Enabling Delta Life – Case studies

Table of Contents

[Introduction – Case studies 3](#_Toc333245718)

[Case studies 4](#_Toc333245719)

[Case Study 1- Bangladesh: The Delta Development Plan 2012, the Ganga-Brahmaputra-Meghna Delta 4](#_Toc333245720)

[Case Study 2- Benin: Towards designing a Master Plan, the Ouémé Delta 5](#_Toc333245726)

[Case Study 3 – Cambodia: The Mekong delta 6](#_Toc333245732)

[Case Study 4 – China: The Pearl River Delta comprehensive Regulation Planning, the Pearl River Delta 7](#_Toc333245738)

[Case Study 5 – Egypt: The Alexandria 2030 Integrated Urban Water Management (IUWM) plan, the Nile Delta 8](#_Toc333245744)

[Case Study 6 – Indonesia: Managing diverse delta systems 9](#_Toc333245750)

[Case Study 7- Thailand: The Town and Country Planning Act, the Chao Phraya Delta 10](#_Toc333245756)

[Case Study 8 – Vietnam: The Delta Master Plan, the Mekong Delta 11](#_Toc333245762)

# Introduction – Case studies

“Enabling Delta Life” is a collaborative initiative of the Global Water Partnership (GWP), Delta Alliance and the Netherlands International Development Programme (DGIS). Two events are organized in the initiative, 2182

Selected GWP partners were asked to develop brief case descriptions focusing on deltas they are actively involved in. The presentations were to focus on five key questions related to delta management:

1. What are the 3 main delta issues in your delta?

2. What are the main measures to deal with these issues?

3. How did you organize / are you organizing the process in your delta for developing this?

4. What was the most difficult part in your process so far?

5. What suggestions do you have for a country that is just starting to think about their delta?

This document is a compilation of these presentations and will be a background document for the two meetings:

1. **Global Water Partnership Consulting Partner Meeting, Workshop Two**:“Building climate resilience in the World’s Deltas: Managing for effective water solutions”. This will be a facilitated panel discussion on the 26th of August, 2012, 13:30-15:00 hrs.
2. **World Water Week, Seminar**: "Managing the World’s Deltas: Unique Systems, Unique Challenges" on the 29th of August, 2012, 09:00-12:30 hrs.

This document may also provide inputs to further activities in the initiative, such as the framework for analysis and action. The framework will be finalised by the GWP Technical Committee and will inform the next GWP and Delta Alliance strategies and a joint GWP-Delta Alliance agenda.

# Case studies

## Case Study 1- Bangladesh: The Delta Development Plan 2012, the Ganga-Brahmaputra-Meghna Delta

*Dr. Khondaker Azharul Haq*

Bangladesh is the biggest delta in the world formed by the three river systems of Ganges, Brahmaputra and Meghna. Approximate 80 percentage of Bangladesh area of 1.45.000 square kilometer is featured with 310 rivers and their floodplains, which support life, livelihoods, economy and ecology of the whole delta.

### Main issues in the Delta

#### Floods

A comprehensive and integrated management of water resources is crucial for the riparian countries, especially Bangladesh, India and Nepal to reduce adverse impact of flood. Floods are very common in Bangladesh and depending on its intensity and duration may have severe adverse impact on lives and properties. Flood is considered as the most destructive natural disaster with its short and long term impact in every sphere of the economy including all types of infrastructure.

#### River Bank Erosion

River erosion renders hundreds of thousands of people homeless with partial or total loss of their agricultural lands and livelihoods. It is also one of the major problems of intra country migration where large number of families is faced to migrate to urban centers including the capital city of Dhaka where they live in slums under extreme poverty and life of indignity. During the last few decades the net erosion was over 200,000 ha. There are examples of families relocating them up to six times in their life due to river bank erosion.

#### Climate Change Impacts

Climate change is expected to have severe impact on the water resources availability and its governance. Bangladesh is already experiencing erratic rainfall both spacial and temporal, impacting crop calendar and agricultural production systems and productivity. Reduced surface water availability is also resulting in saline water intrusion further into the inland. It is also adversely impacting ecological balance of the country especially in the coastal areas. The Sundarbans, one of the largest mangroves in the world, home of the Bengal tigers and a UNESCO designated World Heritage site is also being threatened by significant reduction in surface water flow in the rivers.

### Measures to deal with the issues

The government of Bangladesh developed a Delta Development Plan 2012 with assistance from the government of Netherlands. A Memorandum of Understanding (MoU) was signed between the two governments to implement the 1st phase of the plan by 2021.

### Organization of the initiatives process

Bangladesh Water Partnership participated in the consultation process. A committee has been formed by the government of Bangladesh to operate independently using professional standards. The committee is responsible to the Ministry of Planning for strategic consultation and coordination with the other stakeholders including implementing agencies. The Bangladesh Delta plan is being positioned in such a way that under the guidance of the Ministry of Planning a long term strategic plan will be prepared and implemented.

### Difficult parts in the process of the initiative

For the Delta plan an emergent planning approach has proposed, where a planning track runs parallel with an implementation track. A holistic approach of the Delta Plan can only succeed by joint and coordinated action by agencies under the whole policy network. The difficult part of the process to develop the plan is the issue of a changing social, political and financial condition which is relevant for implementation of the plan. Another difficult part is the implementation process with broad stakeholder involvement.

### Suggestions for countries that just have started to think about their deltas

Each Delta has its own characteristics, so formulation of a Delta plan can be initiated through understanding the process, issues and future challenges, ensuring meaningful and effective community and stakeholder’s participation in the process of the preparation of the Delta Plan. Develop the “Delta Vision” to introduce “no regret” measure that is useful and regardless of the direction of the development. Integrate the Delta Plan in the national planning process.

## Case Study 2- Benin: Towards designing a Master Plan, the Ouémé Delta

*Prof.Abel Afouda, Dr.Fabien Hountondji, Mr.Armand Houanye*

We expose views on management of the south eastern Benin delta. The Oueme Delta is the most important of the two Benin delta. This delta is sustained by both two rivers (Ouémé and Sô), and includes a lake, a lagoon and a channel to the sea. The delta is classified as a Ramsar site (1018). The Delta complex is facing challenges due to population pressure, unsustainable management and climate change.

### Main issues in the Delta

#### Lack of knowledge about the delta system dynamics

It is important to point out that existing information about the Oueme delta is scattered in time and space. It is therefore highly expected that a background study on the whole delta would generate upgraded overview knowledge about it and allow sketching out a better ‘coalition-oriented’ master plan for it.

#### Inappropriate space occupation and overexploitation

Inappropriate space occupation and overexploitation of the delta resources are a big issue. Space occupation in the delta has caused great concerns related to the demographic and urbanization pressures. Fisheries and fish reproduction sites are multiplied on the water plans without appropriate regulation, ignoring navigation network. This situation generates conflicts among fishermen and between fishermen ant other users of the delta, limiting its sustainable management.

#### Flooding, coastal erosion and pollution

#### Flooding and pollution are serious issues around the Oueme delta. The increasing of sea level and the modification of water regimes due to climate change coupled with unsustainable management of the water complex resources have resulted in increasing flooding and coastal erosion in the delta. As consequences of both problems, populations’ displacements, destruction of cultures, habitat destruction, and perturbations of socioeconomic activities/local knowledge management cause life to be constraining in the delta. Moreover, flooding together with serious sanitation problems due to unmatched demographic growth & urbanization associated with agrochemical use and oil spilt around the delta are responsible for environmental pollution of the delta and public health problems. The water complex is also threatened by proliferating weeds due to eutrophication with is a consequences of pollution.

### Measures to deal with the issues

Measures include:

* building up capacity towards monitoring the delta system dynamics and climate change,
* design and implementation of sustainable management of the delta system (build a master plan for the purpose),
* design of an early warning system and promotion of sanitation of the delta.

### Organization of the initiatives process

To work towards establishing an enabling environment both at the national and at the river basin level for integrated management of the delta.

### Difficult parts in the process of the initiative

* Lack of awareness of decision makers;
* Limited local capacities.

### Suggestions for countries that just have started to think about their deltas

1. Identification of challenges and potential solutions for management of the delta
2. Enhancement of political will around decision makers
3. Establishing enabling environment and cooperation with existing delta projects

## Case Study 3 – Cambodia: The Mekong delta

*Dr. Watt Botkosal*

The Mekong Delta.

### Main issues in the Delta

Climate change issues such as more flood and draughts can affect the ones most at risk in the delta, first in Cambodia and later in Vietnam.

#### Improve water management, cultivation technology and livelihood (including tourism)

Socio-economic development is needed, if people have a good livelihood and a good income they will live better. Socio-economic development is quite relevant to Cambodia and is important issue to make a change.

#### Sedimentation and erosion control

From development of Dam on the Mainstream may be from China and if more Dams in Lower Mekong Basin in future.

Insufficient water for irrigation.

#### Minimum flow maintenance

If the flow goes below the minimum flow during the dry season of the Mekong River, from upstream to the Delta, then we need to maintain the flow.

### Measures to deal with the issues

* 1995 MA: overall framework for cooperation and procedures
* Basin Development Plan Programme
* Flood Management and Mitigation Programme
* Navigation Programme: support water ways of two countries
* Fisheries Program
* Environment Programme
* Climate Change Initiative Programme

### Organization of the initiatives process

* 1995 Mekong Agreement
* Mekong River Commission
* Cambodia National Mekong Committee
* MRC programmes/projects
* Bilateral Dialogue: Cambodia-Vietnam for Delta: MOU of CNMC and VNMC, MOU of MOWRAM and MONRE
* Joint Study and Development Project under MIWRMP

### Difficult parts in the process of the initiative

* Mutual and joint interest such as navigation, flood management and joint water management.
* Minimum flow for VN and Cambodia for navigation.
* Data and information is big challenges but MRC has lot information that is now good basic for development and management.
* Roles of CNMC and VNMC in coordination are important work but challenges to maintain cooperation.

### Suggestions for countries that just have started to think about their deltas

#### Knowledge sharing with VN

* We would like to learn from VN about salinity control, water management, cultivation technology of rice in areas, tourism, improvement and livelihoods, and Mekong Delta: perhaps learning from VN development as they have many experiences about 20-30 years ago, even bad lessons, food control and management. This is to be supported by WB, MRC MIWRMP

#### Capacity building and human resources development in IWRM

* In Delta Planning and Management based on IWRM

Morphological management

* Regarding to sand mining, erosion, water way management and improvement for navigation and flood control and irrigation   -shape or form of the river, depth, and no more sediment. Coastal erode will away. If high sea level so cause flood, wave high.

## Case Study 4 – China: The Pearl River Delta comprehensive Regulation Planning, the Pearl River Delta

*Dr. Wang Yuhai.*

### Main issues in the Delta

#### Increasing flood hazards

The delta region is characteristics of low-altitude flat plain with dense netted channels and tributaries. It is facing increasing risks of catastrophic flood hazards from riverine floods and/or marine storm surges, imposing serious threats to local human life and properties.

#### Deteriorating water quality and ecological environment

Over-discharged or poor-treated waste water and other pollutants have seriously deteriorated the water quality, causing lots of ecological environmental problems.

#### Over-exploitation of delta resources

The rapid socio-economic development has led to competitive and over utilization of delta resources including water resources, land & wetland, riverbed sand, shoreline, etc. This has led serious conflicts between development, protection and regulation and threatened the sustainable delta socio-economic development.

### Measures to deal with the issues

1. Flood-guiding line management
2. Flood discharging harness
3. Water resources and water function zone management
4. Shoreline and wetland management
5. Sand- mining regulation

### Organization of the initiatives process

Central government has issued ”Pearl River Delta comprehensive Regulation Planning”. Provincial and local authorities have strengthened the management of water resources, pollutant discharge, sand mining, wetland protection and take various engineering measures to stabilize and deepened the rive channels to ensure flood water to propagate into the sea smoothly and quickly, etc.

As the Pearl River delta has been one of the most developed and densely populated regions in China it has been a long history of development, protection and regulation in the delta. Chinese government has realized that law is the most effective way to regulate all socio-economic affairs in the country and strengthen the administrative power in regulating each sector. Meanwhile, the delta hydraulic and morphological evolving processes have, to a higher degree, been understood by research institutes and universities after many-year hard research efforts. These aspects have promoted “real solution” planning and regulation possible. Recently, central government has ratified “Pearl River Estuarine comprehensive Regulation Planning” and “Pear River Basin Flood Protection Planning”, provincial government has issued “Pearl River Delta Reform and Development Planning” (a master planning), different provincial bureaus has issued sectoral planning to materialize the master planning. In China these planning’s at national, provincial levels are administrative laws, ministries and their subordinate agencies, and provincial, municipal, county governments have been granted mandates to manage water resources, flood control, pollutant discharge, sand mining, wetland protection, navigation, etc. a series of engineering projects have been taken to stabilize and deepened the rive channels to ensure flood water to propagate into the sea smoothly and quickly, etc.

### Difficult parts in the process of the initiative

The most difficult part in the process towards a healthy, energetic delta life is lack of a true ‘comprehensive’ strategic planning that is scientifically sound, far-reaching and being implemented strictly. The difficulties might arise from the misunderstanding of the natural delta evolution processes, the competitive utilizations of delta resources including water, sand, shoreline, channel, etc. by various local, regional interests as well as weak awareness of sustainable regional development.

The most difficult part in the process towards a resilient, energetic delta development is the institutional coordination and cooperation. There are more often than not interest conflicts between central government and provincial government, provincial government with provincial government, local governments with each other, sectoral development priorities, etc. This might lead to prolonged quarrels when problem-solving action needs to be taken immediately. At the same time, the delta governance is prone to be rigid, so the institutional structure, relationship and mandate should be adaptive and evolving when new circumstances emerge.

### Suggestions for countries that just have started to think about their deltas

1. From a holistic viewpoint, scientific researches should be conducted to understand the natural evolution process of the whole delta including water & sediment movement, channel morphdynamics, storm surge (typhoon) forecast and early warning system, etc.
2. With the help of the understanding of the delta process, comprehensive long-term planning encompassing water resources & water environment protection, flood-risk minimization, navigation, agriculture & fishery, recreation, etc. should be formulated and made a law.
3. As guided by the comprehensive planning, engineering projects are taken to regulate water, sediment and pollutant movement in the delta. The harnessing engineering measures have to be scientifically-sound, adaptive, economically feasible and sustained.

## Case Study 5 – Egypt: The Alexandria 2030 Integrated Urban Water Management (IUWM) plan, the Nile Delta

*Eng. Mohamed ElRawady.*

### Main issues in the Delta

#### Competing and escalating demands

Aside from the competition between the Nile basins upstream and downstream, different sectors are competing over water, with the growing population and the evolving industry, the agricultural sector is facing a growing competition. The sector of the highest national consumption, in itself also has competing demands of its own, especially between upstream and downstream farmers.

Water Quality Degradation and Pollution

Caused by Inadequate treatment of municipal and industrial waste water.

#### Ground Water Depletion and Sea Water Intrusion

Caused by excess pumping of groundwater and excessive granting of well permissions.

#### Coastal Shore Erosion and Sea level rise

### Measures to deal with the issues

* EWP was part of a nationwide dialogue on treated wastewater reuse as a measure for decreasing competition over conventional water resources.
* EWP facilitated the establishment of water treatment plants and low cost sanitation schemes in rural areas of the Nile Delta.
* EWP organized a seminar on the future of water in Egypt.
* EWP coordinated a focus study and organized workshops on industrial areas’ water impacts in the delta.
* EWP was part of a future planning process for the coastal city of Alexandria that depends entirely on the Nile, developing what has been known as the Alexandria 2030 Integrated Urban Water Management (IUWM) plan. One of the main objectives of that plan is reducing the pressure on the Nile Delta by developing non-conventional water resources where possible.

### Organization of the initiatives process

* Constantly in contact with decision makers and different stakeholders.
* Continuously facilitating technical Dialogue through workshops.
* Disseminating knowledge through publications.
* Organizing awareness campaigns and public events.
* Developing project concept notes and proposals.
* Giving awareness presentations.

### Difficult parts in the process of the initiative

Lack of harmonization between different sectors, which is emphasized the most by mismatching Water, Agricultural, and Urban development policies.

### Suggestions for countries that just have started to think about their deltas

Watch for trends of urban encroachment on Deltas, monitor pollution sources and water quality and identify all competing uses and get stakeholders consensus on ranking them by priority.

## Case Study 6 – Indonesia: Managing diverse delta systems

*Dr. Mochammad Amron*

### Main issues in the Delta

1. Developed Delta: Java Island: Brantas, Solo, Citarum

* Populated Area (irrigated area, cities/ urban area)
* Water Management (water supply, sanitation)
* Flood Management

1. Developing Delta: Sumatera and Kalimantan islands

* Water management and tidal area
* Sustainable development plan
* Conservation

1. Undevelop Delta: Kalimantan and Papua Islands

* Conservation and preservation
* Sustainable development plan
* Resettlement

### Measures to deal with the issues

1. Master Plan/Land and Water Resources Development Planning
2. Zoning (Macro, Micro and Meso Zoning)
3. Development of infrastructures in soft soils
4. Social Engineering

### Organization of the initiatives process

1. Coordination’s among Lines Agencies
2. Planning Agencies as a Lead Agency during Planning stage
3. Role and regulations
4. Meeting consensus

### Difficult parts in the process of the initiative

1. Appropriate development plan
2. Staging of development
3. Political support

### Suggestions for countries that just have started to think about their deltas

1. Global warming: Attention to CO2 emission reduction
2. Stages of Development :
   * Land and Water Resources Development Plan
   * Appropriate development plan
3. Delta management require significant cost

* Delta Development require careful plan
* Stages of development are required
* Environmental consideration and social aspects
  + Biodiversity protection
  + global warming
  + degraded land
  + resettlement issues

## Case Study 7- Thailand: The Town and Country Planning Act, the Chao Phraya Delta

*Ms. Panpilai Sukhonthasindhu*

### Main issues in the Delta

* Improper settlement in Young Delta: lacking long term land use planning, ineffective urban planning and coastal area development plan
* Flood risks and coastal erosion problems
* Resilience and adaptation to environmental changes (climate condition and extreme weather): Food security has been at risk for the new poor. There is tendency for the local producers to adapt the cropping patterns.

### Measures to deal with the issues

* Public awareness on the understanding of the change process in the Delta is the major measure. Most of the works are undertaken by academics, civic groups and user groups, but it is not yet covered the whole picture of the delta and the change process.
* The structured measures: constructions of dike, flood ways, water diversion scheme, have been the effort of the line agencies, while local initiatives and economic measures are not integrated.
* The legal aspect as the enforcement of the comprehensive plan of Town and Country Planning has been put forth by the Senate Committee on Natural Resources and Environment.

### Organization of the initiatives process

Thai Water Partnership works in coordination with local stake-holders concerns with coastal erosion and coastal area development planning. Examples of work cover the enforcement of the Town and Country Planning Act in downstream Mae Klong, and Thachin river basins, water allocation in Prachin-Bang Pakong river basin.

### Difficult parts in the process of the initiative

So far, the implementations at local level have been the problems solving at the basin level, then it is very difficult to synthesize and upscale issues to the policy brief proposed to line agencies and public sectors. Facilitating the common understandings of diverse-stakeholders is also challenging.

### Suggestions for countries that just have started to think about their deltas

* Develop the holistic views and systematic working approach to make the understanding of the complete picture of your delta. It should not be the sectorial work of different line agencies.
* Prioritize key issues affected the changes in the delta: impact of Climate Change, land use change, and plans of coastal area utilization, for examples. Have the monitoring system in place, with the accurate and update information and data.
* Public awareness raising: on the ecosystem of the mangrove forest, coastal areas, the expansion of urban settlements, for examples. These should be done through the easy accessible channels. Advocate to the young generation through the educational system.

## Case Study 8 – Vietnam: The Delta Master Plan, the Mekong Delta

*Dr. Tu Dao Trong.*

The Mekong River has a catchment area of 795,000 square km and a water volume of 475 BCM. The Mekong delta has a catchment area of 40,000 square km. The Mekong river basin incorporates land and people within six riparian countries namely China, Myanmar, Thailand, Laos, Cambodia and Vietnam.

### Main issues in the Delta

#### Dependent on upstream water/cross-boundary issues

* Heavy dependent on water from upstream countries (95%)
* Too much water in flood season and shortage water in dry season.

#### Salt water intrusion

#### Sea level rise

### Measures to deal with the issues

* Living with flood
* Establishment of resident areas free from flood
* Changing the crop pattern fitting to specific area- aquaculture development
* Development of coastal protection forests to mitigate damage of sea level rise
* Practicing IWRM

### Organization of the initiatives process

* Revising Delta Master Plan
* Conducting deep researches/studies to find appropriate solutions for specific areas
* Improving capacity for local organization and communities
* Learning experiences from other Deltas in Region and in the world
* Studying and assessing impacts to Delta of upstream development– Establishing the scenarios for responding

### Difficult parts in the process of the initiative

* Capital and human resources shortage
* Gaps of understandings on Delta, development for short term but not for long term, outstanding’s in policy and Local benefits.

### Suggestions for countries that just have started to think about their deltas

1. A Comprehensive and scientific plan for Delta development
2. Human resources building
3. Participation of communities in decision making process
4. Strengthening comprehensive basin cooperation
5. Build resilience through restoring natural systems (the Delta used to be an open, highly adaptive systems but large scale infrastructures have turned the delta into a largely human regulated system with low resilience to changes including climate change)
6. The Delta Master Plan is a multi - discipline plan for social-economic development and Environmental protection for the Delta. Therefore it needs allot of efforts from all stakeholders including government (at central and local levels), civil society, communities etc. The solutions should be combined with advanced technologies, local knowledge and experiences (e.g. living with flood).