibration was presented, concluding that climate is changing more rapidly than assumed and additional efforts may be necessary from 2050 on (Delta Commissioner, 2020).

ADM is explicitly mentioned as the basis for the Delta Programme and it took shape through scenario development. The Delta Programme has a time horizon of 2050, with a view-through towards 2100 (Petersen & Bloemen, 2014; Van Buuren et al., 2016; Zevenbergen et al., 2013). This introduces a large uncertainty regarding climate, but also socioeconomic conditions. External scenarios, combining climate change and socioeconomic trends, made this uncertainty manageable by specifying the potential range in long-term water challenges. Adaptive strategies can speed up or slow down when actual developments require them to do so. The delta dynamics cause a continuous need for new water-related investments and maintenance, aggravated by climate change and

subsidence. In the Dutch Delta Programme this continuity is achieved by leadership (Delta Commissioner), sound institutional arrangements between cooperating parties, stability in funding all legally based in the Delta Act, and a complimentary monitoring and evaluation programme.

Complicating factors

The time horizon of the Delta Programme and related scenarios is 2100. Although the effects of climate change on, for example, sea level rise and river discharge are apparent on this time scale, their effects on present strategies are not enough to surpass tipping points in the short or medium terms and do not demand switches in strategies on the short term. Present flood protection and beach nourishment strategies can be continued, at least until 2100. This made it difficult to advocate for a critical review of foreseen investments in land use and infrastructure. In addition, we found out that a strict moment of tipping cannot be defined. Instead, the 'sell-by date' of a measure or strategy can be stretched by technical developments, increased available funding and changing societal preferences, thus enlarging the interval before tipping.

The Delta Programme is focused on the main water challenges, which is also the policy domain of the Ministry of Infrastructure and Water Management. In addition, the Delta Commissioner submits his annual progress report and proposal to this minister, who on budget day introduces it, on behalf of the Cabinet, to Parliament as part of the budget proposal of the department as a whole. During the start of the Delta Programme these complementing responsibilities on the same policy field induced some competition between the Delta Programme and ministerial organizations. Good chemistry between the Delta Commissioner and minister prevented escalation. Gradually the Delta Commissioner focused more on the long-term water perspective (up to 2050 and beyond) on short-term measures, and the need for stability in funding, assisting the minister to put these issues on the political agenda.

Long-term water challenges can be aggravated by land-use developments that neglect climate change impacts on, for example, flood risk and fresh water availability. An integrated approach can contribute to preventing an increase of future water challenges and related damage or expenditures. However, the Delta Act and Fund limit investments to flood protection and fresh water supply measures. On the project level, water-related projects sometimes trigger cooperating parties to combine their local investment agendas, develop a multi-use design and agree upon mutual funding by using ad-hoc financial constructions. To achieve this integrated approach on the regional and national level still remains a large challenge.

In 2014 the national policy frameworks and regional adaptive policies were presented to Parliament and adopted, and implementation could start. This transition was accompanied by a large change in staff in the cooperating organizations, from policy-related staff to staff working in executive sectors. The latter were less familiar with the purpose of the Delta Programme, the ADM concept and related knowledge about long-term water challenges, the governance structure, budget allocation. Fortunately, the Delta Commissioner and his staff remained and provided continuity. Nevertheless, it took almost two years to obtain the implementation phase on track and on speed.

Bangladesh delta challenges

The Bangladesh delta is situated in the tropical monsoon climate zone of the Indian Ocean. It consists of the deltas of the transboundary rivers Ganges, Brahmaputra and Meghna. More than two-thirds of the country is less than 1 m above sea level, and prone to monsoon floods, cyclonic storm surges and water logging. Bangladesh is among the countries that are most affected by climate change and risks from natural hazards (Kreft et al., 2017). Agriculture is a major economic sector in Bangladesh and vulnerable to climate change-induced temperature rise and saline intrusion following sea-level rise (Brammer, 2014). Hence, climate change is a real threat for Bangladesh.

Formulating the Bangladesh Delta Plan 2100

In 2012 the government of Bangladesh decided to formulate a long-term adaptive plan. The Bangladesh Delta Plan 2100 formulation project started in 2014, covering the whole country including the Chittagong Hill Tracts. The Bangladesh Delta Plan 2100 integrates short- to medium-term economic development objectives with long-term sustainable resources management. Bangladesh aims to achieve upper middle-income status and eliminate poverty by 2030. This goal is intertwined with the longer term challenge of water resources management integrated with agriculture, fisheries, transportation and environmental protection (De Heer & Aartsen, 2019). Because of this, the plan has a broad multisectoral scope and combines a long-term vision on the delta at the end of the century with short- and medium-term goals as steps to realize that vision. These goals (Table 3) and associated strategies, institutions and investments are adaptive in nature (Ministry of Planning, 2018).

The Bangladesh Delta Plan 2100 formulation process is aimed at adequate strategies and institutional framework for achieving these vision and goals. It was formulated by a Dutch–Bangladeshi consortium of experts; the project was hosted by the General Economic Division (GED) of Bangladesh’s Planning Commission. Strategy process,

Table 3. Bangladesh Delta Plan 2100 vision and goals.

The Bangladesh Delta Plan 2100 delta vision is to ‘Ensure long-term water and food security, economic growth and environmental sustainability while effectively coping with natural disasters, climate change and other delta issues through robust, adaptive and integrated strategies, and equitable water governance.’

This long-term vision is translated into specific goals as a basis for strategy formulation. The Bangladesh Delta Plan 2100 proposes three higher level national goals set by the National Plans and six water, ecology and land use-specific goals that contribute to these higher level goals.

Higher level goals:

- 1) Eliminate extreme poverty by 2030
- 2) Achieve upper middle-income status by 2030
- 3) Being a prosperous country beyond 2041.

Specific goals are:

- 1) Ensure safety from floods and climate change-related disasters
- 2) Enhance water security and efficiency of water usages
- 3) Ensure sustainable and integrated river systems and estuaries management
- 4) Conserve and preserve wetlands and ecosystems and promote their wise use
- 5) Develop effective institutions and equitable governance for in-country and trans-boundary water resources management
- 6) Achieve optimal and integrated use of land and water resources

Source: Ministry of Planning (2018).

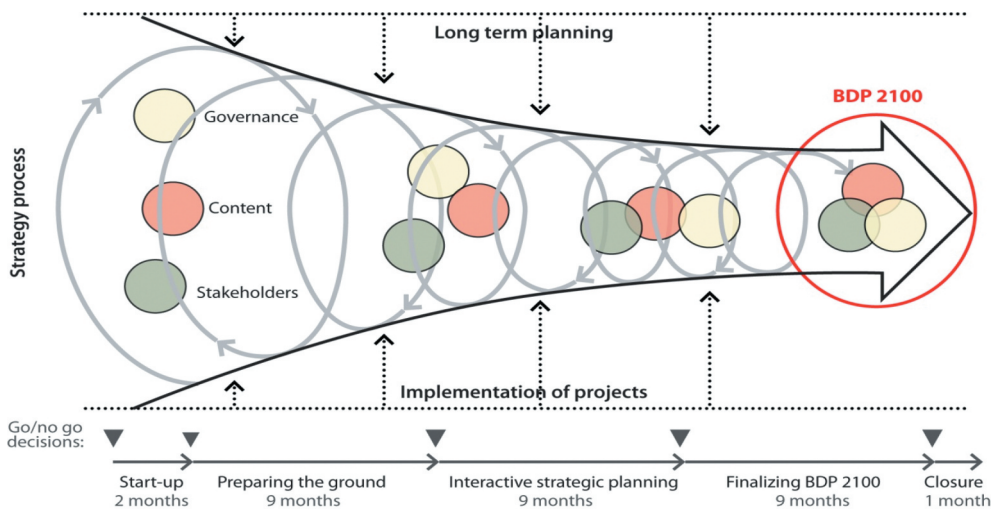


Figure 1. Managing the interactive planning and learning process.

Source: De Heer and Choudhury (2014).

content, governance and stakeholder participation form basic elements of the formulation process (Figure 1).

Content is about the diagnostic description of issues and challenges in the dynamic delta (Ministry of Planning, 2018). Governance refers to the required institutional adjustment of involved ministries and agencies as well as embedding the plan in the institutional and planning context. Stakeholders are in this holistic planning approach of crucial importance for sharing knowledge, reaching common understanding, support and ownership to realize the required coordination and decision-making (De Heer & Jenkins, 2012). Overall, seven ministries and about 2600 people gave input and feedback at stakeholder workshops and consultations at regional and local levels.

The Bangladesh Delta Plan 2100 formulation covered three phases (Figure 2), of which the first consists of mobilizing the project, designing the process and preparing 26 baseline studies. Second, interactive planning and third, developing the institutional framework took place.

Experts from government agencies, the private sector and other stakeholders elaborated on the external drivers, issues and challenges, resulting in possible adaptive strategies. They are closely involved in articulating demands of agriculture, fisheries, livestock, transportation, industry, water supply, sanitation and environment sectors. The potential and preferred strategies were selected based on the developed vision, four scenarios and related selection criteria and standards. This phase also included formulating an investment plan and a governance framework. This framework arranges institutional and funding aspects, capacities and readiness of implementing agencies. The third and final phase focuses on institutional arrangements and decision-making, with broad consultation and the approval process of the Delta Plan. Eventually, the plan was approved by the government in 2018.

In Bangladesh, the whole process of developing baseline studies, articulating a long-term vision and goals, scenarios, strategies, measures, a data and knowledge portal, and

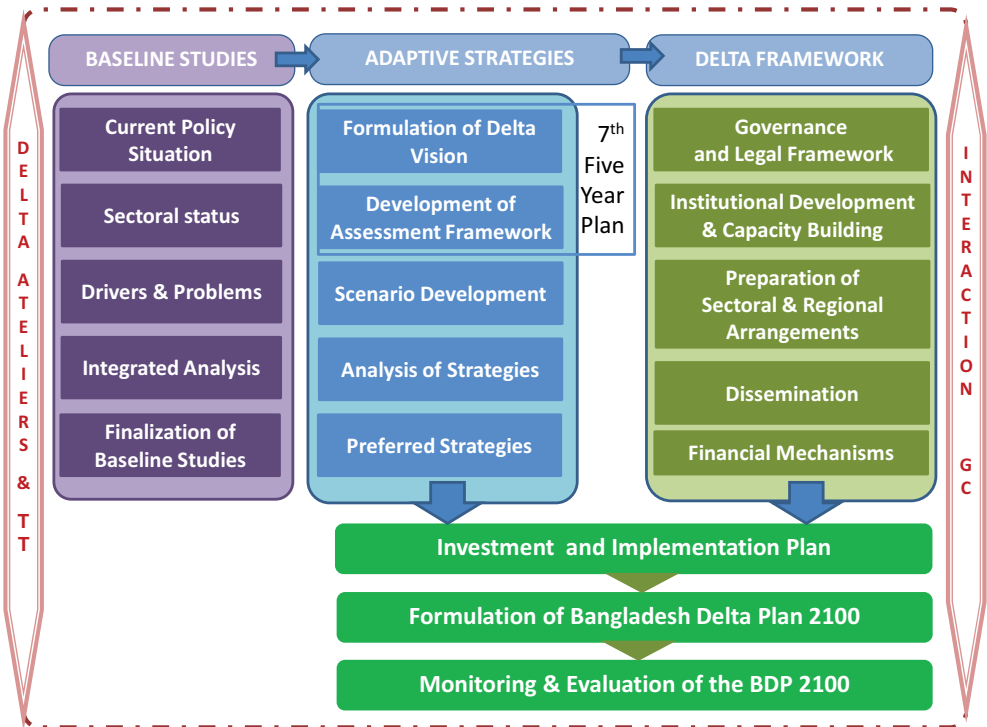


Figure 2. Bangladesh Delta Plan 2100 preparation process.

Note: TT, touch tables; GC, guiding committees.

investment plan, was combined in a single, four-year project at the national level. The final Bangladesh Delta Plan 2100 acts as a long-term reference framework for future and existing planning activities and will feed into the Bangladesh' Five-Year Plans cycle and annual plan and budget. As such, the Bangladesh Delta Plan 2100 is incorporated in the core governance of Bangladesh, where climate change, scenarios and strategies will be monitored and adaptation will be considered.

Implementing the Bangladesh Delta Plan 2100

Although Bangladesh has water policies and plans for considerable time, the effectiveness of implementation of integrated water management is weak due to political, financial and institutional constraints as limited capacity and budgets, insufficient coordination and collaboration. These issues will be addressed in the implementation phase through the establishment of new institutions (a Delta Governance Council to coordinate investment decision-making, a Project/Programme Selection Committee, a Delta Wing in the Planning Commission and a dedicated Delta Fund) and simultaneous capacity development at implementing agencies. These institutions will be results driven, facilitated by a data and information portal and monitoring system to evaluate progress. Presently 0.8% of gross domestic product (GDP) is spent annually on activities (investments, operation and maintenance) that are plan related. The implementation of the Bangladesh Delta Plan 2100 involves a 2.5% of GDP per annum, as agreed by the government. This is around US\$7 billion per year, reserved for initiating new and

maintaining existing delta interventions, of which 0.5% of GDP should originate from private sector investments. The remainder should come from tax financing, the application of cost recovery based on the beneficiary-pays principle and mobilizing foreign funding including tapping into the global Green Climate Fund initiative.

Complications during the formulation process

During the start-up of the project in early 2014 it became clear that the government aimed at the synchronization of the project with ongoing planning procedures. This meant that serious input was expected in early 2015 for the new Five-Year Plan, so already one year after the start of the project, in fact in the baseline study phase. This was an urgent and serious claim, which as such was positive but also put enormous pressure on the fresh team, leading to modification of the work plan and allocation of staff. However, it was seen and utilized as a great opportunity to align the Bangladesh Delta Plan 2100 in such an early stage with the national planning process at the core governance of Bangladesh.

In the usual rational, linear planning approach, long-term orientation and related uncertainty was not an issue in the administrative culture, while it became a major factor in the process under the plan's preparation. This resulted in confusion and tension because it was thought to be impossible to make a long-term plan under unclear conditions. A way out was focusing on the meaning of adaptation over time and to define a breakdown in phases (2030, 2050, 2100), which make it possible to signal changes by research and monitoring and adapt to them. The long-term vision and goals on the delta provided convincing inspiration and ambition that served as strategic direction.

The government's aspirations proved to be very high in terms of climate-proof Bangladesh and in terms of socioeconomic development including poverty reduction and achieving middle-income status. It intended to take up the long-term challenges of climate change, natural disasters and sustainable water resources management in conjunction with economic development, food security, environment and land resources. In defining the scope of the Bangladesh Delta Plan 2100, the government also insisted that population growth and urbanization needed to be addressed and that the hilly areas (not really at a delta level) of the Chittagong Hill Tracts would be included. During the baseline study phase, initially 19 themes would be studied. However, new research items were commissioned, resulting in 26 baseline studies. The focus of the plan became much broader than foreseen with many challenges to manage this. This also refers to another complication. The long-term planning as well as the multi-sectoral scope legitimized the positioning of the Bangladesh Delta Plan 2100 formulation process under the Ministry of Planning instead of the Ministry of Water Resources which claimed the plan project initially. The risk was to be trapped in too many studies and having too little time and budget for the strategy-making and preparing the delta plan. The solution was additional staff and budget and conducting the studies partly parallel to the strategy process.

Working with external scenarios to explore possible developments and gain more insights into uncertainties caused new conceptual and acceptance problems. The first is about the concept of scenarios and the way they are used here, because the government normally works with and chooses from several policy, content-loaded, scenarios.

External scenarios as narratives of futures that may or may not happen, which one cannot choose from, were new and felt uneasy. Second, the naming of the scenarios is sensitive. Only positive labelling was acceptable, for example, congestion and stagnation as a label was not allowed because government policy was aiming at growth and development. The scenarios were discussed many times, further refined, also with calculations and finally accepted for checking the strategies on robustness against a set of uncertainties. An additional method used to address uncertainties is accepting that there is no one best way to achieve the vision and goals and instead design alternative adaptation pathways. The focus is then on monitoring the developments, looking for tipping points and acting upon it by adaptation, if needed following a different pathway, avoiding strong structural interventions as long as possible also to avoid lock in situations.

During the strategy process, the government indicated not only to formulate the Bangladesh Delta Plan 2100 but also to elaborate it in an investment plan up to 2030 in order to take up investments as soon as possible after approval of the Delta Plan. Investment planning has been done in cooperation with the World Bank. The World Bank team was fielded when the strategy and formulation process was almost ready and it experienced a large information gap concerning background studies, ADM use of scenarios, and assessment of the strategies and measures which were prepared in a participative way with contributions from all over the country. The concentration on the transfer of knowledge and of content with many already prepared project proposals was the way to overcome this hurdle to prepare an investment plan that was acceptable to the government.

Analysing the Dutch Delta Programme and Bangladesh Delta Plan 2100 using the OECD Principles on Water Governance

As described in the third section, Neto et al. (2018) was followed for our analysis of the Dutch Delta Programme and Bangladesh Delta Plan 2100. [Appendix Table B1](#) contains the results of this analysis for each case in the table provided by Neto et al.

The Dutch and Bangladesh deltas differ widely in water challenges, socioeconomic conditions and governance frameworks, and so do the respective delta plans that have been prepared in recent years (see [Appendix Table A1](#)). Despite these differences, both plans show strong consistency with the OECD Principles (see [Appendix Table B1](#)). In both cases scores for policy impact and on-the-ground-results are generally lower. This is because both plans are still under implementation. Interestingly, scores for principle 7 (regulatory frameworks) are lowest in both plans. This is because the development of regulatory frameworks often starts after the policy development is finished. Moreover, this activity is time consuming in its preparation and approval.

The main differences between the Dutch Delta Programme and Bangladesh Delta Plan 2100 concentrate around two aspects. The Bangladesh Delta Plan 2100 scores on implementation, ground results and policy impact are generally a fraction lower than Dutch Delta Programme scores because of the stage of implementation: the Dutch Programme entered this stage in 2014, while the Bangladesh Delta Plan entered implementation stage in 2018, although the scores reflect strong intentions to follow the principles in its realization. On the other hand, the Bangladesh Delta Plan 2100 scores higher on principle 3 (policy coherence/alignment) than the Dutch Delta Programme. This is explained by

the wider scope and more extensive multi-sectoral involvement in Bangladesh compared with the Netherlands.

Do the OECD Principles on Water Governance contribute to ADM?

The analysis of the Dutch Delta Programme and Bangladesh Delta Plan 2100 regarding the OECD Principles shows that these plans have been developed in compliance with these principles. Both plans also introduced a new approach to deal with long-term uncertainty that is inevitably connected to long-term water-related investment planning: ADM. From our experiences we present lessons that illustrate whether and how both approaches (ADM and the OECD Principles) can reinforce each other.

Long-term vision, managing uncertainty

The first lesson relates to the need for well-organized water management infrastructure and dedicated governance in low-lying countries, especially as climate change challenges maintaining and improving physical and governance infrastructures. Both applications of ADM give a central role to this long-term perspective, albeit in a different way. Bangladesh aims to become a middle-income country by 2021 and avoid economic and social setbacks as much as possible, which requires implementing huge investment programmes in water management and related sectors. On the contrast, the Netherlands wished to maintain its high living standards in the future. The Netherlands thus applied ADM while focusing on the question: ‘How can we protect our country from adverse impacts resulting from uncertain changing conditions and align this with other policy agendas?’, while Bangladesh focused on development goals: ‘How can we enable socio-economic development and food security together with water safety and security under uncertain changing conditions regarding climate change and trans-boundary water issues?’. As a result, Bangladesh was inspired by the Dutch pioneering example but used water investments as leverage to achieve water and food security and development goals, thereby adding specific features to the approach (e.g., a combination of national, hotspot and thematic strategies; investment plan; decision support model). Hence, in both countries a long-term ambition induced changes, with climate change as main driver.

Application of this vision is a balancing act in practice. Investments in water-related infrastructure and land-use development involve measures with a life span up to 50-100 years, which will strongly determine future water management and land use while climate change, population growth and economic development cause major uncertainties. These uncertainties result in a bandwidth of possible futures. In both cases, scenarios were developed that represent plausible water challenge futures, for example, in 2050 and 2100. These scenarios highlight when present strategies will fail and act as inspiration for the development of additional or new strategies. Combined in adaptation pathways these strategies and flexible measures are aimed to find a balance between ‘too much, too early’ and ‘too little, too late’. In this way future uncertainty is made manageable in a cost-effective manner. An example of a flexible measure is the ‘building with nature’ principle, that is, using natural processes to stimulate sediment transport or deposition, or reduce wave action through mangrove forest or oyster reefs. However, tension emerged in both Bangladesh and the Netherlands between deciding on large structural measures on the short term

(especially when funding is available), or keeping options open for the future. Especially Bangladesh, with a less developed water system than the Netherlands, needed infrastructural measures to realize basic water security. As such, applying adaptive planning requires a long-term vision and balance between short-term ‘no-regret’ measures and long-term adaptive strategies. This basic ‘dealing with future uncertainty’ element of ADM is new compared with IWRM and still absent in the OECD Principles.

Perform a holistic delta analyses of the issues, challenges and knowledge gaps in order to explore the opportunities for linkage with other agendas and integrated measures

To facilitate the preparation of a delta plan along the lines of the abovementioned lessons, data and knowledge are needed about the physical, biotic and socioeconomic status of the delta, the expected trends and developments, interlinkages between subsystems, and the governance and institutional set-up. In both cases a process of joint fact finding was adopted to create consensus among involved authorities, experts and stakeholders on what information is known, lacking or unknown and uncertain, which conclusions can be drawn, and how knowledge gaps will be filled. The available data and knowledge as well as the gaps and necessary actions were documented, for example, in 26 baseline reports (Bangladesh) or the annual progress report to Parliament (the Netherlands). In both countries, study reports, draft policy frameworks and preferred strategies are externally reviewed by independent reviewers and discussed in panels of experts, with special attention for uncertainties, unknowns and possible scenarios. In any case, both approaches to build scientific consensus on collected data and proposed strategies support OECD Principle 1 (clear roles and responsibilities) as well as Principles 5 (on data and information) and 10 (stakeholder engagement).

ADM also extends the emphasis in IWRM on integrated approaches. On the ground, water-related infrastructure interferes with other activities that already exist or may be planned. Combining separate plans and investments in an integrated programme may be more efficient (in terms of required funding, work and material), increase added value and public acceptance. Such integration requires involved stakeholders to be transparent in their investment agendas, to tune their agendas (and related budgets), and to agree on responsibilities in contracting and maintenance. Searching for integrated solutions worked in the Netherlands in the ‘Room for the River’ programme and resulted in combining coastal defence reinforcements with urban development plans. In Bangladesh, the Bangladesh Delta Plan 2100 investment programme linked several sectoral agendas. Like a holistic vision, this underlines OECD Principle 3 (policy coherence). Relevant here are also Principle 2 (manage water at the appropriate scale(s)); Principle 4 (capacity of responsible authorities); Principle 5 (sharing data and information); and Principle 6 (mobilizing (shared) financial resources).

Arrange ownership and stimulate coherence by combining ‘bottom-up’ and ‘top-down’ approaches

A third lesson concerns the need to create ownership for tailored measures and stimulate coherence between regions. Certain areas in the delta are ‘hotspots’, meaning they have specific

challenges and demand a regional approach. For example, coastal areas face salinization, hilly areas face flash floods, and rivers face bank erosion, siltation and floods. Similarly, where upstream areas struggle with droughts, urban areas need to improve water supply and sanitation. On the other hand, important linkages exist between these regions in the transfer of water, sediment and nutrients, which asks for system or catchment-based coherence and thus coordination on a supra-regional, delta level. In Bangladesh and the Netherlands, where the delta largely covers the national territory and rivers are transboundary, this implies national coordination and international cooperation. Regional strategies ('bottom up') and (inter) national coordination ('top down') requires a multi-governance structure that enables gradual integration of national and regional strategies and institutional arrangements for adequate ownership. For this purpose, parties involved should agree upon a common timetable and governance structure from the start to ensure political commitment. In the Dutch situation, with decentralized water and land-use governance, the independent Delta Commissioner leads this process. In Bangladesh, with a more centralized governance, leadership was provided by the Member (Senior Secretary) of the General Economics Division (GED) of the Ministry of Planning. This GED is also responsible for the preparation of the national Five-Year Plans and longer term (20 years) Perspective Plans. Where international agreements were already in place for the Dutch rivers, the Bangladesh Delta Plan 2100 indicates the importance of settlement of transboundary issues in the near future and provides an approach based on water diplomacy to achieve this. This alignment of regional strategies through (inter)national coordination emphasizes OECD Principle 2 (manage at the appropriate scale); Principle 3 (foster coordination); Principle 8 (promote innovative governance approaches); Principle 9 (mainstream integrity and transparency for greater accountability); Principle 10 (informed outcome-oriented contributions); and Principle 11 (encourage water governance frameworks for managing trade-offs across water users).

Governance to guarantee progress and continuity

The fourth lesson is that delta management requires continuous efforts on water management and flood protection, given its dynamic nature (e.g., natural hazards, continuous processes such as subsidence and climate change). The preparation of a holistic long-term vision and strategies with investment agenda are first steps, which need follow-up and implementation. This requires governmental (institutionalized) ownership and broad political commitment, since reservation of large budgets is imperative for a long period. This ownership and commitment crystalized in Bangladesh and the Netherlands in installing specific high-ranking official or commission to supervise, report and advice. This refers to OECD Principle 8 (promote an innovative governance approach). Furthermore, annual progress reports to Parliament or to a national steering committee may help to maintain urgency in the development phase and continuity during implementation. In Bangladesh, the Delta Plan was connected with the regular five-year plans and in the Netherlands, the Delta Commissioner annually reports progress and proposes rolling-on investment plans to the Dutch Cabinet.

In addition, long-term financial stability has to be guaranteed, for example, by a fund or specific part of the government budget that is relatively free from frequent political prioritization. The Dutch Delta Fund is supplied by budget from the national government and receives a 15% contribution of regional authorities, whereas in Bangladesh a block provision (as 2.5% of the GDP) is foreseen for Delta Plan related investments.

Additional investments from private parties and international institutions are also envisaged. The Dutch fund has already proven to aid continuity, as the funding stream remained relatively undisturbed during the economic crisis of 2010–14. These arrangements meet with OECD Principle 6 on mobilizing water finance and allocate financial resources in an efficient, transparent and timely manner.

Finally, the implementation phase needs a well-developed monitoring and evaluation system in order to establish on a regular base whether the implementation is still on schedule and on the right track. In the Netherlands, a Delta Programme monitoring and evaluation system has been developed (Haasnoot et al., 2018) and first results were presented in 2020 (Delta Commissioner, 2020). In Bangladesh such a monitoring system is under construction. This fits well with OECD Principle 12 on monitoring and evaluation.

Risk-based planning

Living in deltas has many benefits, but can be dangerous during extreme events such as flooding or droughts. These two cases teach us that delta management also entails risk management. Delta strategies should be designed in such a way that they optimize the use of water during normal conditions and prevent damage and fatalities during extreme events. The level of protection or water supply (and hence the budget for involved investments and maintenance efforts as well as the accepted residual risk) forms a political choice and decision, often at the national level. On a local or regional level, the elaboration of the measures to comply with these risk-based standards is a matter of tailor-made approach, in which stakeholders and relevant authorities have to be involved. In Bangladesh flood protection standards vary between high-risk urban areas and locations with vital infrastructure and lower risk rural areas. In the Netherlands, this risk-based approach has resulted in a new system of regionally differentiated flood protection standards, based on the potential damage, number of fatalities and societal disruption due to a flood (Van Alphen, 2016). This system was developed in close consultation with local authorities and approved in Parliament.

Conclusions

This paper evaluated the application of ADM in the Netherlands and Bangladesh. The Dutch and Bangladesh deltas differ widely in water challenges, socioeconomic conditions and governance systems, and so do the respective Delta Plans that have been prepared in recent years. Comparing both cases provides lessons for other applications of ADM in practice and indicates points of attention for further research. The paper focused attention on climate change adaptation by showing through the cases that adaptive planning and implementation to protect vulnerable areas and populations requires action now, rather than in the future.

The applications of ADM in the Netherlands and Bangladesh were assessed using the OECD Principles on Water Governance (OECD, 2015). Based on these results, we conclude that both the Dutch Delta Program and the Bangladesh Delta Plan show compliance with these principles, especially on (innovative) governance, stakeholder participation, and inter-policy and inter-agency coordination, funding and monitoring and evaluation. Although these OECD Principles proved useful and relevant in many countries, they cannot account for two relevant aspects of ADM that are novel to water governance. These two aspects are the long-term nature and the risk-based approach underlying ADM. We therefore propose to add 13th and 14th

Principles. The 13th concerns the designing and managing of a process of adaptive planning with a long-term perspective. This entails preparing narratives of different possible futures (scenarios) and combining these scenarios with adopting a long-term holistic vision. Combined, they form a framework for adaptive strategies that are able to deal with future uncertainties in water-related challenges, notably climate change, and may give direction to short-term investment agendas. We further point to the importance of increasing government capacity in the process of applying these principles. Given that ADM is inherently surrounded with uncertainty (Kwadijk et al., 2010) governments need to be able to manage these uncertainties and monitor signals for tipping points (Haasnoot et al., 2013). The cases showed that governments do so by investing in capacity related to managing uncertainties, such as strategic planning skills, learning, governance and participatory processes as well as knowledge management for dealing with climate change adaptation.

The 14th Principle concerns the risk-based approach. As living in a delta has many benefits and involves high levels of economic activities and investments, a risk-based approach could be adopted to adequately manage extreme events, such as floods and droughts. These extreme events are expected to increase in frequency and intensity due to climate change and thus are likely to become more relevant in future water governance.

In addition to these conclusions, a reflection on the methods used is appropriate here. We have used a specific type of action research whereby we reflected on the policy development processes from within. As such, our starting point was that ADM is a valuable extension of IWRM. To prevent bias from our side, we combined two recent methods to use the OECD Principles of, respectively, Seijger et al. (2018) and Neto et al. (2018). These methods enabled us to be transparent in our analysis and complemented each other. Still, ‘policy impact’ and ‘on ground results’ (Neto et al., 2018) of ADM cannot be fully assessed yet, even after 10 years, due to the time horizon of up to a century of such strategies and the relatively short implementation experience. We nevertheless therefore encourage other researchers to apply this combined method to analyse other cases of ADM in practice to build a global knowledge base.

Living in a delta requires flexibility and adaptive strategy-making to deal with long-term uncertainties and dynamics of nature, society and climate change accompanied by large and continuous investment programmes and ongoing long-term implementation. Overall, this comparative case study showed that Bangladesh and the Netherlands managed to develop such a strategy, while complying with the OECD Principles of Good Water Governance and provided lessons from these experiences that could aid other applications of ADM in practice. Furthermore, this paper calls for ‘future proofing’ these OECD Principles so they can account for long-term and risk-based water governance frameworks that are required to deal with climate change and other uncertain issues with long duration.

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ORCID

Jaap de Heer  <http://orcid.org/0000-0003-0494-2938>

Ellen Minkman  <http://orcid.org/0000-0002-8543-3029>

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Appendix

Table A1. The Dutch Delta Programme and Bangladesh Delta plan: a comparison

Characteristic	The Netherlands	Bangladesh
<i>Country characteristics</i>		
Territory (km ²)	41,543	147,570
Inhabitants (millions)	17	160
Gross domestic product (GDP) (US\$ billions)	828	288
Climate	Temperate maritime North East Atlantic	Tropical monsoon Indian Ocean
Main climate change-related threats	Sea-level rise, increased precipitation, droughts	Sea-level rise, temperature rise
Area-threatened hosts	<ul style="list-style-type: none"> • 60% of the population • 60% of GDP • 60% of territory 	<ul style="list-style-type: none"> • 80% of the population • 90% of GDP • 70% of territory
Institutional setting	Parliamentary democracy Decentralized government	Parliamentary democracy Centralized government
Growth rate (%/year last decade)	–2% to +3%	7%
<i>Characteristics of the delta plan</i>		
Development time frame	2010–14	2014–18
Implementation time frame	2015–present	2019–present
Scale	National (three ministries), regional, local	National, multi-sectoral (seven ministries) regional, local
Vision for the delta in 2100	To maintain a safe, prosperous and attractive delta for present and future generations, anticipating climate change	Ensure long-term water and food security, economic growth and environmental sustainability while effectively coping with natural disasters, climate change and other delta issues through robust, adaptive and integrated strategies, and equitable water governance
Output characteristics	National policy frameworks on flood-risk management, fresh water supply and climate-proof urban areas, and regional adaptive strategies and related investment agendas for national government	National, Hotspot and Thematic Strategies on flood-risk management, fresh water supply, and regional adaptive strategies (also on water supply and sanitation and riverbank erosion), agriculture, transportation, urban development and spatial planning, Blue Economy and related investment agendas
Similar elements of the governance structure	<ul style="list-style-type: none"> • Long-term approach (2050–2100) scenarios 	<ul style="list-style-type: none"> • Long-term approach (2050–2100) scenarios
Elements of the governance structure	<ul style="list-style-type: none"> • Multi-governance, linking ‘bottom-up’ (six regions) and ‘top-down’ (three policy frameworks) • Joint fact finding (JFF) • Coordination by the Delta Commissioner • Annual progress report to Cabinet (→ Parliament) 	<ul style="list-style-type: none"> • Multi-governance, 26 baseline studies, focus on six ‘Hotspots’ top down with extensive local consultation • JFF • Coordination by the National Planning Commission • Input to national five-year plans and annual development plans
Institutional arrangements	<ul style="list-style-type: none"> • Delta Commissioner • Annual progress report to Parliament • Delta Fund (€1.2 billion/year) (0.15% of GDP) • Delta Act 	<ul style="list-style-type: none"> • Delta Governance Council, chaired by the Prime Minister • Input to national five-year plans • Delta Fund (US\$7 billion/year) (2.5% GDP) • Special rules and institutions



Table B1. Comparison of the Dutch Delta Programme (DP) and the Bangladesh Delta Plan (BDP) 2100 regarding the OECD Principles on Water Governance following the approach of Neto et al. (2018).

Principle	Dutch Delta Programme (DP)		Bangladesh Delta Plan 2100 (BDP)		
	Criteria	Score (1–5)	Explanation	Score (1–5)	
Principle 1: Clear roles and responsibilities	Alignment	5	The DP recognizes the existing roles and responsibilities of all national, regional and local authorities involved in water management and spatial planning	5	Decision-making at Cabinet level endorsed the BDP institutional framework in which roles and responsibilities are clearly defined. Roles and responsibilities between the national and local level will be redefined
	Implementation	5	The DP adopts a related multi-governance structure for coordination and decision-making regarding policy development and implementation	4/3	A specific 'Delta Wing' was already established and other preparations concerning the BDP institutional framework are ongoing. A special Delta Fund is under construction as block-provision in the national budget
	On-the-ground results	5	See 'alignment'	4	Ongoing alignment process with sectoral ministries, Five-Year Planning cycle and budget allocation
	Policy impact	5	See 'alignment'	5	Major changes in sectoral ministries because of the coordination mechanism Delta Governance Council (DGC) and adaptive planning and programming
Principle 2: Appropriate scales within basin systems	Alignment	5	The DP recognizes that water-related challenges should be dealt with at the appropriate spatial scale (surface or ground water system), but also that on a supra-system scale interlinkages exist that should be safeguarded	5	The basins are identified and data collection on basin characteristics is ongoing. The Implementation Program for the North-Western basin is discussed with many stakeholders. Preparations ongoing; see 'alignment'
	Implementation	4	The DP organized policy development by responsible authorities on the appropriate system scale in six regional programmes, complemented by three national policy frameworks and two supra-regional policy decisions	3	Stakeholder workshops in relevant basins. Preparations ongoing; see 'alignment'
	On-the-ground results	4	Six regional adaptive strategies and three national implementation programmes (flood protection, fresh water supply and climate-proof spatial adaptation)	2	The BDP holistic/multi-sectoral approach is being translated to basin and coastal systems. Preparations ongoing
	Policy impact	5	Implemented legislation on regionally differentiated flood protection standards. Development of regionally differentiated fresh water supply agreements is underway	4	BDP shows a holistic approach of the Bangladesh delta addressing water safety and security, water supply and sanitation, food security and facilitating economic growth. Linkage with policies on poverty reduction, disaster management, shipping and the Blue Economy
Principle 3: Policy coherence	Alignment	4	Coordination between water management, land-use planning, agriculture, nature and disaster management is accounted for, as well as in policy development, planning and design of measures ('creating added value for society by linking agendas')	5	

Note: See end of table for explanation of Scores 1–5.

(Continued)

Table B1. (Continued).

		Dutch Delta Programme (DP)		Bangladesh Delta Plan 2100 (BDP)	
Principle	Criteria	Score (1–5)	Explanation	Score (1–5)	Explanation
	Implementation	4	Policy coherence is achieved by the participation of all relevant authorities in regional and national steering committees and approval by Cabinet	3	BDP Investment Plan contains proposals from the mentioned sectors. Coordination takes place by the DGC based on the 8th Five-Year Plan with a linkage to budget allocation
	On-the-ground results	4	Regional pilots to adapt agriculture to drought and salinization and hence reduce fresh water demand, pilots for flood proof urban developments. A midterm evaluation showed that integration between flood protection, fresh water supply and climate-proof spatial adaptation could be further improved	4	Coordinated input from the BDP to the 8th Five-Year Plan with contributions of seven ministries
	Policy impact			3	Clearly a better focus on joined action instead of usual silos
Principle 4: Capacity	Alignment	4	Knowledge and skills of water managers and land-use planners are generally well, but are further developed regarding adaptive planning and design	5	Gets a lot of attention in terms of 'readiness' for the large investment volumes. Capacity-building is key as is knowledge and data management capacity, e.g., for feasibility studies and creating bankable projects
	Implementation	4	Dedicated training programmes are in place	3	Capacity-building in various forms and other preparations ongoing
	On-the-ground results	4	See 'implementation'	3	High expectations/anticipation on investment volume of the BDP
	Policy impact	4	Adaptive planning is internalized on almost any authority, adaptive design has to be further developed	3	BDP-related capacity draws attention given the new way of budget allocation
Principle 5: Produce and share data and information	Alignment	5	The DP adopts a joint fact-finding approach in which data, model and research results are shared (e.g., on common web-portals), and discussed in regional and national steering committees	5	The BDP embraces the principle that it will always be science and knowledge driven. It established an information portal and data bank which are updated frequently. An explicit knowledge management strategy and knowledge agenda indicate knowledge gaps and shape the research questions
	Implementation	5	The development and results of the Delta Model were supervised and evaluated by an independent external advisory committee	5	Elaboration of a data and a knowledge-based decision support system take place. A new research programme was launched with support of development partners. The information portal and data bank are updated and receive continuous attention
	On-the-ground results	5	The substantiation of regional strategies and national policy frameworks was accounted for in a so-called 'synthesis report', and were reviewed (and qualified as 'up to standard') by independent experts	4	Preparations ongoing; see 'alignment' and 'implementation'
	Policy impact			4	Preparations ongoing; see 'alignment' and 'implementation'

Note: See end of table for explanation of Scores 1–5.

(Continued)

Table B1. (Continued).

Principle	Dutch Delta Programme (DP)			Bangladesh Delta Plan 2100 (BDP)		
	Criteria	Score (1–5)	Explanation	Criteria	Score (1–5)	Explanation
Principle 6: Financing	Alignment	5	The measures of the DP are financed from the Delta Fund, which has a volume of about €1.2 billion euro/year with a rolling on planning horizon of 12 years		5	The BDP finances the investments based on a block provision of 2.5% of GDP annually (US\$5–6 billion) divided into 2% investments, 0.5% for operations and maintenance. Of this 2.5%, private sector investments are expected to be 1.5%. Funding takes place by a specific Delta Fund with contributions from the Government of Bangladesh, international financial institutions, development partners, private sector and the Green Climate Fund
	Implementation	4	The Delta Commissioner presents every year a budget proposal to Cabinet and may advise to make more budget available when necessary		3	Preparations ongoing; see 'alignment'
	On-the-ground results	5	Since the start of the DP three different Cabinets and the economic crisis have occurred, which had only a limited effect on the volume of the Delta Fund		4	Preparations ongoing; see 'alignment'. Sectoral ministries anticipate the BDP-related allocation
	Policy impact	5	The Delta Fund clearly created continuity and stability in water-related investments, maintenance and knowledge development		4	Preparations ongoing; see 'alignment'. Sectoral ministries anticipate the BDP-related allocation
	Alignment	3	New flood-protection standards have been developed, adopted and implemented; they are underway for fresh water supply and need to be concretized for climate-proof spatial planning		4/2	Flood-protection standards have been introduced and will be further risk-based elaborated. Licencing and regulations for water use in the various sectors are under construction, also for waste water discharge and treatment as well as for groundwater use and irrigation
Principle 7: Regulatory frameworks	Implementation	3	See 'alignment'		3	Preparations ongoing; see 'alignment'
	On-the-ground results	3	See 'alignment'		3	Preparations ongoing; see 'alignment'
	Policy impact	3	See 'alignment'		2	Preparations ongoing; see 'alignment'

Note: See end of table for explanation of Scores 1–5.

(Continued)

Table B1. (Continued).

Principle	Dutch Delta Programme (DP)		Bangladesh Delta Plan 2100 (BDP)	
	Score (1–5)	Explanation	Score (1–5)	Explanation
Principle 8: Adopt and implement innovative governance	5	The DP has adopted a multi-governance approach in which the relevant authorities are involved in decision-making at the appropriate regional and national levels. This process is coordinated by the independent Delta Commissioner, who presents his annual proposal to Cabinet. On behalf of Cabinet, the Minister of Infrastructure and Water Managements (who is politically responsible) presents the DC's proposal to Parliament. This annual progress report and budget proposal creates a kind of urgency to proceed with the implementation	5	The BDP provides a new institutional framework. The long-term BDP planning is embedded in the Five-Year Planning cycle and yearly budget-allocation processes. Besides, a new coordinating mechanism Delta Governance Council and related institutions have been established. The BDP follows an innovative strategy approach of adaptive delta management (ADM) where issues and challenges are seen in a future perspective following several scenarios of possible futures. The new holistic approach of the delta leads to many interrelated strategies and actions, following adaptive pathways and adaptive design. A new institutional arrangement is under construction for engagement of water users at a regional level
Implementation	5	In a midterm review this multi-governance structure is evaluated as effective	4	Preparations ongoing; see 'alignment'
On-the-ground results	5	See 'implementation'	4	Preparations ongoing; see 'alignment'
Policy impact	5	See 'implementation'	3	Preparations ongoing; see 'alignment'
Principle 9: Integrity and transparency	4	Practices regarding integrity, accountability and trust in decision-making are already established in present organizations, legislation and governance, the DDP only adds common procedures on decision-making, taking account of the democratic procedures of the involved organizations	4	The BDP follows important principles of accountability as indicated in Government of Bangladesh programmes on integrity and transparency, e.g., to reduce corruption
Implementation	4	Implementation of these practices is the responsibility of participating organizations	3	Preparations ongoing; see 'alignment'
On-the-ground results	4	see 'implementation'	2	Preparations ongoing; see 'alignment'
Policy impact	3	see 'implementation'	2	Preparations ongoing; see 'alignment'

Note: See end of table for explanation of Scores 1–5.

(Continued)



Table B1. (Continued).

Principle	Dutch Delta Programme (DP)			Bangladesh Delta Plan 2100 (BDP)		
	Criteria	Score (1–5)	Explanation	Criteria	Score (1–5)	Explanation
Principle 10: Stakeholder engagement	Alignment	5	In the multi-governance approach the relevant authorities are involved. In addition, regular involvement of non-governmental organizations (NGOs) is organized by OFL (Cooperation Platform Physical Environment) and in regular meetings and design workshops for local communities		5	Stakeholder engagement is one of the pillars of the BDP. It has various forms such as broad national consultation and participation in analysis of issues and solutions; multilevel governance involves district and local levels in preparing basin-wise implementation programmes
	Implementation	5	See 'alignment'		5/4	Many stakeholder sessions have been organized, called delta ateliers, covering the whole country. Further preparations concerning project executions are ongoing; see 'alignment'
	On-the-ground results	5	See 'alignment'		4	Stakeholder involvement in basin implementation programmes. Preparations ongoing; see 'alignment'
	Policy impact	5	See 'alignment'		4	Preparations ongoing; see 'alignment'
Principle 11: Managing trade-offs	Alignment	5	The DP approach is aimed to create solidarity between generations (do now what is necessary and avoid that they have to pay for present neglect) and regions (a major flood or drought will affect all Dutch society). Regional strategies create coherence between rural and urban water management issues (e.g., drainage/storage of excess rainstorm waters)		5	The holistic, multi-sectoral character of the BDP is based on the Delta Vision and goals, which address water safety and security, food security and economic growth. The seven involved ministries bring in their project proposals and measures that need to be prioritized and selected. The huge investment programme claims a large part of the Government of Bangladesh budget which cannot be used for other purposes. Besides, the international basins of the large rivers show transboundary problems and trade-offs
	Implementation	4	See 'alignment'		4	See 'alignment'; preparations are ongoing with respect to the selection and prioritization of projects and financing
	On-the-ground results	4	See 'alignment'		3	See 'alignment'; preparations are ongoing
	Policy impact	4	See 'alignment'		4	Far more integrated focus; see 'alignment'

Note: See end of table for explanation of Scores 1–5.

(Continued)

Table B1. (Continued).

Principle	Dutch Delta Programme (DP)			Bangladesh Delta Plan 2100 (BDP)		
	Criteria	Score (1–5)	Explanation	Criteria	Score (1–5)	Explanation
Principle 12: Monitoring and evaluation	Alignment	5	The DP adopts an adaptive approach, which includes a six-year evaluation interval to establish whether the implementation is still on track or if external developments justify the adaptation of the strategies (or policy goals). An independent Signal Group informs the Delta Commissioner on relevant external developments (such as recently on a potential acceleration of sea level rise)		5	The BDP follows ADM with five-yearly updates in relation to the Five-Year Planning cycle. Long-term developments as well as programme-wise progress or troubles will be monitored and evaluated with a result-based monitoring and evaluation system
	Implementation	4	The first six-year evaluation will be completed in 2020; results will be reported to Parliament in DP2021 September 2020, and, when approved, will be translated in the National Water Plan		4	The input to the recent 8th Five-Year Plan contains a result-based monitoring and evaluation system, including elaborated targets and indicators. Preparations ongoing
	On-the-ground results	4	The first six-year evaluation is performed by the regional and national steering committees; their conclusions are substantiated in so-called synthesis documents, which are reviewed (and qualified as 'up to standard') by independent external experts		4	Preparations ongoing
	Policy impact	5	When approved by Parliament, the results of the first six-year evaluation will become official policy in the National Water Plan		4	Involved ministries need to evaluate based on ADM and results-based monitoring and evaluation

Note: See end of table for explanation of Scores 1–5.

Table B1 notes

Alignment of the programme with the OECD Principle

- (1) No alignment.
- (2) Poor = some common objectives.
- (3) Moderate = common objectives and measures of policy proposed.
- (4) Good/strong = previous experience and well-aligned policy ongoing.
- (5) Full alignment = policy framework matching all the objectives of the OECD Principle.

Implementation takes the OECD Principle into account

- (1) No implementation.
- (2) Poor = minimally addressed.
- (3) Moderate = consistently included, with some measures proposed.
- (4) Good/strong = under implementation through measures in place.
- (5) Full alignment = implemented with evaluated results/good practice.

On-the-ground results

- (1) No evidence of change.
- (2) Poor = involving major agent of change (institutional or other).
- (3) Moderate = involving different agencies and stakeholders.
- (4) Good/strong = involving multilevel platforms of participation and decision-making.
- (5) Major changes evident = implemented with evaluated results/good practice.

Policy impact

- (1) No impact.
- (2) Poor = considered and being implemented in the ongoing water policy.
- (3) Moderate = considered for implementation in other policies (transversal impact).
- (4) Good/Strong = impacting different institutional levels of governance (vertical impact, bottom-up and top-down).
- (5) Very strong impact = producing political change after evaluation (e.g., new legislation, regulatory measures, institutional restructuring or innovative institutional arrangements).