



# BANGLADESH DELTA PLAN 2100

## (Bangladesh in the 21<sup>st</sup> Century)

### Volume 2: Investment Plan

**General Economics Division**  
Bangladesh Planning Commission  
Ministry of Planning  
Government of the People's Republic of Bangladesh



# Bangladesh Delta Plan 2100 (Bangladesh in the 21st Century)

## Volume 2: Investment Plan

General Economics Division  
Bangladesh Planning Commission  
Ministry of Planning  
Government of the People's Republic of Bangladesh

October 2018

## **Bangladesh Delta Plan 2100**

Volume 2 : Investment Plan

### **Prepared and Published by**

General Economics Division (GED)  
Bangladesh Planning Commission  
Government of the People's Republic of Bangladesh  
Sher-e-Bangla Nagar, Dhaka 1207, Bangladesh  
[www.plancomm.gov.bd](http://www.plancomm.gov.bd)

### **Copyright © General Economics Division, Bangladesh Planning Commission, October 2018**

*All rights are reserved. Though we encourage use of the Bangladesh Delta Plan 2100 by any interested person, but no part of this publication may be reproduced or transmitted in any form or by any means without prior permission in writing from the publisher.*

### **A note on this Edition**

National Economic Council (NEC) approved this 'Bangladesh Delta Plan 2100' on 04 September 2018.

This is final edition which is also available for general access in Bangladesh Planning Commission's Website:  
[www.plancomm.gov.bd](http://www.plancomm.gov.bd)

### **Cover Designed by**

General Economics Division  
Bangladesh Planning Commission  
Government of the People's Republic of Bangladesh

### **First Published: October 2018**

### **Printed by**

**TURTLE**  
67/D Green Road, Dhaka, Bangladesh

*“No plan, however well formulated, can be implemented unless there is a total commitment on the part of the people of the country to work hard and make necessary sacrifices. All of us will, therefore, have to dedicate ourselves to the task of nation building with single- minded determination”.*

**SHEIKH MUJIBUR RAHMAN**

From Foreward of the 1<sup>st</sup> Five Year Plan (1973-78)

November 1973





بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



**PRIME MINISTER**  
GOVERNMENT OF THE PEOPLE'S  
REPUBLIC OF BANGLADESH

## Message

I am delighted that Bangladesh Planning Commission is publishing the document 'Bangladesh Delta Plan 2100'. This long term visionary plan is an important step towards fulfilling our commitment of achieving a safe, resilient and prosperous Bangladesh; and would ensure bright future for generations to come.

The Father of the Nation, Bangabandhu Sheikh Mujibur Rahman, dreamt of a happy and prosperous Bangladesh. To translate his dream into reality, he established the Bangladesh Planning Commission with eminent economists and development personalities. But Bangabandhu's assassination in 1975 halted the dream and frustrated people's hope of a poverty, hunger and exploitation-free Bangladesh that was ravaged by the war in 1971.

It was Bangladesh Awami League after returning to state power in 1996, revived and restored action plan to achieve the development vision of Bangabandhu. In the past nearly 10 years, Bangladesh achieved tremendous success in many fronts of development, including record growth of social development and secured social justice.

In order to face challenges and realize the potentials of the Bangladesh Delta, we adopted the long term visionary techno-economic plan- "Bangladesh Delta Plan 2100 (BDP 2100)" with the cooperation of the Kingdom of the Netherlands. The BDP 2100 seeks to integrate the medium to long term aspirations of Bangladesh to achieve upper middle income (UMIC) status and eliminate extreme poverty by 2030, and become a prosperous country by 2041.

Bangladesh is fully committed to achieving SDGs. However, the challenge lies in integrating these sectoral, national and global targets and plans into long term coherent strategies. Effective implementation of the strategic interventions in a coordinated manner is warranted for achieving the BDP 2100.

I am happy that the Bangladesh Planning Commission has skillfully translated the political vision of the Government of Bangladesh into a long term Plan. I thank the General Economics Division of Bangladesh Planning Commission for its efforts and other Ministries/Divisions for their whole-hearted support to the preparation of BDP 2100.

I hope that our concerted efforts will realize the goals and targets of the BDP 2100 to fulfill our development aspirations of becoming a safe, resilient and prosperous country.

Joi Bangla, Joi Bangabandhu  
May Bangladesh Live Forever

(Sheikh Hasina)





A H M Mustafa Kamal, FCA, MP

Minister

Ministry of Planning

Government of the People's Republic of Bangladesh

## Message

I am happy to note that our government has prepared a long term visionary plan 'Bangladesh Delta Plan (BDP) 2100' for our country, Bangladesh- the largest delta of the world. BDP 2100 aims to ensure long term water and food security, economic growth and environmental sustainability while effectively reducing vulnerability to natural disasters and building resilience to climate change and other delta challenges.

Bangladesh, being a deltaic country, is highly vulnerable to climate change and water related threats and challenges. It is even more challenging in making the achieved growth sustainable in the face of extreme climate variability, storms and tidal surges, flooding and droughts. BDP 2100 has been prepared in view of the special long term challenges for development outcomes presented by climate change and natural hazards. It has, as such, set up a long term vision '**achieving safe, climate resilient and prosperous delta**' for the evolution of the country by the end of the 21st century. The plan also defines short, medium and long term goals, targets and strategies as steps to reach that vision. I hope that this techno-economic plan, which is linked with resources, would contribute to the making of five year plans as well as contribute to achieving SDGs and other policy goals.

I am extremely grateful to the Hon'ble Prime Minister Sheikh Hasina for her strong commitment and guidance of preparing such a visionary plan. She has given her valuable time in reviewing this plan and made very important suggestions for its improvement. I am also grateful to my cabinet colleagues for their constructive suggestions at different stages of preparation of this mega plan. I thank the Government of the Kingdom of the Netherlands for their support and cooperation in preparing BDP 2100.

I congratulate the officials of General Economics Division (GED) of Bangladesh Planning Commission for accomplishing this challenging task of preparing such a techno-economic mega plan, which is first of its kind in the planning history of Bangladesh. This long term plan has been prepared through rigorous and extensive consultation with government ministries, divisions, agencies, development partners, experts, academia, researchers, civil societies, think tanks and NGOs. I thank all of them for their active participation in the process of formulation of the Plan.

Finally, I sincerely hope that the concerned ministries, divisions and agencies would give due attention and put their all-out efforts for implementation of BDP 2100. I am confident that proper implementation of this plan would aid us transforming our country into a happy and prosperous 'Sonar Bangla' as dreamt by our great leader Bangabandhu Sheikh Mujibur Rahman.

(AHM Mustafa Kamal, FCA, MP)





**M. A. Mannan, MP**

State Minister

Ministry of Finance and Ministry of Planning  
Government of the People's Republic of Bangladesh

## Message

It gives me immense pleasure to know that the General Economics Division (GED) of Bangladesh Planning Commission is going to publish the Bangladesh Delta Plan 2100 (BDP 2100), a long term water centric and climate change focused integrated plan for the first time in the history of Bangladesh.

Bangladesh has been experiencing rapid socio-economic development in recent times with improved per capita income, higher GDP growth rate and better performance in other social indicators such as education, health, sanitation and reducing poverty, child mortality, etc. Its economy is gradually transforming from rural and agrarian to a more urban and industrial/service oriented economy. However, making such development sustainable is more challenging due to its vulnerability to natural calamity and climate change events. Owing to the deltaic formation by the confluence of 3 (three) mighty rivers the Padma, the Meghna and the Jamuna, the country is often affected by tidal surge, flooding, river erosion, drought, cyclone and salinity intrusion, which pose continuous challenge to food security, water safety and livelihood for a large part of the population. Development of the country is also threatened by other challenges from growing urbanization, declining land availability, weak infrastructure, shortage of energy and possessing huge number of unskilled labor forces. These problems are likely to be worsening due to adverse impact of climate change.

In view of the above context, Government of Bangladesh in cooperation with the Government of the Netherlands has formulated BDP 2100, which would aid in realizing our vision to become a developed country by 2041. We hope that BDP 2100 would guide the country ensuring long term water and food security, economic growth and environmental sustainability and effectively reducing vulnerability to natural disasters and building resilience to climate change and other delta related challenges. The most significant part of the BDP 2100 is the formulation of its strategies in a short, medium and long term basis. The long term strategies will help to fulfil Delta vision of being a safe, climate resilient and prosperous delta, whereas the short and medium term strategies will help achieve benefits within the country's five year planning horizon.

We are grateful to the Hon'ble Prime Minister Sheikh Hasina for her personal initiative and guidance without which preparation of this visionary plan would not be possible. Hon'ble Planning Minister Mr. AHM Mustafa Kamal, FCA, MP, has always encouraged and contributed passionately in the formulation of this mega plan.

BDP 2100 is the culmination of a huge process that the team GED has pursued with the engagement of various stakeholders, development partners, eminent economists, social scientist, researchers, academia and civil society members, etc. I thank the GED officials and others who were involved in preparation of BDP 2100 for their immense effort and contributions.

(M. A. Mannan, MP)





**Dr. Shamsul Alam**  
Member (Senior Secretary)  
General Economics Division  
Bangladesh Planning Commission

## Preface

Bangladesh is one of the largest deltas of the world built by the confluence of the 3 (three) mighty rivers- the Ganges, the Brahmaputra and the Meghna. Like many other deltas of the world, Bangladesh is not bereft of challenges, many of which are closely related to its downstream location within the basins of the major sediment laden rivers, having an intense pressure on the scarce land and water resources. The country faces major inter-related delta challenges in water safety, food security and land degradation and is prone to natural calamities, such as floods, river erosion, cyclones and droughts. The challenges are both man-made and natural. The country is equally characterized by its resilience, the ability to adapt to changing climatic and economic conditions and advantage gained from the abundant natural resources available in the delta.

Management of this delta has therefore always been a key concern in both political and development agenda since long. Almost all the political movements during pre-independence period invariably included demand for flood control, disaster management and for irrigation measures, it is so because that those were the major causes of extreme poverty prevailing at that period within this delta. The election manifesto of the then United Front in 1954 advocated for protection of the country from extreme floods and famine and improving irrigation system. Father of the Nation Bangabandhu Sheikh Mujibur Rahman was always committed to develop flood control, drainage and irrigation facilities in the country and repeatedly demanded implementation of the Krug Mission report. Immediate after independence of Bangladesh, Bangabandhu established the relief ministry giving a special attention to building a disaster resilient country through minimizing losses of lives and properties caused by different natural hazards including cyclone and floods. He established Bangladesh Water Development Board (BWDB) in 1972, bifurcating the then East Pakistan Water and Power Development Board (EPWAPDA) to accelerate the implementation of the flood control, drainage and irrigation measures. He took keen interest in solving the transboundary water issues and established Joint Rivers Commission on a permanent basis in 1972. Bangabandhu had installed earthen forts locally known as 'Mujib Killa' in coastal regions aiming to provide shelter to coastal flood and cyclone affected people along with their livestock. The First Five Year Plan of Bangladesh (1973-1978) that was prepared under his guidance as the Chairman of the Planning Commission put strong emphasis on sound management of water resources. Many of the strategies and policies for sound management of water resources highlighted in the first five year plan are as relevant today as they were then suggesting the far-sightedness of Bangabandhu in identifying the need for holistic management of water resources and flood management.

Over the past 48 years since independence Bangladesh has achieved success in many fronts. The country has secured tremendous gains in development during the last ten years under the strong political leadership of Her Excellency Prime Minister Sheikh Hasina combined with many sound development policies and programme. GDP growth has today climbed from less than 4% in the early 1970s to around 7.86% in 2018; per capita income has surged from less than US\$ 100 in 1972 to US\$1751 in 2018; poverty has fallen from more than 75% in the early 1970s to less than 24%; life expectancy has increased to 72 years in 2018; and literacy has increased to 72.9% in 2017. The economy is gradually transforming from an agrarian base towards a modern manufacturing and services oriented economy. Bangladesh crossed over from a low-income economy to a lower middle income economy in 2015. The country has already

fulfilled all the criteria of graduating from least developed country to a developing country for the first time in 2018. Making this growth sustainable is even more challenging in the face of extreme adverse climate variability, with frequent storm and tidal surges, flooding, and droughts. Climate change is a serious threat to sustainable development. If nothing is done by 2050, climate change impact could make an additional 14% area of the country extremely vulnerable to floods and dislocate more than 35 million people in the coastal districts. At the macro-level, the combined effects of climate change could range from a loss of 1.3% of GDP per year in a moderate climate change environment to 2.0% of GDP per year in an extreme climate change environment. Many more challenges lie ahead of Bangladesh, the most important being pressure on land use, environmental protection, globalization and macro-economic development. Given the ambition to become a developed country by 2041, addressing the expected impacts of climate change, there is a need for an integrated approach to future land and water management in relation to water safety, agricultural growth and food security. The recent and future anthropogenic changes in the hydrological cycle due to e.g. climate change, construction of dams and barrages in the upstream countries in combination with increasing water demand are expected to make future water governance and management even more challenging. A number of sectoral plans have been developed so far in Bangladesh, but they tend to be short term oriented and independently pursued by individual ministry or division. Whereas, goals and targets at the national level and climate change and natural disaster risks present major downside risks and uncertainties that require long term strategies and multi-sectoral coordinated policy management under uncertainty. In view of the above long term challenges presented by climate change and natural hazards and based on the intention of Sheikh Hasina, the Hon'ble Prime Minister of Bangladesh, General Economics Division (GED) of the Bangladesh Planning Commission has formulated 'Bangladesh Delta Plan (BDP) 2100' with support from the Government of the Netherlands. The Memorandum of Understanding (MoU) signed between Bangladesh and the Netherlands in 2012 in presence of the Hon'ble Prime Minister Sheikh Hasina to cooperate on delta planning laid the foundation of BDP 2100. The preparation of BDP 2100 was officially launched by the Hon'ble Planning Minister AHM Mustafa Kamal FCA, MP in August 2014.

BDP 2100 has been conceived as a techno-economic, long-term, holistic, water centric integrated plan. An interactive planning process has been followed comprising three major steps: i) conducting baseline studies; ii) developing delta vision, goals and management framework; and iii) formulating adaptive strategy. These steps were supported by country wide consultation processes which eventually led to the outcome of an investment plan. The formulation of BDP 2100 drew lessons from Dutch delta experiences, while at the same time adapting to the specific needs of Bangladesh and finding inspiration in country's long tradition of resilience in adversity and water management. In short, it can be said that BDP 2100 focuses on "How to enable socio-economic development under uncertain changing conditions especially regarding climate change and (trans-boundary) scarce water resources?" The plan is holistic, considering many themes and sectors and bringing together individual strategies as well as integrated ones for the whole country, considering the needs of all water-related sectors in a single plan.

BDP 2100 looks primarily at the delta agenda up to 2050 but being mindful that the decisions taken today have implications up to 2050 and beyond. It sets up a long term vision for the evolution of the Bangladesh Delta by the end of the 21<sup>st</sup> century as '**Achieving a safe, climate resilient and prosperous delta**'. As steps to reach that vision it defines short to medium term goals as to achieve upper middle income status and eliminate extreme poverty by 2030 and being a prosperous country around 2041 with the longer term challenge of sustainable management of water, ecology, environment and land resources in the context of their interaction with natural disasters and climate change. The BDP 2100, therefore, seeks to ensure long term water and food security, economic growth and environmental sustainability while effectively reducing vulnerability to natural disasters and building resilience to climate change and other delta challenges through robust, adaptive and integrated strategies, and equitable water governance.

First Volume of the BDP 2100 has been organized into 14 chapters of which first five chapters deal with context, challenges and opportunities of Bangladesh Delta, climate change, environment and ecological

issues, trans-boundary water issues and approach of the planning process. The chapters from six to ten have elaborated strategies on water resources, land resources, agriculture, inland water transport and urban water management issues. Chapter 11 discusses investment and financing and chapter 12 focuses on governance and institutional issues. Chapter 13 and 14 describe monitoring and evaluation framework and delta knowledge management issues respectively. It provides long-term strategies for flood risk management, freshwater management, water supply and sanitation, river management, navigation, agriculture, fisheries, livestock, renewable energy, blue economy, earthquake. It addresses the changing dynamics of the climate change impacts and disaster risk nexus. It also includes a framework for its implementation with an investment plan phased out in short, medium and long term interventions (BDP 2100, Volume 2). The goals, associated strategies, policies, institutions and investments are moving targets and adaptive in nature. They are adaptive to changing natural events in order to respond appropriately and stay on the course to the path of the long term vision. The adaptive nature of delta management puts knowledge at a premium. BDP 2100 should be continuously science and knowledge driven. The knowledge management approach is anchored in the delta vision and goals and be updated periodically (end of every five years, preferably).

The implementation of the BDP 2100 involves total spending on delta-related interventions, through new projects and maintenance of new and old projects, which will gradually increase up to a level of 2.5 percent of GDP per annum by 2030; of which 2.0 percent of GDP would be from public funding and rest 0.5 percent would be from the private sector. The strategy for public funding involves some combination of tax financing, application of cost recovery based on 'beneficiary pays principle' and mobilizing foreign funding including tapping into the global Green Climate Fund (GCF) initiative. The BDP 2100 Investment Plan up to the year 2030, prepared in cooperation with World Bank group, consists of a total of 80 projects: 65 are physical projects, and 15 are institutional and knowledge development projects. Its total capital investment cost of the investment plan is estimated at 2,978 billion (\$37 billion). The investment plan projects have been selected following multi criteria analysis and rigorous consultation with the stakeholders. This BDP 2100 took almost four years to give it a final shape to kick off. This comprehensive, techno-economic mega plan stretching a period to the end of the current century is **the best gift to the future generations by the present generation.**

The process of the BDP 2100 formulation was led by the Hon'ble Planning Minister Mr. AHM Mustafa Kamal, FCA, MP and the Deputy Chairman of Bangladesh Planning Commission, who took keen interest in making this plan happen. Hon'ble State Minister for Planning and Finance Mr. M. A. Mannan, MP has always been supportive to us while preparing this plan. We have received intimate support and contribution from the relevant Ministries/Divisions in preparing this plan. The contribution and support received from different quarters particularly the members of the Technical Advisory Committee and National Steering Committee are deeply acknowledged and appreciated. We must also record our gratitude to Sheikh Mohammad Belal, Ambassador of Bangladesh to the Netherlands for his continuous support, encouragement and the liaison he maintained between the Foreign Ministry of the Netherlands and the Government of Bangladesh relating to Delta Plan issues. The concerned officials of GED who put their best determinations and efforts in formulation of this mega plan can never be forgotten. I also acknowledge with deep sense of appreciation the cooperation and support we received from the Government of the Kingdom of the Netherlands in preparing BDP 2100.



(Dr. Shamsul Alam)



## Executive Summary

The Bangladesh Delta Plan (BDP) 2100 is a long-term, integrated, and holistic vision of water and land management throughout Bangladesh. It supports the country's long-term development in the face of the opportunities and risks that emerge from the interface between water, climate change, and human activity<sup>1</sup>. Investment planning to implement this long-term vision will be done through shorter-term strategies, prepared in accordance with the principles of adaptive delta management (ADM). This adaptive approach to delta planning selects investment projects that link short to medium-term development targets and investment programmes with the long-term goal of sustained development based on climate-sensitive management.

The current Investment Plan is the first such selection of projects to put the Delta Plan into action. It sets out the physical and institutional investments the Government will make to put the Delta Plan into effect. The current Investment Plan consists of a total of 80 projects: 65 are physical projects, and 15 are institutional and knowledge development projects. Its total capital investment cost is BDT2,978 billion (\$38<sup>2</sup> billion). All projects can be started within the next eight years, though given the scale and programmatic nature of some investments, construction in some cases will extend over decades.

Development of the Investment Plan followed a rigorous, consultative, and inclusive process, using the principles of ADM. As part of the BDP 2100 formulation process, the General Economics Division (GED) of the Planning Commission asked over 20 agencies involved in work in the Delta to submit their priority investment projects. This generated 133 candidate projects with total capital costs of BDT3,753 billion (\$47 billion).

The candidate projects were screened, grouped, and then sequenced following an ADM methodology. Bangladesh is the first country in the world to develop a comprehensive investment plan for an entire delta using ADM. The purpose of ADM is to ensure that the right investments are made at the right time. It aims to avoid both 'too little, too late' and 'too much, too early' by identifying tipping points when a change in approach is needed. Therefore, flexible approaches based around smaller interventions phased over time are often preferred to large one-off projects that cannot be changed once committed to. Projects aim to address climate conditions that can be realistically anticipated. Interactions between projects, land use, and water management are considered. Working in harmony with natural hydrological systems is generally preferred to largescale attempts to alter such systems. Resources are used efficiently following cost-benefit analysis, and protection from water disasters is prioritized. Broad participation, investment in knowledge, and innovation are key. The ADM approach is detailed in section 2.

Candidate projects were included in the Investment Plan if their expected benefits exceed expected costs; if they contribute to at least one of the six Delta Plan goals; and if they are compatible with the ADM approach. Of the 133 candidate projects, 80 met these criteria.

---

<sup>1</sup> BDP 2100, Volume 1: Strategy

<sup>2</sup> This includes the costs of conducting feasibility studies

These 80 projects were then grouped into the seven ‘hotspots’ defined in the Delta Plan. These hotspots were developed from consideration of the Delta’s distinct hydrological regions, and the type and magnitude of the natural hazards in each. There are six geographic hotspots: 1) Coastal Zone 2) Barind and Drought Prone Areas 3) Haor and Flash Flood Areas 4) Chattogram Hill Tracts 5) River System and Estuaries and 6) Urban Areas . A seventh, cross-cutting hotspot addresses common issues that cut across the six geographical hotspots. Where appropriate, similar projects in hotspots were further grouped together into sub-programmes, such as improved urban water supply and sanitation, irrigation in the Barind, and Haor flood management. These sub-programmes promote scale, coordination, and learning economies in implementing these projects.

Within each hotspot programme, projects were prioritized and sequenced along adaptive pathways. Adaptive pathways help sequence projects by identifying archetypical projects to address a theme. They identify how economic and climate change scenarios affect when a change in approach is needed from one type of project to another. These points in time when a change in approach is needed are called ‘tipping points’.

Eighteen adaptive pathways were developed, covering three themes for each of the six geographic hotspots. These three central themes were: 1) preventing ‘too much water’, 2) ensuring ‘enough’ water, and 3) ensuring ‘adequate quality’ water.

Many interventions are possible to address each theme. These interventions can be placed into three project clusters. Some interventions simply build and expand on what is already being done (Cluster 0+ projects). Others require a change from the current approach (Cluster 1 projects). At the extreme, some may require changing the behavior of the water system (Cluster 2 projects). Each project was sequenced along the relevant adaptive pathway based on the hotspot the project relates to, the theme it addresses, and its cluster.

The total capital expenditure on projects in the Investment Plan is estimated to be BDT2,922 billion (\$37 billion). Adding in the feasibility studies (where currently lacking) and operating and maintenance costs<sup>3</sup>, total expenditure on the plan is expected to be BDT4,091 (\$52 billion). Annual expenditure on the plan will average BDT178 billion (\$2 billion) over the first 10 years, peaking at BDT254 billion (\$3 billion) in 2025. The Investment Plan portfolio of projects is presented in Part 2 of this volume. The investment expenditure profile is detailed in section 4.

This ambitious Investment Plan is feasible within the fiscal parameters set out in the Delta Plan. It will be financed using a mix of public, climate, and private finance (as described in section 4). It is expected that 99% of total expenditures on the plan will be publicly financed. Public capital expenditure is expected to average BDT120 billion (\$1 billion) per year over the first five years of the plan, peaking at BDT242 billion (\$3 billion) in 2025.

---

<sup>3</sup> Operating and maintenance costs for infrastructure projects are considered up to 2040

Of the total public finance, the Government aims to raise BDT370 billion (\$5 billion), or 12% of total expenditure, from climate finance sources. As the least-developed country with the most people seriously at risk from climate change, Bangladesh needs and deserves a substantial contribution from global climate finance providers. The Investment Plan's Climate Change Adaptation Programme (CCAP) is a holistic programme for boosting climate resilience in the Delta. It includes policies and institutions for coordinating climate resilience, as well as 46 infrastructure projects. The programmatic nature of the CCAP will facilitate the process of obtaining climate finance.

The Investment Plan also targets private finance through seven pioneer public-private partnership (PPP) projects. Although Bangladesh has a strong foundation in PPPs, private finance in delta projects like the ones in the Investment Plan has been relatively rare. The seven pioneer projects will help pave the way to scale up private finance in large-scale irrigation, inland water transport, dredging and land reclamation, water supply and sewerage services, and embankments with roads. Annual private inflows peak in 2021 at BDT6 billion (\$72 million, or 0.02% of GDP). This is a modest amount to start with, but will gradually increase after pioneer PPP projects show success, and after a comprehensive policy reform agenda is implemented. This reform agenda includes introducing user charges, developing viability gap funding mechanisms, having credit-worthy off takers, and building capacity within ministries and other agencies to implement bankable contracts.

To ensure the successful implementation and sustainability of the Investment Plan, policy and institutional reforms are planned so that an increasingly integrated and adaptive approach can be taken to planning and implementing investments in the Delta. These reforms start with how investments will be coordinated, and projects delivered. Bangladesh's successful five-year planning cycle will be retained, but greater flexibility and inter-agency coordination in implementation of the plan will be introduced as ADM is incorporated. ADM approaches will be progressively embedded into the planning paradigms of all agencies. New policies will be implemented to maximize the development impact of projects and to stimulate the flow of ever-larger volumes of private and climate finance. The policy and institutional reforms to support the Investment Plan are detailed in section 5.

The current Investment Plan is based on the existing situation and challenges in Bangladesh. As the Plan is implemented, circumstances may evolve that require adjustments in the design, selection, prioritization, and phasing of projects. Tracking these evolving circumstances requires careful monitoring and evaluation, not just of the implementation of the Plan, but of environmental, economic, and social developments across the Delta. Section 6 describes the monitoring and evaluation framework for the Investment Plan. Monitoring and evaluation capacity building will be coordinated with knowledge gathering and data management. By using this information base to evaluate and periodically adapt the Investment Plan, the Investment Plan will be a learning-based, living document that remains relevant to evolving conditions.



## Table of Contents (Part 1)

<b>Executive Summary</b>	<b>x</b>
<b>Introduction</b>	<b>3</b>
<b>2 Development of the Investment Plan Using Adaptive Delta Management</b>	<b>5</b>
<b>3 Investment Plan Projects and Sequencing</b>	<b>12</b>
3.1 Coastal Zone Hotspot	20
3.2 Barind and Barind and Drought Prone Areas Hotspot	21
3.3 Haor and Flash Flood Areas Hotspot	21
3.4 Chattogram Hill Tracts Hotspot	22
3.5 River Systems and Estuaries Hotspot	22
3.6 Urban Areas Hotspot	23
3.7 Cross-Cutting Area	24
3.8 Summary Statistics	25
<b>4 Financing the Investment Plan</b>	<b>29</b>
4.1 Public Finance of the Investment Plan	31
4.2 Accessing Climate Finance	31
4.3 Resource Mobilization through Private Finance	34
4.4 The Finance Plan Is Robust	42
<b>5 Policy and Institutional Reforms to Facilitate Implementation of the Investment Plan</b>	<b>45</b>
5.1 Implementing and Adapting the Delta Investment Plan to Achieve Climate Resilience	46
5.2 Introducing the Beneficiary-Pays Principle	47
5.3 Creating an Enabling Environment for Private Sector Engagement	48
5.4 Engaging the Public	49
5.5 Policy Reforms to Increase Coordination in Hotspots	50
5.6 Reforming and Strengthening Institutions	52
<b>6 Monitoring and Evaluation</b>	<b>53</b>
<b>List of Tables</b>	
Table 3.1: Investments by Hotspot Programme	26
Table 3.2: Investments by Theme	27
Table 3.3: Sources of Financing by Theme	27
Table 3.4: Investments by Cluster	28
Table 4.1: Guiding Principles for Selection of Pipeline Projects of the CCAP	32
Table 4.2: Projects Targeted for Private Finance	36
Table 4.3: PPP Project Groups	40
Table 4.4: Results of Finance Plan Scenario Analysis	42
<b>List of Figures</b>	
Figure 2.1: Overview of the Investment Plan Hotspots and Sub-Programmes	8
Figure 2.2: Sample Adaptive Pathway	10

Figure 3.1: Interpreting the Investment Plan Graphic	12
Figure 3.2: Investment Plan Portfolio of Projects	14
Figure 3.3: Investments by Hotspot Programme	26
Figure 3.4: Investments by Cluster	28
Figure 4.1: Delta Plan Expenditures and Finance Targets	29
Figure 4.2: Delta Plan Expenditures as Planned with Reduced Finance Targets	43
Figure 4.3: Delta Plan Expenditures Modified with Reduced Finance Targets	44

## List of Boxes

Box 1.1: The Investment Plan as an Annex to the Delta Plan	4
Box 2.1: Project Screening, Grouping, and Sequencing through Multi-Criteria Analysis	11
Box 3.1: PCN Information Used in Investment Plan Graphic	13

## Table of Contents (Part 2)

Appendices	
Appendix A : One-Page Project Detail Sheets	57
Appendix B : Investment Planning with Adaptive Delta Management	138
Appendix C : Agencies Consulted	207
Appendix D : Climate Change Adaptation Program	210
Appendix E : Institutional Structure for Program Management	234
Appendix F : Policy and Institutional Reforms Matrix	240
Appendix G : Results Framework and Monitoring Report Template	253
Appendix H : Use of Private Finance in Delta Investment Plan	263

## List of Tables

Table B.1: Coastal Zone Archetypical Projects for Too Much Water	144
Table B.2: Coastal Zone Archetypical Projects for Sufficient Quantity of Water	146
Table B.3: Coastal Zone Archetypical Projects for Quality of Water	148
Table B.4: Barind and Drought prone Areas Archetypical Projects for Too Much Water	149
Table B.5: Barind and Drought prone Areas Archetypical Projects for Sufficient Quantity of Water	150
Table B.6: Barind and Drought prone Areas Archetypical Projects for Quality of Water	151
Table B.7: Haor and Wetlands Archetypical Projects for Too Much Water	152
Table B.8: Haor and Wetlands Archetypical Projects for Sufficient Quantity of Water	154
Table B.9: Haor and Wetlands Archetypical Projects for Quality of Water	155
Table B.10: CHT Archetypical Projects for Too Much Water	156
Table B.11: CHT Archetypical Projects for Sufficient Quantity of Water	157
Table B.12: CHT Archetypical Projects for Quality of Water	158
Table B.13: River System and estuaries Archetypical Projects for Too Much Water	160
Table B.14: River System and estuaries Archetypical Projects for Sufficient Quantity of Water	161
Table B.15: River System and estuaries Archetypical Projects for Quality of Water	163
Table B.16: Urban Areas Archetypical Projects for Too Much Water	164
Table B.17: Urban Areas Archetypical Projects for Sufficient Quantity of Water	166
Table B.18: Urban Areas Archetypical Projects for Quality of Water	167
Table B.19: Criteria and Scales Used in the MCA	170
Table B.20: Stakeholders Invited to Participate in the MCA	177
Table B.21: Explanation of the MCA Scale	180
Table B.22: Summary of MCA Participants	181
Table B.23: Results of the Questionnaire—Question 1	181
Table B.24: Assigned Weights Based on Questionnaire Results	182
Table B.25: MCA Analysis Scores and Results	183
Table B.26: Selection of Projects for the Investment Plan	189
Table B.27: Summary of Project Costs	205
Table C.1: Agencies Consulted for Formulation of the Investment Plan	207
Table D.1: Guiding Principles for Selection of Pipeline Projects of the CCAP	224
Table D.2: Scale Scoring Guiding Principles of Pipeline Projects in the CCAP	226
Table D.3: Proposed Pipeline Projects CCAP	226
Table D.4: Lead Agencies for the Climate Change Adaptation Program	232
Table E.1: Investment Plan Hotspot Sub-programs	235
Table E.2: Institutional Structure for Investment Plan Sub-Programs	238
Table F.1: Policy and Institutional Reforms Matrix	247
Table G.1: Investment Plan Monitoring and Evaluation Results Framework	254
Table H.1: Comparing PPPs and Public Procurement in the UK and Australia	264
Table H.2: Assumptions to Calculate Revenue	290
Table H.3: Drivers of Success for Private Investment in the Power Sector	293
Table H.4: Success Drivers for Private Investment in Economic Zones in Bangladesh	294

## List of Figures

Figure B.1: Paradigm Shift to Adaptive Delta Management	139
Figure D.1: Change in average future total annual rainfall 2010 to 2039	212
Figure E.1: Overview of the Investment Plan Hotspots and Sub-Programs	234
Figure H.1: Project Structure for Privately Financed Irrigation Project	267
Figure H.2: Kurigram Irrigation Project Area	268
Figure H.3: Project Structure	269
Figure H.4: Model Calculations	270
Figure H.5: Ferry Terminal in Dhaka Illustrating Opportunities for Improvement	274
Figure H.6: DBFOM Structure for New Ferry Terminal	275
Figure H.7: DBFOM and Lease Structure for Dredging and Land Reclamation	278
Figure H.8: DBFOM Structure for Water and Wastewater Treatment Plants	281
Figure H.9: Project Structure	282
Figure H.10: Model Calculations	283
Figure H.11: Project Structure for Embankment and Highway PPPs	287
Figure H.12: Eastern Bypass Road and Embankment Map	287
Figure H.13: Project Structure	288
Figure H.14: Model Calculations	289

## List of Boxes

Box B.1: Assessing Risk	174
Box B.2: Draft Investment Plan Workshop Participants	179
Box D.1: Green Climate Fund (GCF) Financing Instruments	221
Box F.1: SDG Outcomes Targeted by Sector Policy Reforms	241
Box H.1: Pontal Irrigation PPP Project, Brazil	272
Box H.2: Privately operated and financed ports in the Mississippi-Missouri River System	276
Box H.3: Fasiver Dredging and Canal Revitalization, Belgium	278
Box H.4: PPP for As Samra Wastewater Treatment Plant, Jordan	285
Box H.5: Note on Cost of Capital and Revenue Forecasts	290
Box H.6: Laguna Lake Expressway Dike Project and Manila Bay Integrated Flood Control, Coastal Defense, and Expressway Projects, Philippines	292

## Table of Contents (Part 3)

### Appendices

Appendix I : Project Cost and Benefit Analysis	299
--	-----

### List of Tables

Table I.1: Economic Costs and Benefits	308
Table I.2: Project Alignment with BDP2100 Goals	313
Table I.3: Summary of Project Studies	314
Table I.4: Main Challenges within Hotspots	317
Table I.5: Short-Term Ranking of Projects	318
Table I.6: Summary Table of Project Assessments	329
Table I.7: Project Costs and Assumptions	339
Table I.8: Prioritized Projects	342
Table I.9: Batch 1–3 Projects Included in the ADM Prioritization	343
Table I.10: Batch 1–3 Projects Excluded from the ADM Prioritization	343
Table I.11: Summary of Project Scoring	346
Table I.12: Project Prioritization Results	347
Table I.13: Projects Received through the BDP2100 Process	487
Table I.14: Additional Batch 4 Project Proposals	490
Table I.15: General Research for Project Assessment	500
Table I.16: Additional Project-Specific Research and Consultations for Project Assessment	507
Table I.17: Project Prioritization Approaches in Select Countries	511

### List of Figures

Figure I.1: Sample Adaptation Pathway	304
Figure I.2: Distribution of Projects by Regional Hotspot	312
Figure I.3: Delta Investment Budget Envelope	340
Figure I.4: Adaptive Pathways Example	344
Figure I.5: Major Rivers Adaptive Pathway	494
Figure I.6: Coastal Zone Adaptive Pathways	495
Figure I.7: Urban Areas Adaptive Pathways	497
Figure I.8: Barind and Drought Prone Areas Adaptive Pathway	499

### List of Boxes

Box I.1: Brief Introduction to Adaptation Pathways	304
Box I.2: Challenges Facing Projects (Reasons for Delays)	315
Box I.3: Dike Technologies	515

