



SEMINAR
Proceedings



BANGLADESH DELTA PLAN 2100



09 November 2017
BISS Auditorium, Dhaka

Organised by



Bangladesh Institute of International and Strategic Studies (BISS)



General Economics Division (GED), Bangladesh Planning Commission



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FOREWARD

Bangladesh Institute of International and Strategic Studies (BISS) in collaboration with General Economics Division (GED), the Bangladesh Planning Commission organised a seminar titled “Bangladesh Delta Plan 2100” on 09 November 2017 at BISS Auditorium. **Mr Anisul Islam Mahmud, MP**, Honourable Minister, Ministry of Water Resources, Government of the People’s Republic of Bangladesh graced the seminar as the Chief Guest. **Mr M A Mannan, MP**, Honourable State Minister, Ministry of Finance and Ministry of Planning was the Special Guest in the programme. **Major General A K M Abdur Rahman, ndc, psc**, Director General, BISS delivered the address of welcome while **Ambassador Munshi Faiz Ahmad**, Chairman, Board of Governors, BISS, delivered Introductory Remarks and chaired the inaugural session. **Professor Dr Jamilur Reza Choudhury**, Vice-Chancellor, University of Asia Pacific chaired and summed up the second session.

Professor Dr Shamsul Alam, Member, GED, the Bangladesh Planning Commission presented two papers, titled ‘Overview of BDP 2100: Process and Methods, Hotspots, Opportunities and Challenges, Context, Vision and Goals of BDP 2100’ and ‘Overview of BDP 2100 - Strategies, Interventions, Investment Planning, Financing, Governance and Institutions, Monitoring and Evaluation, Follow up Project’ in Session I and Session II, respectively. The second session of the seminar was followed by a panel discussion, where three distinguished panellists, **Professor Dr M Monowar Hossain**, Executive Director, Institute of Water Modelling (IWM), **Professor Dr Md Munsur Rahman**, Institute of Water and Flood Management (IWFM), Bangladesh University of Engineering and Technology (BUET) and **Engineer Md Mahfuzur Rahman**, Director General, Bangladesh Water Development Board (BWDB) discussed about various aspects related to the issue.

The participants informed that Bangladesh Delta Plan (BDP) 2100 has been formulated through a process that takes inspiration from the delta planning process used in the Netherlands while taking into account Bangladesh’s perspective. It integrates the delta-related sectors to formulate a long-term, holistic and integrated plan for the Bangladesh Delta. The plan aims at the long-term water and food security, economic growth and sustainable environment while coping with natural disasters, climate change through adaptive and integrated strategies. Through optimal uses of land and water resources, the plan aims at achieving its goal through conservation and judicious use of water, wetlands and ecosystem, and efficient management of rivers.

This publication is an endeavour to present the narrative of addresses in the inaugural session; valuable presentation and discussion by Officials from different ministries of Bangladesh government, representatives from different diplomatic missions, national and international organisations, researchers from various institutions, top-level officials of civilian and military organisations, media and members of academia and questions, comments, and recommendations by the audience during the working sessions. I am quite sanguine that this report will be a useful reading and reference material on the subject matter.

Major General A K M Abdur Rahman, ndc, psc
Director General, BISS

SESSION I

INTRODUCTORY REMARKS



Ambassador Munshi Faiz Ahmad
Chairman, Board of Governors, BISS

Ambassador Munshi Faiz Ahmad started the session by saying that the BDP 2100 has been inspired by the delta planning used in the Netherlands, focusing on the prevailing conditions in Bangladesh and its short, mid and long-term needs. However, most people in Bangladesh are not aware of such an important enterprise undertaken by the government. He hoped that the seminar would create more awareness about the plan through discussion and dissemination of information. He talked about Bangladesh's deltaic formation and geography, importance and impact of rivers and other water bodies for the country and its people. In regard to Bangladesh's moving ahead with its steady and commendable development efforts, these water bodies would be playing an increasingly important role in ensuring sustainable development in mid and long terms. However, river-related calamities like floods, water-logging and river bank erosion saw increase in recent times, both in frequency and severity of the devastation. There are these problems, and on the other, rivers have been disappearing at a fast pace, taking massive tolls on the people and the environment. This would assume the more severe form as Bangladesh remains one of the most vulnerable countries in the world from the impacts of climate change. Small geographical area, massive and continuously growing population, inadequately planned development and rapid urbanisation would only exacerbate these troubles in the absence of appropriate measures.

Considering such important challenges, the government of Bangladesh has come up with the BDP 2100 in cooperation with the government of the Netherlands. It has laid down its vision as ensuring 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 endeavour would incorporate planning from relevant sectors to formulate a long-term, holistic and integrated plan for Bangladesh. The plan, moreover, would be based on a long-term vision for the country's future. That vision, together with the use of scenarios, would allow planning to be flexible and at the same time, dynamic by continuously taking uncertainties and future issues regarding climate change, socioeconomic development, population growth, regional and international cooperation into account. The BDP 2100 would aim at providing the foundation for permanent delta governance in

Bangladesh through defining a delta framework. It would be expected to achieve three national goals for the country: a) eliminate extreme poverty by 2030; b) achieve upper-middle income country status by 2030; and c) becoming a prosperous country by 2041. It also contains developed strategies at both national and regional scale. National-scale strategies have been developed for flood risk management, freshwater and water supply and sanitation while those at the regional level have been developed for river system and estuaries, coastal zone, Chittagong Hill Tracts (CHT), urban areas, *barind* and drought-prone areas, *haor* and flash flood areas.

Ambassador Ahmad commented that there were several previous plans, namely National Water Plans (NWP), Flood Action Plan (FAP), Bangladesh Water and Flood Management Strategy (BWFMS), National Water Management Plan (NWMP) and others of which very little was known about and whether they were implemented fully or partially and how they benefitted Bangladesh. He finally added that people might like to know as to whether and how BDP 2100 is linked with its predecessors.



WELCOME ADDRESS



Major General A K M Abdur Rahman, ndc, psc
Director General, BIISS

In his address of welcome **Major General A K M Abdur Rahman, ndc, psc**, informed the audience that Bangladesh is the largest delta of the world. More than 300 rivers and massive floodplain of the country support life, livelihoods and economy. Owing to the deltaic formation, the configuration of rivers and climate change, Bangladesh has been ranked as one of the most vulnerable countries in the world in terms of risks from natural disasters. He argued that the vulnerabilities of Bangladesh delta and its associated multidimensional challenges necessitate a plan. In this regard, General Economics Division of Bangladesh Planning Commission with wholehearted support from the government of the Netherlands has already developed the “Bangladesh Delta Plan 2100”.

Major General Rahman said that the BDP has a vision, “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.” He noted that the BDP 2100 is a long-term strategic plan for the entire Bangladesh delta and a roadmap towards coordinated and prioritised investment in land and water management, leading to the desired future in 2100. It is being formulated through wide-ranging stakeholder consultations.

Major General Rahman described the BDP 2100 an arduous and mammoth task with issues of strategy, investment, planning, financing, governance and institutions, monitoring and evaluation. However, he firmly believed that with coordinated policy options and effective actions, Bangladesh would be able to address the issues convincingly. He hoped that the seminar will not only enlighten the audience about the present status of the BDP 2100 but also generate lots of ideas and thoughts to solidify the plan. Finally, he concluded his address of welcome by thanking everyone.

PRESENTATION ON 'OVERVIEW OF BDP 2100: PROCESS AND METHODS, HOTSPOTS, OPPORTUNITIES AND CHALLENGES, CONTEXT, VISION AND GOALS OF BDP 2100'



Professor Dr Shamsul Alam

Member (Senior Secretary) General Economics Division (GED), Bangladesh Planning Commission, Government of the People's Republic of Bangladesh

Professor Dr Shamsul Alam said that the BDP 2100 is a mega plan, which is underway to be approved by the government of Bangladesh. He presented the final draft of the plan and noted that there would remain ample scope for improvement by taking inputs. According to him, salient features of his presentation are: delta context, opportunities and challenges, the process of preparation methods, hotspots, visions, goals, strategies, monitoring and evaluation, investment in and financing of this mega plan, governance and implementation, *i.e.*, how to proceed with this plan. Professor Alam informed that the BDP has 14 chapters in its first part while the second part contains investment for the plan. Bangladesh, the largest delta of the world is built on the confluence of three important rivers, namely, the Ganges, the Brahmaputra and the Meghna. A total of 93 per cent of the catchment area is lying outside Bangladesh. This catchment area is very dynamic and would carry the annual sediment load of 1.0-1.4 billion tonnes. There are about 700 rivers, 57 trans-boundary rivers of whom 54 are with India and 3 are with Myanmar. However, water is abundant in the wet season and scarce in the dry season, which is a common feature of this region.

The formation of this delta provides with good opportunities. That is because of the deltaic nature of Bangladesh's land which is quite fertile. The country has plenty of rivers, tributaries and creeks which help it go with a very productive agricultural sector. This deltaic opportunity also gives the country open access to the sea, which is a huge advantage. Bangladesh's riverine situation also allows inland water transport facility of about 6,000 km of river routes. The Sundarbans, the largest natural mangrove forest in the world, is situated in this delta. It is a unique ecosystem which covers a total area of 5,77,000 hectares, of which 4,01,600 are land, and the remaining 1,75,400 is underwater. The ecological settings here are the contribution of the deltaic nature; there are two Ramsar sites, 9 Ecologically Critical Areas (ECAs), 17 national parks, 20 wildlife sanctuaries, 8 eco-parks and 2 botanical gardens. The five important ECAs are: Hakaluki *haor*, Tanguar *haor*, Sonadia

Island, St. Martins Island, and Teknaf peninsula. Over 800 species of wildlife have been identified in these ECAs. Thus, this deltaic nature provides opportunities and simultaneously, brings in challenges as well. The challenges are: rising temperature, rainfall variability, increased flooding, droughts, river erosion, sea-level rise, cyclones and storm surges, water logging, problems of sedimentation and its management, trans-boundary river challenges.

Professor Alam said that before going with the preparation of the BDP 2100, there had been 24 research studies conducted for generating information, data and scientific knowledge. The studies were mostly related to climate change, natural resources, environment, ecological management, investment and finance, governance, and the performance of water sector over the last 60 years. Later, the vision and goals of this plan are set. Strategies are developed following adaptive delta management plan which is a significant value addition to the BDP 2100. Strategies for sectoral development have also been formed, particularly for water resources, land, agriculture, inland water transport, urban and rural water supply while national strategies are formed for the management of flood risk, freshwater and ensuring freshwater availability. Extensive reviews of relevant existing policies, plans and strategies related to the water sector are carried out to find reasons why those were not implemented. The suggestions made in those plans are taken up and



holistically integrated into the BDP 2100. In preparation of the BDP 2100, a number of committees are involved. Here, Professor Alam said that he led the preparation of the 6th and 7th Five Year Plans of the government of Bangladesh. The second one is going on now. As the BDP is a technical document and techno-economic plan, views of all technical people from all spheres of public life are considered for its preparation. Other involved committees are the Project Implementation Committee, headed by a member of the GED (Professor Alam himself), the Project Steering Committee (led by the Principal Secretary, Prime Minister's Office) with about 20 Senior Secretaries from large ministries involved with the water, agriculture, environment, land, etc., to oversee the preparation of the BDP. The National Advisory Committee is being headed by the Planning Minister; other members are Ministers for water resources, agriculture, environment and forest, Cabinet Secretary, Principal Secretary, Governor of Bangladesh Bank, other relevant secretaries and members of relevant sectors/divisions of the Planning Commission.

Dutch-Bangla Intergovernmental Committee is also involved with the plan's preparation. Bangladesh took assistance (technical and financial) from the Dutch government. The intergovernmental committee is being headed by the Deputy Foreign Minister of the Netherlands and Foreign Minister of Bangladesh. This committee so far held three meetings. There are 25 officials from relevant ministries working as focal points. These officers were taken to the Netherlands and showed how the country managed their delta. All these focal points have also received an orientation about the Netherlands Delta Plan. More than 20 Dutch consultants are working in Bangladesh on the BDP. Although Bangladesh took technical and financial assistance from the Netherlands, the BDP's draft is not prepared by the Dutch consultants. It is prepared by Bangladeshi consultants taking inputs from them. Professor Alam termed this as an example of ingenuity. It is in fact prepared by Bangladeshi experts in water sector planning, management, investment who were employed by the country's government. Other Bangladeshi specialists whose assistance was taken here included the Center for Environmental and Geographic Information Services (CEGIS), Institute of Water Modelling (IWM) and Water Resources Planning Organisation (WARPO). They all participated in every stage of preparation of the BDP draft, and their opinions were taken. Thus, the process has become participatory. The government of Bangladesh has tried to use its domestic talent as much as possible along with inputs from the Dutch consultants.

Professor Alam highlighted the concept, 'hotspots', a term used in the water sector and also in climate change, which has been discussed in the BDP. The hotspot is defined as a place of significant activity or danger. The BDP 2100 has defined hotspot as a broad grouping of districts and areas facing similar natural hazard risks. Hotspots are prototypical areas where similar hydrological and climate change vulnerability characteristics and problems converge. He described six types of hotspots: coastal zone, *barind* and drought-prone areas, *haor* and flash flood areas, CHT, river systems and estuaries, and urban area. There are some areas which do not belong to hotspot category. These are called 'crosscutting areas'. Also, some areas do not fall in the delta. As large parts of Bangladesh is deltaic, the name Delta Plan is adopted covering the whole country, but that does not mean every area would be included. In the Netherlands also, not all parts of the country are within the Dutch Delta. The scenario is same for the Nile Delta. The BDP 2100 would cover entire Bangladesh. It is a long-term national plan; areas are interconnected somehow in terms of production and entrepreneurial activities. Therefore, the country would have to be seen as a whole.

While talking about hotspots, Professor Alam said, each of them has particular characteristics and challenges. Coastal zone, for example, has floods, salinity, cyclonic storms and tidal surges; *barind* and drought-prone areas have water scarcity, ongoing desertification; in *haor* and flash flood areas, there are flash floods. Here he mentioned the flash floods of 2017, which, besides other damages, caused rice production loss of 1.5 million tons. The CHT is affected by the scarcity of fresh water, inadequate sanitation and continuous environmental degradation. River systems and estuaries have problems of river erosion, sedimentation and navigation leading to their demise. But rivers must be kept alive for lives and livelihood. In urban areas, water-logging has become a big problem accompanied by air pollution and environmental degradation. These are the challenges with hotspots. Regarding the vision of the BDP, Professor Alam said each plan must have its own vision. The BDP's vision is prepared through consultation with large numbers of people, approximately 1,800. He hoped it would cover the vision in its most genuine spirit of the Delta Plan. The vision is: ensuring long-term water and food security, economic growth and environmental sustainability while coping effectively with natural disasters, climate change and other delta issues through robust, adaptive and integrated strategies and equitable water governance. Thus, the vision would cover all problem areas in Bangladesh's national life and what

would be needed to aim for, e.g., food security and economic growth. There are three higher level goals: elimination of extreme poverty by 2030; achieving the status of upper-middle income country by 2030, and becoming a developed country by 2041.

Professor Alam spoke about the goals of BDP 2100: ensuring safety from floods and climate change-related disasters, ensuring water security and efficiency of water usages, ensuring sustainable and integrated river systems and estuaries management, conserve and preserve wetlands, ecosystems and promote their wise usage, developing effective institutions and equitable governance for in-country and trans-boundary water resources management, and achieving optimal use of land and water resources. All these goals are water-related, climate centric and if Bangladesh would have to go with the green growth strategy, development must be sustainable. To accomplish such a growth strategy, the BDP 2100 would be the answer and the most significant value addition. Because all climate parameters and climate change impacts are considered while devising the plan and providing suggestions. The BDP 2100 is a great value addition which would be an effective tool for going with the green growth strategy. This planning is a paradigm shift compared to earlier times, and it would produce the Adaptive Delta Management.

Professor Alam said that in the late 1960s and early 1970s, only standalone projects were followed in Bangladesh. Projects used to be built wherever necessary not considering how other sectors like agriculture, hydrology, the livelihood of people around would be affected. From then on and after Bangladesh's independence, intersectoral consideration scheming was followed. It focused on how water-related works could be linked to agriculture. Then there were also flood control and irrigation projects in those days. But agricultural productivity received more attention. The improvement was the shift from standalone approach to intersectoral approach in the 1960s. Then gradually, water and other ministries felt the need for cooperation and there arose an awareness about the interrelation between projects. They did not limit the focus on water and agriculture. Therefore, multisectoral thinking emerged. But these were not enough. There were needs to see the multiplicative effects of water and effects of climate parameters very carefully. Here, Professor Alam stressed considering everything within the paradigm of climate change. He also referred to the Adaptive Delta Management as an exogenous variable in planning. This is a comprehensive strategy, taking care of everything in its aspects: in society, nature and management of natural resources. This is what Adaptive Delta Management, which has been followed in preparing the BDP 2100. In order to illustrate the role of BDP 2100 and its contribution to the long-term development of Bangladesh, two scenarios are considered as policy options. The first is "Business as Usual Scenario" and the second is "Delta Plan Scenario".

Apart from this two broad scenarios, there could be many depending on how one would view the socioeconomic and natural resources which have to be managed. But to make it simple, first, it was considered, if there is no BDP 2100, what Bangladesh would gain and where it would go. Then, if the plan would be implemented, what would change and how that would impact growth and improve livelihood is taken into account. These are measured, and it would give a clear justification for adopting the Delta Plan. These two scenarios are considered, but four other scenarios also come in while developing the strategies, namely productive, resilient, what would happen if climate change would go on this way, depending on the uncertainties that Bangladesh would be facing. That is a bit technical, but broadly, when these are judged in the plan regarding investment and its impact, it could be seen what could happen in the absence of the BDP and what changes would be there if there exist such a plan. That would help the architects of the BDP 2100 to understand the difference between having and not having the Delta Plan.

ADDRESS BY THE SPECIAL GUEST



Mr M A Mannan, MP

*Honourable State Minister, Ministry of Finance and Ministry of Planning,
Government of the People's Republic of Bangladesh*

Mr M A Mannan, MP thanked BISS and GED of the Planning Commission for such a time demanding initiative of organising the seminar on BDP 2100. He stated that he did not get the chance to know the BDP in detail. He hoped that the seminar will help him as well as the audience to understand more about the plan.

The State Minister mentioned that the BDP 2100 is one of the biggest plans of the country. Every plan has dream behind it. He recalled the time from his school days when he heard about the Krug Mission Report of 1957 and General Hardin's Report of 1963 which resulted in the adoption of the Master Plan of 1964. The Master Plan indeed created hope among the general public. However, it did not last long. He also mentioned that the idea to establish the Rooppur Nuclear Power Plant, the country's first nuclear power plant, generated back in 1961. Finally, the dream came true after so many years under the current government and the first of two units is expected to go into operation in 2023. He added that Bangladesh has attained a strong position under the prudent leadership of the Honourable Prime Minister Sheikh Hasina. The country is moving steadily towards fulfilling her dreams. The latest inclusion is the BDP 2100.

The State Minister noted that the BDP 2100 is a joint venture between the Netherlands and Bangladesh. The Netherlands will assist Bangladesh to develop and implement the plan. However, there are huge differences between the deltas in the Netherlands and Bangladesh. Bangladesh is the largest delta in the world. It is continuously changing and is much more complicated than the Dutch delta. So, he requested the authority to keep that in mind while developing the plan.

He informed the audience that he worked closely with the Center for Environmental and Geographic Information Services (CEGIS), a leading knowledge centre for information on the environment in Bangladesh in developing the *Master Plan of Haor Area*. The plan aims at the integrated development of the *haor* region considering its development potential. He opined

that it will be beneficial if the authority could make a connection between the *Master Plan of Haor Area* and the BDP 2100. He hoped that like the Master Plan, the BDP will get the nod from the Honourable Prime Minister.

The State Minister argued that the BDP's necessity and long-term impacts should be discussed more. He urged the GED to disseminate the detailed information to the people. The lack of feedback on the plan might be due to the language barrier. Therefore, he emphasised that the text of the plan should be made easier so that common people can understand it. He suggested that the authorities concerned should disseminate the plan in Bangla for better understanding.

He concluded his speech by stating that Bangladesh is getting closer to fulfil its aspirations slowly but surely. The Padma Bridge, Dhaka-Chittagong double-track rail line, Payra deep-sea port and the BDP 2100 are no longer a dream. If the authorities can make a connection with these ventures, then everything will fall in place. He hoped that participants would share their valuable opinions to make the seminar a success.



ADDRESS BY THE CHIEF GUEST



Mr Anisul Islam Mahmud, MP

Honourable Minister, Ministry of Water Resources, Government of the People's Republic of Bangladesh

At the outset, **Mr Anisul Islam Mahmud, MP** thanked BIIS for organising the event on a very important subject – the BDP 2100. He believed that this subject lies in the existence of the nation. He also thanked Professor Dr Shamsul Alam for presenting the huge plan, which spans almost 83 years if it starts from the year of 2017. He termed the BDP as the 'first holistic approach' in solving a problem that covers such a wide-range of time. For example, Five Year Plan (FYP) is for five years, and within this time frame, policy makers can change certain things but still, the horizon may not be beyond the line of sight. Compared to FYP, the BDP is for 83 years, and it needs lots of discussions. Though it has been finalised, but there is one thing in between, and that is Adaptive Delta Management which means there will be a change, an adaptation by looking at what happens when the process starts. He opined this plan needs lots of dissemination and requested to print and electronic media to come up with the dissemination of this huge plan.

The Minister added that Bangladesh is the largest delta in the world and this deltaic plain is a river delta which is made of the largest sediment load of two Himalayan rivers – the Ganges and the Brahmaputra and other non-Himalayan river the Meghna. He pointed out that there are few examples of so many rivers, especially big rivers in one country. Bangladesh has three big river basins. In Europe and America, policy makers are concerned about river management. Except rivers like the Amazon and the Nile, Europeans do not have any big river like the Ganges, the Brahmaputra and the Meghna. He also pointed out that although Bangladesh is a deltaic plain of these three rivers, it constitutes only seven per cent of the total catchment area. The entire water of the catchment area goes through a single outlet. The Meghna estuary is the second largest single outlet after the Amazon. This is also the single largest outlet for three rivers – the Ganges, the Brahmaputra and the Meghna. He expressed his concern that the 93 per cent water of the total catchment area which does not belong to Bangladesh is coming to a narrow catchment area of only seven per cent and passing through a narrower single outlet which is Meghna estuary. According to him, this situation is a big problem for Bangladesh. Another problem he pointed out that Bangladesh has a tremendous amount of water that the country gets on a yearly basis. But according to the seasonal basis, Bangladesh gets only 20 per cent of the available water. It happens during the dry season when water is needed the most. So, this difference of availability

between different seasons creates tremendous water scarcity. Bangladesh gets too much of water when it does not need, but when it needs the water, it does not get enough of it, he remarked.

The Minister mentioned Bangladesh's geographical location. In the south, Bangladesh has the Bay of Bengal. In the north, it has the Himalayas. Water from melting snow flows through the rivers and finally goes to the Bay of Bengal. Because of the geographical location, Bangladesh has to face cyclones, tidal surges and other natural calamities. Salinity intrusion is another big challenge for Bangladesh. Salinity is now being an important and widely discussed issue. Since Bangladesh has a long coastline on the north, the adverse impact of saltwater intrusion is significant here. The coastal population of the country is becoming vulnerable to saltwater intrusion. He expressed concern about the problem of silt accumulation due to which rivers and canals are losing their navigability. Rivers cannot contain water due to excess deposition of silt on riverbeds. Loss of topsoil in the Himalayas is coming to the floodplains and riverbeds and waterways are getting clogged with massive amount of silt deposit. He informed that at least 1.2 to 1.5 billion tons of



silt flows through the river systems yearly. The coastal rivers are also getting clogged with loads of sediment coming from the Bay of Bengal through the tidal rivers. He gave the example of Bhabadaha sluice gate water clogging problem due to the vast amount of siltation.

The Minister agreed with the statement of the State Minister, Mr M A Mannan that the complexity of Bangladesh's Delta is different from that of the Netherlands and its situation is more complicated. The Minister argued that Bangladesh did its best to tackle these problems in the past. For example, the 1957 Krug Mission Report guided the government policy. The Report was the product of a study on flood control and water management in East Pakistan after the disastrous floods of 1954, 1955 and 1956 that drew global attention. The most significant recommendation of the report was to create a new government corporation with comprehensive responsibilities and authorities to deal with all water and power development problems. Following the recommendation, East Pakistan Water and Power Development Authority (WAPDA) was created in 1959. According to the Krug Mission Report, the government took steps to ensure the prevention of flood control and drainage. The Brahmaputra right bank embankment was one of the examples that were made on the basis of the suggestion of the Krug Mission Report. It was made under the Brahmaputra Flood Embankment Project, which

was located on the right banks of the Teesta and the Brahmaputra Rivers in then East Pakistan. After that, between the 1960s and 1970s, the government built around 139 polders to prevent flooding. The Minister argued that people make lots of criticism of the water development board, but he strongly opined that the polders were very effective to protect the area from flooding. He added that without these polders farmers could not be able to do their irrigation and cultivation properly. These polders are also useful for protecting croplands from saline water intrusion. Then, he described the usefulness of the irrigation project in 1980. He also highlighted the riverbank erosion problem. He informed that every year Bangladesh loses 5000 hectares of land due to riverbank erosion. There are about 50 thousand families who had lost their lands due to riverbank erosion. And around 70 per cent of them migrated to Dhaka after losing their lands. So Bangladesh dealt with the flood control problem at the outset, then worked for irrigation and then gradually started working for preventing river bank erosion problem. The Minister reminded that the prevention of river bank erosion is very costly. Therefore, Bangladesh spent money on the irrigation projects in only four districts. These are Khulna, Rajshahi, Sirajganj and Chandpur.



In discussing more about the issue, the Minister argued that people nowadays have become more politically aware. Therefore, politicians and policymakers have to face tremendous amount of pressure to stop the erosion. From his experience, he noticed that the members of parliament come for erosion control projects to be signed. Hence, the focus has been changed from irrigation to bank erosion. In the past, people were more interested in solving the irrigation problem, but nowadays people are more aware of the bank erosion. The situation has changed. People are now finding out their needs and making demands to fulfil the requirement. The Minister recalled that, earlier, there was no integrated policy. Projects were built based on the directions only. There was no integrated view of development. Now, most of the projects which have been taken are demand-driven. These are not planned but based on the people's demand.

The Minister strongly argued that Bangladesh's capacity in the last ten years has changed tremendously. Now the country is going for a more integrated approach towards development. People of Bangladesh should have to realise it. The vision of 2021 to become a middle-income-country has been achieved under the leadership of the Honourable Prime Minister Sheikh Hasina. After that, the next vision is that Bangladesh will become a developed country by 2041. In this

context, the country is now developing the BDP 2100. It is an integrated plan. Bangladesh is now approaching for such a mega plan under which there will be everything that the plan needs.

While discussing the issue of climate change, the Minister said that although the BDP 2100 is related to water, it is a cross-cutting issue. So, climate change is also related to the plan. He believed that the problem of climate change is one of the major impediments towards sustainable development and the vision of achieving the economic development by 2041. He recalled the impact of climate change over his hometown. It is about 20 km upstream of the Karnaphuli river. In the past, he had never seen water overflowing the Halda river. He also gave the example of the Chittagong city. During high tide, water enters the city. He informed the audience about the latest prediction that by 2100, one-third of the country would be vulnerable due to sea level rise. Additionally, the country is facing frequent tropical cyclones, storm surges and heavy monsoon rainfall. Moreover, the country does not have any protection such as using modern dykes.

At the same time, the Minister also gave hope that there is always a solution to counter the menaces of climate change. He mentioned the example of the Schiphol Airport in the Netherlands, whose official name is the Amsterdam Airport Schiphol. This airport and its surrounding area, known as Schiphol Mainport, are extremely vulnerable to climate change. Thus, the Amsterdam Airport Schiphol is defined as one of the hotspots in the Netherlands for adaptation to climate change. The airport is the world's most low-lying airport, which lies on the bottom of the Haarlemmer Lake over four metres below the sea level. Climate change and the resulting change in weather conditions not only affect daily operations at Schiphol Airport but are also a determining factor in possible future expansion. Therefore, this airport needs to anticipate such changes in weather and climate if it is to maintain its competitive position as a main port. It needs climate data and better adaptation policies to control air traffic and manage the operation. By giving the example, he showed that the climate change could be a driving force for research and innovation to find out advanced adaptation capabilities.

While talking about the Amsterdam Airport Schiphol, the Minister said that Bangladesh does not have any land below the sea level. But in the Netherlands, around 50 per cent of the land is below sea level. With this vulnerable situation, the country is surviving. Thus, the Minister asked to know well about how the Netherlands is surviving, what they have done to survive and what measures they have taken to counter climate change. Since the Netherlands has made the necessary adaptation, necessary changes, they are now surviving the vulnerable situation. The Minister argued that the new BDP 2100 needs to have a greater emphasis on the issue of climate change.

The Minister also informed that the Ministry of Water Resources has changed their plan. They are now taking initiatives to upgrade the embankments and polders as these are almost 60 years old. He emphasised that the maintenance is an important issue for sustainability of any project. For that purpose, he informed that the ministry has taken some projects and under these projects, they are increasing the height of embankments by almost a metre. Also, Bangladesh does not have any hard-covering embankments. They are made of just mud. The Minister said that hard-covering embankments are used abroad. Therefore, the Ministry of Water Resources has taken plans to build hard-covering embankments to make them robust. It has also taken a project called "Coastal Embankments Improvement Project". Under this project, these mud-made embankments are being upgraded with hard-covering embankments.

The Minister also discussed “hotspots”. The BDP 2100 covers the entire country, but some places will be given special focus which will be called “hotspots”. He said they will not solve the entire water management problem. Instead, they will divide the zones on the basis of vulnerability. These zones will be given special priority. He gave the example of the northern zone which is a drought-prone area. He also opined that people do not know about the Teesta Project properly. The Teesta Barrage project is not only for the dry season. In fact, it was done for supplementary irrigation between September to December. He said that this Teesta Barrage is very useful for irrigation and helps farmers by increasing the irrigation water by almost three times. Although it is true that there is not sufficient water in the Teesta river, Bangladesh is getting its portion of the water efficiently through the Teesta Barrage. He, therefore, talked about the “Hotspot Approach”. Under this approach, selected special zones will get priority. For example, the southern coastal zone’s major problem is silt which comes from the high tide. Hence, this type of challenge will be addressed under the Hotspot Approach.

The Minister also discussed the land reclamation issue, which is included in BDP. He opined that the issue needs to be done within Bangladesh as the river system has taken away almost 2000 km of land. People do not realise the issue yet. He said, in the past, the width of the Brahmaputra was eight km, but today it has become sixteen km. With this example, the Minister tried to show how Bangladesh is losing its land. He informed that the process has now started to reclaim the land from the river. He also added that the reclamation of land from the Bay of Bengal is also necessary for Bangladesh especially for its growing population.

The Minister summed up his valuable deliberation by discussing the “Close Cooperation” and “Basin Wide Cooperation” among riverine countries. He suggested that there must be close cooperation among India, Nepal and Bhutan for making a successful basin-wide approach. He, finally, concluded his speech by thanking BISS for arranging such an important event.



SESSION II

PRESENTATION ON 'OVERVIEW OF BDP 2100- STRATEGIES, INTERVENTIONS, INVESTMENT PLANNING, FINANCING, GOVERNANCE AND INSTITUTIONS, MONITORING AND EVALUATION, FOLLOW UP PROJECT'



Professor Dr Shamsul Alam

Member (Senior Secretary), General Economics Division (GED), Bangladesh Planning Commission, Government of the People's Republic of Bangladesh

Professor Dr Shamsul Alam discussed the framework for strategic development in BDP 2100 at the beginning of his second presentation. Although most of the 'vision plans' do not exceed 20 years, BDP 2100 is unique as it will be implemented throughout 87 years of time span. However, it does not mean that the whole planning process is already finalised and cannot be modified with changed realities. Future uncertainties require the plan to be adaptive and dynamic. Hence, the first phase of the plan will last till 2030 in connection with the SDGs, while the second phase will be completed in 2050 and finally, the last phase of the plan will be completed by the year of 2100. The BDP will be updated after each five year cycle, and therefore, there will be a need for the institutional mechanism which will be ensured by setting up a commission named Delta Commission.

Professor Alam said that the BDP 2100 consists of several national strategies and flood risk management fall under the national strategy for water resources management. This strategy covers the whole country to protect economic strongholds and critical infrastructures, such as highways, important cities and so forth. The strategy also dictates priorities for the protection of cities, places or installations that are the locus of high economic activities over others. For example, saving Chandpur or Sirajganj will be given higher priority over a char for the protection against the effects of climate change. Regarding the debate on polders, Professor Alam argued that they have served their purpose as the polders work as the barriers to save the coastal population from saline flood water and are used as a platform for social forestation. However, he argued that considering

the climate change and the sea level rise, the height of the polder needs to be increased and restructured from 5 meters to 6.5 meters.

Flood risk management incorporates safeguards of livelihoods of vulnerable communities as part of the national strategy under BDP 2100. Vulnerable communities are defined under the plan as the population living in disaster-prone areas, where construction of cyclone centres and critical facilities get special emphasis. Homestead raising and flood-proofing of critical roads and health services are also two key features of this strategy. Under the flood management and drainage strategy, special attention will be given to building water bodies in order to drain the excess water to save the highways as well as it will encourage usages of surface water rather than ground water. To further increase utilisation of surface water, Padma barrage needs to be constructed which will end the water scarcity problem in 23 districts during the dry season and will help save the Sundarbans as well. Hence, recovery of water bodies in the southwestern part of Bangladesh has also been included in the plan to upgrade the drainage system of this region in order to solve water logging problem.

One of the strategies for hotspots is to provide adequate room for the river and infrastructure to reduce flood risk. During the monsoon season, this strategy aims to prevent river erosion and reclaim lost land from rivers. Embankment of rivers, river dredging and channelisation are necessary to ensure river stabilisation, sufficient space for water flow and the required depth of the river. Professor Alam said that to maintain the ecological balance, conservation of the wetlands is imperative. In *barind* and drought-prone areas where the ground water level has decreased, reforestation, restoration of river navigation, development of surface irrigation facilities from the Ganges and regional rivers have been recommended. In many places, sluice gates often become a trouble and responsible for waterlogging. Hence, it has to be well-thought out and accordingly restructured. By using satellite, state of the art flood warning system has to be established. Professor Alam expressed his firm reservation regarding replenishment of the groundwater level by pumping surface water, as there is a chance of chemical contamination. Since the *haor* region is the flash flood prone area, the riverbanks need to be stabilised. The maintenance of the embankments is imperative, and there should be the allocation of sufficient fund in order to do that.

In the urban area, water management is more problematic than flooding. The drainage system is often poorly managed due to lack of public awareness. Hence, it creates the problem of waterlogging. Professor Alam said that old canals should be retrieved and navigability should be restored in order to develop a public transportation system in the urban area. Within strategies for crosscutting issues, agriculture management or sustainable agriculture will receive considerable priority. The corps should be diversified and dependency on *boro* rice harvest should be lessened as it requires extensive irrigation. Adaptation for reducing vulnerability to climate change in agriculture sector is another important aspect of this strategy, he added.

Regarding trans-boundary water management, Professor Alam mentioned that it is a sensitive issue and requires multi-layered dialogues between the participating countries. Multitrack water diplomacy can prevent any conflict emanating from this problem and peacefully resolve it as well. In this regard, international engagement is important which require the active participation of a third party (multilateral or bilateral donor). According to him, the World Bank can be a potential actor in this regard.

To emphasise the importance of inland water transportation, Professor Alam said that once it was the primary medium of goods transport. However, development of road transport and sedimentation problem has reduced the role of water transport to the secondary choice of public

and goods transport. BDP 2100 plans to reverse that process and incorporates several strategies to do that. Developing the navigation network, according to the societal and economic demands can be a crucial strategy in this regard. Another strategy is to develop, maintain and operate inland river ports, landing ferry ghats and terminal facilities in ports or ghats. It is also important to contribute to dealing with trans-boundary water aspects by developing mutual understanding and cooperation between neighbouring countries.

Although the blue economy is considered as the new 'development space' for Bangladesh, Professor Alam said, not much has been discussed in this regard. Therefore, shipping, marine fisheries, coastal tourism, ocean energy and so forth have been identified as the key priority sectors under BDP 2100. Different strategies have been recommended like this, for example, complete resource surveys, enhancement of port facilities and coastal ship fleet, developing and growing shallow and deep sea fishing as well as the development of ecotourism and marine cruises.

Professor Alam said that Bangladesh is expected to have enormous potential in renewable energy development. Hence, it is important to develop a long-term renewable energy policy, specific strategies, and formulate a master plan for 50-100 years to harness the potential. Promoting research on the development of technology in the field of renewable energy in universities and research institutions as well as building capacity for its application are imperative. In Bangladesh, investment in research and innovation is very low – only 0.6 per cent of total GDP. Industrially developed nations invest 5-6 per cent of their total GDP in research and innovation. Universities in Bangladesh employ much of their research focus on knowledge generation rather than problem-solving. It needs a change in order to develop homegrown research and innovation to make the BDP 2100 a sustainable one.

He mentioned that earthquake initially was missed out from the BDP, although it was incorporated later on the recommendation of Professor Dr Jamilur Reza Choudhury. Bangladesh and the northeastern part of India have long been one of the seismically active regions of the world, and have experienced numerous large earthquakes during the past 200 years. Therefore, strengthening the earthquake management and enhancing the capacity to cope with this disaster have been suggested in the BDP. Along with that, designing earthquake-proof structures, including barrages, regulators, sluices, embankments, cross-dams, roads, bridges and buildings in conformity with the Bangladesh National Building Codes or any other approved standards have also been recommended in the plan.

Regarding current expenditure and future investment requirement for water resources, Professor Alam stressed the importance to increase Bangladesh's current investment. The country currently invests only 0.6-0.8 per cent in water-related projects. By 2030, about 2-2.5 per cent of GDP will be required for climate change, environment and water-related projects. Increasing public spending on water-related projects by more than three times in relation to GDP would be tough and will require creative financing arrangements, including involvement of the private sector. Professor Alam informed that the BDP 2100 plans to bring 80 per cent of the new investments (2.5 per cent of GDP per annum) which will be publicly funded and private sector involvement will be limited to 20 per cent of the overall spending, equivalent to 0.5 per cent of GDP. The funding strategy combines tax with non-tax revenue, cost recovery for public services, tapping into Green Climate Fund (GCF) and development partner's traditional funding. A time-bound policy will be needed, whereby all public urban water and sanitation services must be required to cover 100 per cent of the operation and maintenance cost. Over time, consideration may be given to recover capital costs, starting with relatively well-off service areas of the four Water Supply and Sewerage Authority (WASA). Public-private partnership (PPP) will be one of the potential options for funding the BDP 2100 projects.

PANEL DISCUSSION



Professor Dr M Monowar Hossain

Executive Director, Institute of Water Modelling (IWM)

Professor Dr M Monowar Hossain appreciated Professor Dr Shamsul Alam's paper for providing a useful understanding of the BDP 2100. He referred to Professor Alam's statement that many projects have been taken in Bangladesh, work has been done based on those, and the country is progressing. Bangladesh has different classes of people, including marginal, poor, middle class, upper-middle and upper class. In general, the nation has experienced overall progress in economy, food and everywhere. Professor Hossain said that some new items have been added to the BDP 2100. He said that Bangladesh had earthen embankments along the coast to face tidal surges or inundation. But with the passage of time, it was found storm surges destroyed everything. Consequently, there were thoughts about improving that. However, the problem came from the downstream to the upstream, which was, dwindling freshwater. The decrease of fresh water and rise of salinity in the southern part of the country are closely linked. The BUET has conducted many studies on this subject. Professor Hossain said that they have seen definite results on how the BDP 2100 is making a difference regarding this kind of pollution or other things. The solutions to this problem in the southern region include - (a) building a barrage to store water within Bangladesh, and (b) not hampering the efflux.

While talking about data, Professor Hossain questioned if Bangladesh right now has any updated Digital Elevation Models (DEM) which is essential to design any project in coastal areas, hinterland, *haor* region or in drought-prone areas of the *barind* region. Bangladesh would need accurate DEM which should not necessarily have to be minutely precise like those of developed countries, However, at present, Bangladesh gets only 300 metres and 30 metres of accuracy. Therefore, the country must have a much better resolution to see itself first; then it can decide what to do. The BDP is indeed a long-term, visionary plan and very rightly has pointed out the need for adaptive management. Professor Hossain said there were some mistakes in the past, but a lot could be learnt from those. But the BDP is still in a book form and not a project that has come in reality. Some projects had been implemented and a lot could be learnt from evaluating their performances. It is a reality that all implemented projects are not functioning well, although some were and are doing well. It would depend on who is involved in these projects.

People involved in the formulation of the BDP 2100 are very meritorious, technically qualified, prominent economists of Bangladesh, who have made the BDP 2100 an excellent piece of work. But questions remain: when it would be taken to the field for implementation, does Bangladesh have the necessary resources, capacity and equipment? Here Professor Hossain cited the ongoing coastal embankment project where Chinese contractors are involved. The Bangladeshi side has problems in exchanging ideas or suggesting anything with and to their Chinese counterparts as neither party could understand each other. The Royal HaskoningDHV is the chief consultant in the coastal embankment project, but they were not the contractor and worked through other contractors. Therefore, Bangladesh need to develop its capacity. He added that without using the drone facility for survey, good topography of a country could not be collected. There are traditional/land-based and satellite surveys. Land surveys are accurate, but very time-consuming. Satellite surveys are very fast, but not accurate. Therefore, there would have to be something in-between. Bangladesh should acquire more advanced technologies, which should be an integral part of capacity development.

Professor Hossain highlighted another project known as the Delta Cap. The IWM is implementing this project with other partners like BUET, CEGIS and many other technical entities. It is a part of the capacity development under the BDP 2100. This is to increase knowledge. But, he argued that there is a need to widen the vision and inclusiveness. He then recalled another ongoing programme titled, "Learning Delta Asia Initiative (LDAI)" and said that similar programmes are also taking place in other deltaic countries of Asia and beyond.

Professor Hossain stressed the importance of field level knowledge, especially capacity of those who will be implementing the plan. He expressed his concern regarding the implementation of projects (about 80 projects with budget lines) and touched upon the crucial question of ensuring funding for those. He said, a delta plan along with a vision for Bangladesh is necessary, but vision always has some limited visibility. Hence, a group of dedicated workers with in-depth knowledge of delta plan would be a must considering the complex nature of the BDP, which consist of more than 800 pages.

The speaker congratulated Professor Alam for his presentation. He informed the audience that Bangladesh has three major rivers that created this delta, but is also responsible for bringing huge sediment loads. He termed the impacts of climate change and the annual loss of land a big problem. Here he referred to Bangladesh's Minister of Agriculture, who said, due to development activities, like homestead, roads and others, the country is losing about one per cent land each year. Bangladesh will have a population of 225 million with Dhaka alone would have 25 million. Therefore, he expressed his concern regarding high population density, water supply, groundwater depletion, pollution and river systems. There is hardly any record in Bangladesh about the cleaning of rivers. He stressed on changing peoples' mindsets and developing the sense of belongings which would be crucial to making the country livable and sustainable.

Professor Hossain expressed his concern about the future size of the country's population and said, IWM has used advanced modelling techniques to forecast it. He informed that the population would be more than double in the year 2100 while the land would continue to decrease, not only due to riverbank erosion but also development activities. He said these issues need to be kept in mind while implementing the BDP and suggested Adaptive Delta Management for its sustainable development and implementation.



Professor Dr Md Munsur Rahman

Institute of Water and Flood Management (IWFM), Bangladesh University of Engineering and Technology (BUET)

Professor Dr Md Munsur Rahman discussed some of the key issues of deltaic environment. He shared his experience with the GED and other institutions that are working on the delta issue for the last five years. He said that he worked with a number of national and international researchers on delta issue covering different deltas as well as the GBM Delta. He informed that the delta is a land mass that forms from deposition of sediment carried by the river before entering the sea. If any disturbance occurs within the water sediment regime, the deltaic physical sustainability and physical system will be disturbed. He noted that the deltaic area is one of the important geomorphological environments. More than seven per cent of the global population is living in the deltaic area, whereas the deltaic land mass is only less than one per cent of the global mass. These areas are also very populated and also rich in natural resources. People living in the delta are also trying to explore deltaic resources locally and to the basin scale. Due to the exploration, the water sediment regime is changing to negative direction. In most of the deltas, he said that there is the massive amount of siltation.

Professor Rahman highlighted the changing nature of services of the deltaic region due to climate change and anthropogenic interventions at local and basin scale. The relation between the ecosystem services and the productivity that are currently receiving from the deltaic region with the biophysical changes are very important to understand. He expressed his concern that this understanding is very poor at national and global level. Therefore, he suggested the government and other relevant institutions to work in enhancing the knowledge.

Professor Rahman argued that the issue of poverty eradication in the deltaic region is important which is included in the Delta Plan. According to the plan, the eradication of extreme poverty is supposed to be achieved by 2030. Bangladesh is supposed to achieve the title of middle income country by that time. To achieve these goals, he suggested giving focus on increasing productivity and GDP. At the same time, he also stressed on the issue of environmental cost. Because when people use resources to increase productivity, that entails environmental cost. He gave the example of the Buriganga river in this regard. In tackling the issue of environmental costs, he suggested developing an integrated assessment tool. Although much focus is given to fisheries, agriculture, forestry and other things, but many services are being supported by the water issues. Therefore, he suggested developing any possible intervention to create alternative supporting services to reduce the environmental cost. He emphasised on the knowledge development of the Delta Plan Commission and GED in this regard.

Professor Rahman informed the audience that the year 2015 was considered the year of the delta. This is the evidence that globally the issue has gained so much importance. This is because

the delta issue is related to global sustainability. After that, he emphasised on the issue of research and development. By conducting research, responsible authority should create a knowledge base. In this regard, he underscored that the local community should come forward to make valuable contributions in creating the knowledge base. This task might be done by local researchers, in collaboration with international researchers. He shared some of the research projects related to this issue in collaboration with national and international institutions. These projects have been started since 2012. These are projects on 'ecosystem services and poverty alleviation' through which it is tried to understand the knowledge and information gap between different sectors. Based on the findings of this particular research, BUET has developed a holistic tool. This invention has also been shared with different relevant institutions and the GED.

He also informed that the Delta Plan has six different 'hotspots' zones. In this regard, he suggested that there should be room for any new addition. He shared his observations that the BDP has limited tools which are not enough to deal with the whole issue. Therefore, these tools should be developed by the local scientists.

In conclusion, Professor Rahman said that the researchers from BUET are exploring some of the issues related to disaster management. He said that the BUET is conducting a research regarding the disaster management issue in collaboration with Japanese researchers. This research project is funded by the Japan International Cooperation Agency (JICA) and the Japanese Government. He also informed about another research project, which is on the climate change adaptation. He believed that these kinds of research projects will generate information and develop knowledge.





Engineer Md Mahfuzur Rahman

Director General, Bangladesh Water Development Board (BWDB)

Engineer Md Mahfuzur Rahman stated that the country did not take any wrong decisions previously. In 1964, a Master Plan was prepared after the severe flooding in 1954 and 1955. The activities on water sector started based on the Master Plan. The Master Plan of 1964 had an emphasis on large-scale flood control, drainage and irrigation projects to enhance agricultural production, which shaped the water sector development till 1975. The Master Plan was adopted because at that time there was a shortage of food and increasing population. So, the government had to address only the food sector and inundation. But the situation has changed now. Presently, the vision is to eradicate poverty by 2030 and achieve the status of a developed country by 2041. Previously, the issue was addressed with multisectoral plan and lacked a national holistic plan. He thanked the GED for adopting a long-term, holistic and integrated plan for the very first time.

He emphasised on fixing a timeline of 10-15 years for reviewing the plan. He requested the authority, not to revise or update the plan before that period as any project takes at least five to six years for implementation. Changing the plan from time to time will not be a wise decision. He stated that the authority is lagging behind on operational maintenance. It is not addressed in the plan. He opined that operational maintenance should be embedded in the plan more. The country is facing some emergency, i.e., flood, cyclone which are not embedded in the Plan. He added that emergency funding and rehabilitation should be included in the BDP as well.

The Netherlands has constructed embankments targeting 1000-year period to protect it from floods. In Bangladesh, usually, projects run for about 20 year period and in coastal areas 50 year period due to resource limitations. This time the idea has to be shifted. Bangladesh can take plan for construction of embankment for a 100-year period to protect the country from flooding. He shared with the audience that the BWDB has decided to redesign embankments and drainage system considering the present needs as well as future needs. He mentioned that the issue of climate change is considered as well. Due to the climate change, the flooding situation is changing over the country. He cited the example of Dinajpur, which is not a flood-prone area. There was a flood 30 years ago. But in 2017, two-storied buildings were damaged due to flash flood. The climate change is responsible for changing the flooding situation over the country. This issue needs to be addressed in the BDP. Then it will be easier to develop the projects.

Talking about the funding of the project, Engineer Rahman said that there are lots of conditions and requirements for getting funds, which is problematic. He opined that lending procedure and utilisation of the funds should be easier. He then mentioned the irrigation rehabilitation project. He emphasised on water efficiency and water security. He suggested that research should not be only academic, it should be within the implementing agency. The research activities should

be done after 5-10 years; then there is a maximum chance of getting real results. He said it is necessary to use the surface water for irrigation. In 1980, in order to ensure the food security, Bangladesh started harvesting *Boro* crop which is done mostly with underground water. As a result, the groundwater level is also declining due to excessive withdrawal threatening the environment. He argued that the country should shift the focus from *Boro* rice to *Aman* or *Aush* which needs less irrigation water.

Engineer Rahman mentioned that Prime Minister Sheikh Hasina prioritises dredging projects. She has directed the authorities concerned to formulate a complete plan for dredging the silted rivers of Bangladesh to bring back navigability. For the last fifty years, the depth of the rivers has been decreasing gradually due to siltation. Dredging of rivers could not regularly be undertaken in Bangladesh due to two reasons. Firstly, lack of money and technology, and secondly, the control of the three major rivers are outside the country. The authority needs to be careful regarding sediment management. He requested to emphasise the dredging of the small river. The dredging of the major rivers will drive water away from small rivers, which in turn will dry up in hot weather. Water transport and fish cultivation in the small river areas will be hampered. In order to ensure beneficial results, the government should undertake another additional project to dredge the small rivers connected to major rivers.

Engineer Rahman also emphasised on the institutional capacity building. The institution, which will implement the BDP should be trained in such a way that the outcome of the research can be applied to the project activity. Human resources are vital in this regard. He said that flood forecasting and early warning should be disseminated. Bangladesh will be benefitted by the flood forecasting from India, Nepal and China. He opined that transboundary data sharing would help Bangladesh better prepare for floods. The Adaptive Delta Management (ADM) is essential in this regard. The government plans to create 100 economic zones within the next 15 years. These economic zones are located near the rivers. He said that initiatives to establish economic zones aimed at encouraging industrialisation, generating employment opportunities, increasing production and ensuring export promotion and diversification. Therefore, urbanisation, as well as industrial development, should be kept in mind. In 2041, there is a possibility that the industrial sector will be the leading sector for GDP. So, the usage of water will change. He concluded his speech by saying that the BDP 2100 is a holistic, long-term vision-based plan and expressed his optimism about its implementation.



OPEN DISCUSSION



Major General (Retd) A M S A Amin, ndc, psc, termed the BDP 2100 a “super plan”. He praised the idea of formulating a plan for 100 years in the light of 100 years of experience. He highlighted the importance of the political dimension of the plan. According to him, the GDP growth of Bangladesh can be increased from 6-7 per cent to 8-9 per cent if the government can control corruption. The necessary budget for the BDP can easily be collected through curbing corruption. He also sheds light on the importance of river basin development with India. He noted

that the relationship between Bangladesh and India depends on which government is in power. It would be challenging to implement a 100-year plan with this attitude. Referring to the relationship between USA and China, he opined that international relation is a dynamic issue. He stated that China is the arch enemy of the USA; at the same time, the closest friend as far as trade, commerce and investment is concerned. He questioned why Bangladesh does not have that kind of outlook with India. He argued that it is important to ensure the involvement of India in the development of the BDP to reap the full benefit out of it.

Mr Rezwan-ul Alam, Director (Outreach and Communication), Transparency International Bangladesh, noted that the plan is an ambitious task and therefore, it should not be treated in a lavish way. He made some concrete suggestions and called for innovation and creativity in the planning process. He recommended that (a) the plan should be a living document to incorporate changes as and when required; (b) it needs to take rapid changes of hydro-technologies into consideration which may not have been considered; (c) a transparency and integrity framework is required in order to ensure accountability, reduce/control corruption; (d) it needs to incorporate strategic communication strategy to build public consensus, manage risks, reputation and build partnership; (e) the use of social accountability tools is a must to engage community and ensure their participation; (f) public grievance redressal system should be made effective; (g) budget and audit reports should be published; (h) excessive reliance on world bank needs to be reduced.





Mr Suhel Ahmed Chowdhury, former Secretary of Commerce, Government of Bangladesh, thanked the government for undertaking an ambitious endeavour of the BDP 2100 and working towards its implementation. He asked whether people involved with the formulation of the BDP have visited Mekong River Basin Project or similar projects to gather information and knowledge.

Professor Dr A Q M Mahbub, Department of Geography and Environment, University of Dhaka, expressed his strong support for using polders as there is no alternative technology available for the country. In Bangladesh, polders serve for only single or dual purpose, while he recommended building multipurpose polders which can be used as roads, service centres, schools, markets and so forth. The soil to construct these polders should be extracted by river dredging, which in return will solve the siltation problem with rivers. Professor Mahbub suggested bringing the vast wetlands of Bangladesh under 'integrated farming'. Then he referred to the ongoing dredging project that has been underway in Aricha and its effect on Manikganj and Shariatpur in the form of river erosion. Professor Mahbub also talked about the river erosion that has been happening in Chandpur and



suggested using the byproduct soil from river dredging projects for protecting river bank.



Engineer Dr Md Lutfor Rahman, Director General, River Research Institute (RRI), opined that research plays a significant role in the overall development of a country. The BDP 2100 is a complicated issue. There is no alternative to research in order to ensure the sustainability of the project. He mentioned that the authorities have been carrying out dredging of the Gorai

river. However, the project failed to yield the desired result owing to lack of research. Therefore, he emphasised on undertaking a proper research project before implementing the BDP.

Lieutenant General (Retd) Nooruddin Khan, psc, former Chief of Army Staff noted that 93 per cent of the catchment area of the three major rivers of Bangladesh lies outside the country's jurisdiction. It would be very difficult for



Bangladesh to successfully implement the BDP without the strong commitment from those who have the lion's share of this catchment area. He also highlighted that, despite being a riverine country, Bangladesh only has 6,000 km waterway for inland water transportation. He stressed on the importance of increasing the inland water transportation route by manifold.



Ambassador Shahed Akhtar, Former Principal, Foreign Service Academy, reinforced the recommendation that the BDP should be explained properly. He also pointed out that the Yangtze River Delta is the biggest delta in China. For this Yangtze delta, China made a particular framework of development. Therefore, he suggested that Bangladesh may learn from China's Yangtze Delta Plan. He also noted that the government of Bangladesh is mainly emphasising on developing economic zone. He also stressed on the need of coherent understanding of the nature

of Bengal Delta. He also emphasised on the issue of land reclamation. He gave the example that the Netherlands has successfully managed to reclaim land. Therefore, Bangladesh can take lessons from the Netherlands. He suggested re-evaluating every five year's work under the Delta Plan.

Ambassador Munshi Faiz Ahmad, Chairman, Board of Governors, BISS, inquired whether the term 'equitable water governance', used in relation with transboundary river sharing or greater context. Ambassador Ahmad also wanted to know if there is any plan to use advanced technology to harvest Bay of Bengal's water in order to lessen dependence on river water.



Mr Saleh Ahmed, Columnist and Freelance writer, stated that he has been working on the issue of water management and dredging for a long time. He said that Bangladesh is a riverine country and dredging is mandatory to increase the depth of rivers and remove unwanted deposits for safe passage of boats and ships. He asked whether any specific dredging manufacture programmes are included in the plan. He informed



the audience that China has the largest and most advanced dredger which is capable of dredging as much as 6,000 cubic meters of sand or clay per hour from 35 meters below the water's surface. He emphasised on surface water management and urged to take a comprehensive multipurpose project following the example of China. Then there will be no shortage of water. He mentioned that 80 per cent of the allocated money for dredging is pilfered. In order to make the BDP 2100 successful, the government needs to be conscious about the pilferage.

RESPONSE BY THE SPEAKER



Professor Dr Shamsul Alam

Member (Senior Secretary), General Economics Division (GED), Bangladesh Planning Commission, Government of the People's Republic of Bangladesh

Professor Dr Shamsul Alam stated that in the BDP 2100, the emphasis has been given on land reclamation with the provision of ensuring the normal flow of the river. He believed, along with normal operation and maintenance, there should be mention of the emergency fund for the project. Regarding the issue of dredging, Professor Alam highlighted some of its negative impacts along with its importance. He stated that river dredging could increase river bank erosion. Therefore, site identification and its proper assessment are essential to mitigate the negative impact of river dredging. Focusing on the issue of climate change, Professor Alam mentioned that there is numerous evidence of climate change in Bangladesh. Therefore, this issue cannot be overlooked. He believed that BDP 2100 would be an effective tool to address the issue of climate change. He agreed with the remarks that lending procedures of development partners are very complicated. He said that there is a tendency in Bangladesh to use government fund for development projects. Because they have to ensure accountability and fulfil all necessary conditions to receive assistance from development partners, who are very stringent in lending money to development projects. However, he stressed the importance of easing the lending procedure. Professor Alam argued that proper importance has been given to the issues of water deficiency and water security in the BDP. He said that for water security, management of creeks, small rivers and their tributaries is very important as main rivers of the country are mostly unmanageable. This issue has also been discussed in the BDP with appropriate importance.

Regarding the question of how far it would be possible for Bangladesh to implement the BDP without cooperation of other riparian states considering the fact that 93 per cent of Bangladesh's catchment area lies outside of the country, Professor Alam highlighted two possible ways. Firstly, Bangladesh can discuss the issue with other riparian states. Secondly, the country can develop its own contingency plan for survival. Bangladesh is currently following both of the ways. He further added that, currently, Bangladesh cannot store the excess monsoon water that the country can use in the lean period. In the BDP, there is the mention of creating new water retention bodies in the government *khas* land and excavation of canals to store that excess water for future use.

To highlight the political will of the government in resolving the pending issues with India, Professor Alam stated that the Prime Minister has sincerely discussed the issue of Teesta Water Sharing Agreement with her counterpart. Not only that, but the Prime Minister has also called for

joint collaboration regarding Ganga Barrage/Padma Barrage. However, India has not responded equally. Furthermore, India does not share water-related information usually. So, it is important for Bangladesh to develop its own ability to collect information and the country is preparing for that. Bangladesh believes in regional cooperation. However, the country cannot do anything if there is a lack of reciprocity. Bangladesh needs to develop its plan considering the fact that 93 per cent of its catchment area lies outside of its jurisdiction. Bangladesh has already taken various projects like the excavation of ponds and canals in the Northern part of the country to collect drinking water. This project is being implemented with assistance from the World Bank. The Prime Minister has instructed to ensure transparency and accountability in water-related projects. So, there is no question about the political will of the government to develop and implement the plan.

Professor Alam supported the proposal of introducing basin-wide flood forecasting. But he preferred hotspot based flood forecasting as mentioned in the BDP. He said that the problems vary depending on different hotspots and it is within the jurisdiction of Bangladesh to issue hotspot based early warning.

Regarding the issue of dependency on foreign aids, Professor Alam noted that Bangladesh is not a debt-ridden country and the total debt of the nation is only 33 per cent of its GDP. In the case of Japan, the debt-GDP ratio is 210 per cent. Singapore has a debt-GDP ratio of 110 per cent. There is no problem for Bangladesh to increase its GDP as the country has a small debt burden. But the country needs to improve its human capacity, skill, diplomatic capacity and technical knowledge by manifold. Academia has a crucial role to play in human resource development.

Emphasising the political dimension of the BDP, Professor Alam mentioned that the plan could not be implemented without the political will of the government. It is a techno-economic plan which has been formulated on government's instruction. It has been presented in front of the members of the parliament and parliamentary committees. It has also been uploaded to the Ministry's website for people's feedback. Unfortunately, the response from people regarding the plan is not satisfactory. He opined that further campaign would be launched to enlighten people about this issue.

Professor Alam agreed that the development projects in Bangladesh are not free from corruption, and pilferage and leakage are a common scenario. He blamed the socio-cultural system of Bangladesh for that. He stressed the importance of changing the socio-cultural settings. Pilferage and leakage are creating obstacles for the management of development plans. Professor Alam hoped that this environment would change in the future.

Referring to the example of the Mekong River Commission, Professor Alam informed the audience that the Commission is also facing the same problem that Bangladesh is facing. China, the most influential actor in the region and a major part of the Mekong Delta, does not cooperate with other members of the commission. However, they are more cooperative compared to the South Asia. He stressed the importance of increasing mutual trust and cooperation in this region.

Professor Alam discussed the importance of private sector involvement in the implementation of the BDP and stated that initiatives need to be taken to encourage the private sector involvement. Professor Alam concluded his remarks with high hope that Bangladesh has the ability to implement the BDP alone. In this regard, he highlighted the instance of the construction of Padma Bridge and said that this Padma Bridge would be the symbol of Bangladesh's national pride for upcoming days. He hoped for a forward-looking transparent and functional society.

SUMMING UP BY THE CHAIR



Professor Dr Jamilur Reza Choudhury

Vice Chancellor, University of Asia Pacific

Professor Dr Jamilur Reza Choudhury summed up the session by saying that policy planning is relatively easy than the implementation process. He termed the BDP 2100 a comprehensive effort covering all the sectors. He gave the example of the Strategic Transport Plan and argued that every plan is good, but the implementation is a difficult task. Regarding the Strategic Transport Plan through which Dhaka's traffic problem would be solved by 2025, he said that the plan was good, but it had not been appropriately implemented. He also gave the example of the "Detailed Area Plan for Dhaka" where he served as the Chairman. Regarding the "Detailed Area Plan for Dhaka", he shared his experience that the plan had not been implemented properly due to political pressure. He argued that some of the landowners were politically very influential. He commented that the political forces combined with commercial interest are dangerous. Therefore, he expressed his concern that the Delta Plan is also good and comprehensive, but its implementation will face difficulties. He also gave the example of Pangsang Model Study, which was suddenly postponed.

Professor Choudhury agreed with the earlier panel discussants about the development of a knowledge base. Regarding this, he suggested preparing knowledge workers to handle difficulties, assessing the plan in details and finding out what type of personnel are needed to manage it. So the arrangement for selecting right workforce is an important issue for the BDP 2100. He expressed his concern that if the government could not prepare the local base of human resources, then it has to depend on foreign contractors and consultants. He argued that the BDP is not a rocket technology. Therefore, it will not be a difficult task for the local specialist to deal with it. Therefore, from the very beginning, the development of human resources should be started, he suggested.

In discussing the issue of technology, he pointed out the tool that could prevent the wastage of irrigation water. In this context, he informed the audience about using of soil sensors to avoid the wastage of irrigation water. Soil sensors are widely used by foreign farmers to reduce the wastage of irrigation water. Regarding the case of Bangladesh, around 80 per cent water is being wasted during the irrigation. Therefore, he suggested introducing the soil sensor to the local

farmers to save the irrigation water. He also mentioned the “Internet of Things (IoT)” which could help distribute water for irrigation. Under this project, a card will be given to the farmers to use the water. He informed that this card system is already being tried to implement in Bangladesh.

Finally, he summed up by quoting the words of Donald Rumsfeld, former US Secretary of Defense, that “There are known knowns. These are things we know that we know. There are known unknowns. That is to say, there are things that we know we don’t know. But there are also unknown unknowns. There are things we don’t know that we don’t know.” By quoting this, he tried to say that no one knows what will happen until 2100. But he welcomed the formulation of the BDP and appreciated the team involved with it for making such a plan.



SUMMARY OF SUGGESTIONS AND RECOMMENDATION

Many suggestions and recommendations have been put forward during the presentations and discussion of the Seminar. Some of them are as follows:

Related to BDP

- Emphasis has been given on undertaking proper, extensive research before implementing the BDP 2100.
- Adaptive Delta Management (ADM) should be implemented for revising the BDP.
- Budget and audit reports of the BDP should be published to ensure transparency and accountability.
- Public grievance redressal system should be made effective while implementing the BDP.
- For implementing the BDP, improving institutional arrangements and enhancing capacity building on a long-term has been recommended. It has been suggested that the plan should be a living document to incorporate changes as and when required. Future uncertainties require the plan to be adaptive and dynamic.
- Emphasis has been given on private sector involvement in the implementation process of the BDP 2100.
- The BDP's necessity and long-term impacts should be discussed and the GED need to disseminate detailed information of the BDP to people. To overcome lack of feedback due to the language barrier, the plan's text should be made easier for common people. Concerned authorities need to disseminate the plan in Bengali for better understanding. Print and electronic media should come up with extensive dissemination of this plan.
- The BDP needs to have a greater emphasis on climate change, with research and innovation to find out advanced adaptation capabilities. It has been recommended to consider climate change impact in every phase of its implementation.
- The BDP would be updated after each five-year cycle, and therefore, there would be a need for strong institutional mechanism which can be ensured by setting up a commission named Delta Commission.
- There are huge differences between the deltas in the Netherlands and Bangladesh. Bangladesh is the largest delta in the world. It is continually changing and is much more complicated than the Dutch delta. Thus, it has been suggested that the authority should consider this while developing the Plan.
- Universities and academic institutions in Bangladesh need to place much of their research focus on problem-solving rather than knowledge generation for developing home-grown researcher who can work effectively in implementing the BDP.

- As the population would be more than double in 2100 while land would continue to shrink, not only due to riverbank erosion but also development activities, it has been suggested to consider these issues while implementing the BDP. Adaptive Delta Management for sustainable development and implementation has also been suggested in this regard.
- A suggestion has been made to incorporate the provisions of emergency funding and rehabilitation in the plan along with normal operation and maintenance.
- Emphasis has been given on institutional capacity building for the implementation of the BDP.
- A recommendation has been made to incorporate strategic communication strategy in order to build public consensus, manage risks, reputation and strengthen the partnership. Further emphasis has also been given on the use of social accountability tools that would be essential to engage communities and ensure their participation in implementing the BDP.

Related to Water Resource Management

- It has been recommended to build multipurpose polders which can be used as roads as well. The soil to construct the polders can be extracted by river dredging, which in turn will solve the problem of river siltation. However, river dredging sometimes causes river bank erosion. Therefore, site identification and assessment is very important in this regard.
- Initiative needs to be taken by the government to make hard-covering embankments to make them robust and long-lasting.
- Digital Elevation Models (DEMs) are essential to design any project in any part of Bangladesh. Therefore, it has been suggested to have an updated DEM for the country.
- The government should plan to build embankments for a 100-year period to protect the country from flooding.
- Easing lending procedures to fund different projects related to water resource management has been proposed in order to reduce complex conditions and requirements related to them.
- A transparency and integrity framework is needed to ensure accountability and reduce/control corruption in water resource management projects.
- It has been recommended to have "Close Cooperation" and "Basin Wide Cooperation" among co-riparian countries. For instance, close cooperation among India, Nepal, Bhutan and Bangladesh is needed for making a successful basin-wide river management approach.
- Considering climate change and sea level rise, a suggestion has been made that the height of polders needed to be increased and restructured from 5 metre to 6.5 metre.
- There is a need to see the multiplicative effects of water and impact of climate parameters very carefully in designing any project.
- Dredging and channelisation of rivers have been proposed to ensure their stabilisation

and increase water carrying capacity. In order to ensure truly beneficial results, the government needs to undertake supplementary projects to dredge small rivers connected to the major rivers. Conservation of wetlands has also been suggested to maintain ecological balance.

- Old canals should be retrieved and navigability should be restored in order to develop a public transportation system in the urban area.
- A suggestion has been made for installing and making necessary restructure of sluice gates in order to reduce their role in water-logging.
- Regarding the sensitive nature of trans-boundary water management, multi-layered dialogues between and among participating countries need to be pursued; these could include active participation of third parties (multilateral/bilateral donor), e.g., the World Bank.
- It has been recommended to introduce the soil sensors to avoid the wastage of irrigation water.
- Importance of increasing Bangladesh's current and future investments for water resource management has been stressed upon. Strengthening of public-private partnership (PPP) has been suggested in this regard.
- Another recommendation stressed to use drone facility for different surveys. Land surveys are accurate but very time-consuming. Satellite surveys are very fast, but not accurate. Thus, there would have to be something in-between, and Bangladesh should acquire more advanced technologies, which should be an integral part of capacity development.
- Developing an integrated assessment tool or creation of alternative supporting services has been proposed for tackling/reducing environmental costs of any project work.
- A suggestion has been made to encourage the local community to contribute in creating a knowledge base. This might be done by local researchers, in collaboration with international researchers.

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