Tidal River Management, Perspectives of a Water Management Concept

Msc Thesis by Rik Heinen

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Tidal River Management, Perspectives of a Water Management Concept

Master thesis of Sociology of Development and Change group submitted in partial fulfilment of the degree Master of Science of International Development at Wageningen University, the Netherlands

Rik Heinen

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910811318040

Supervisors:
Dr. J.F. Warner, Wageningen University
M.F. van Staveren, MSC, Wageningen University

Abstract

This thesis identifies different perceptions of the concept of Tidal River Management (TRM) in Bangladesh. TRM is a water management concept that originated from local knowledge and is practised in the South West of Bangladesh. Experts within the water management sector, and who are working on a national level, are interviewed on their perceptions of Tidal River Management. Furthermore, during the three months of research in Bangladesh for this thesis, a field visit of two weeks was carried out in order to have a better understanding of the concept and the local perceptions of Tidal River Management. By documenting the perceptions of TRM this thesis tries to identify the current problems and possibilities of TRM. Firstly a short historical review is made where the water sector in Bangladesh is compared to the ideas of James Scott in his book "*Seeing like a State".* Secondly, the concept of TRM is explained and discussed. Finally the data collected in the interviews are used to create an overall better understanding of the water sector in Bangladesh, and to identify the different perceptions of TRM. The perceptions are analysed with the help of the ideas of James Scott. These perceptions can clarify why there are currently problems with the implementation process. They can also shed a light on the possible future use in of TRM, especially within the Bangladesh Delta Plan 2100.

In his book "*Seeing like a State"* Scott discusses large scale governmental projects and the dangers they can represent. If all the following elements are present in a project; administrative ordering, high-modernity, an authoritarian state, and a weak civil society, a governmental project could have disastrous consequences according to Scott. The short historical review shows that there is a correlation between water sector projects in Bangladesh and the ideas from Scott. More recently the similarities are smaller but there are still elements of Scott's ideas present in the current water management sector.

The different perceptions about TRM identified for this thesis have proven to be less varied and controversial then originally hypothesized. The data from the interviews have indicated differences in perceptions of the current issues preventing implementation, but not on the basics of TRM. Generally different experts agree on its characteristics and results. The larger differences are in the perceptions of the solutions, and the current social problems that TRM experiences. There is a disparity between the different experts in their similarities with the elements of Scott, but overall they are never completely similar. The water sector in Bangladesh has changed enough to implement, and use, a local social concept like TRM. Although many changes need to be made to its implementation process before it can be successful.

Currently there is no active TRM project as there are conflicts between the local population and the implementing agency. This is where the difference in perceptions result in disagreements, and different ideas, on what the causes of the current problems are. There are some new programs that try to solve these issues but overall little progress has been made in recent years. A shared opinion between different experts and locals is the following; waterlogging will happen again in the South West of Bangladesh, before there is time to solve the implementation issues of TRM.

Acknowledgement

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Abbreviations and Bengali concepts.

Abbreviations

ADB	Asian Development Bank
BDP2100	Bangladesh Delta Project 2100
Blue Gold project	Project of the Government of the Netherlands in the South West of Bangladesh on participatory water resources management.
BWDB	Bangladesh Water Development Board
BWFMS	Bangladesh Water and Flood Management Strategy
CEGIS	Centre for Environmental and Geographic Information Services
CEP	Coastal Embankment Project
CEIP	Coastal Embankment Improvement Project
FAP	Flood Action Plan
GoB	Government of Bangladesh
GoN	Government of the Netherlands
GPWM	Guidelines for Participatory Water Management
IWM	Institute of Water Modelling
IPSWAM	Integrated Planning for Sustainable Water Management, project of the Government of the Netherlands in the South West of Bangladesh.
KJDRP	Khulna Jessore Drainage Rehabilitation Project
LGED	Local Government Engineering Department
NWMP	National Water Management Plan
TRM	Tidal River Management
WAPDA	East Pakistan Water and Power Development Authority, would become the BWDB
WARPO	Water Resource Planning Organization

Bengali concepts

Beel	Low lying area in Bangladesh, mostly in South West region.
Bhabodah regulator	Regulator near Beel Kapalia, exact spelling can differ between documents (Bhabodah/Bhadabaha).
Bigha Surface area	3 bigha is 1 acre.
Decimal Surface area	100 decimal is 1 acre.
Fishing Gher	Fish cultivation pond surrounded by embankments.

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Chapter 1 Introduction

1.1 General introduction

The country of Bangladesh is situated where the water from the largest delta in the world flows into the Bengal Basin, resulting in water management being a daily part of the lives of many Bengali people. As G. Wood (1999) said in his paper: "*Every citizen is Bangladesh has an legitimate and acute interest in water policy"* (Wood, 1999). The Ganges-Brahmaputra-Meghna delta covers most of the area of Bangladesh creating opportunities for the country (Figure 1.1), together with many challenges. The country experiences frequent flooding events like riverine floods and coastal flooding, caused by storms and cyclones. Recent cyclones like Sidr in 2007 and Aila in 2009 caused wide spread flooding and damages (World Bank, 2005), with cyclone Aila breaching embankments at the coast resulting in long term damages and hardships for Bangladesh (Auerbach, et al., 2015). This long history with water related disasters resulted in the emergence of many programs and projects, which throughout the years that have attempted to mitigate the flood risk.

For the sake of this thesis only the "recent" history of water management will be discussed. The starting point of this is considered to be the 1950's, in which Bangladesh experienced multiple floods. These floods prompted new projects and policies sponsored by both national as international actors which shaped the current day water sector in Bangladesh (Dewan, 2012). The first decades of this water sector in Bangladesh were characterized by many technocratic and high modernity inspired projects. Now 70 years later the decisions made during that time are still visible and shape the water management that is practiced. Since the late 50's there have also been many changes, and new concepts that have been introduced.

One of these new concepts is Tidal River Management (TRM), a local water management strategy. It is adapted from an old water management practice that has been used in the South West of Bangladesh for hundreds of years. This thesis will explore how this concept of TRM is perceived by experts in the water sector of Bangladesh, and how it compares with other projects that have been done or are being carried out in Bangladesh. The research continues on the work of other Wageningen University students that have researched the perceptions of TRM on a mostly local level. This research focusses largely on the national level. In order to relate the general research of perceptions to the actual situation in Bangladesh, this thesis will analyse the new Bangladesh Delta Project 2100 (BDP2100). It will discuss if and how TRM will fit within this large delta project. The BDP2100 is a joint project between the Government of Bangladesh (GoB) and the Government of the Netherlands (GoN). Its goal is to produce a new strategy for the next 50 to 100 years for the entire water sector in Bangladesh. TRM is a water management practice often considered as a partly social process. The perceptions of TRM by the people working on the BDP2100, as well as of other experts in the water sector of Bangladesh, can shed some light on the current strategies of the water sector. It could also indicate some of the changes it has gone through since the 1950's.

This thesis is divided into four chapters: the first chapter is a general introduction to the thesis, the characteristics and situation in Bangladesh and the research that was carried out for this thesis. The second chapter will look at the water sector of Bangladesh starting from 1950 up to current projects and policies. The third chapter discusses TRM by looking at the TRM projects that have already been

implemented and a new project that is planned but delayed. The final chapter will focus on the actual perceptions of experts on mostly the national level but also of people that work and live in the area where TRM has been carried out. The thesis will finalize with a conclusion and discussion on the answers this thesis has provided and the questions that still remain.

Figure 1.1 Political map of Bangladesh

Source: http://www.mediabangladesh.net/map-of-bangladesh/

1.2 Relevance of the study

The concept of TRM has existed for two decades and has already been used in official government projects like the Khulna Jessore Drainage Rehabilitation Project (KJDRP). There are however many issues, and the new proposed TRM project that was planned for 2012 has been delayed because of protests. The likelihood is low that these will be resolved soon. Recently there has been new research on the technical aspects of TRM (Amir, et al., 2013), (Auerbach, et al., 2015), (van Minnen , 2015). There already has been research on perceptions of TRM in the South West of Bangladesh, by a student from Wageningen University (de Die, 2015). This thesis will build on his work, he researched the emergence of TRM and identified different frames with which the stakeholder perceive TRM. The majority of the stakeholders interviewed by de Die were from the local region where TRM was practised. This research focusses on the national level and on organisations and institutions that operate throughout the country. As the actors that implement the projects and influence the policies their perceptions of TRM are relevant. This thesis will try to identify the perceptions of experts working on a national level of the water sector in Bangladesh. These individuals have a large amount of influence on the decisions made on new projects and policies. The perceptions of this group is important to understand, in order to make a scientific assumption on the possible future role of TRM.

The BDP2100 when complete will produce a strategy for the entire water sector in Bangladesh for the next 50 to 100 years. With that it will determine many of the new projects and policies that will be created, and greatly influence what kind of projects are realised and how these are undertaken. It is interesting to research how the BDP2100 will perceive and maybe use, a new and not frequently practised social concept like TRM. This thesis will attempt to answer this question as fully as possible given the fact that BDP2100 is still starting up. The question of what the strategy will be that the BDP2100 will produce, remains very relevant for the entire water sector in Bangladesh.

Finally this thesis forms part of the research project *Communities and institutions for flood resilience: enhancing knowledge and capacity to manage flood risk in the Bangladeshi and Dutch Deltas*. This is a 5-year research project, funded by the Netherlands Organisation for Scientific Research. It enables two Phd students from the Netherlands and two from Bangladesh to carry out their research. The work done for this thesis can contribute to the work of the different Phd researchers. The research carried out as a part of the larger 5-year research project.

1.3 Study objective

The objective of this thesis is to study tidal river management and what it's possible connection with the BDP2100 will be. The water sector in Bangladesh has been crucial in mitigation floods and improving the safety of Bangladesh and has tried to improve the livelihoods of the people living in the country. It has a long history of projects and policies mostly focussing on large scale strategies, recently new concepts and ideas are used. This study will try to identify the perception of TRM by different experts, in order to understand what kind of role the "new" concept of TRM can play within the national water sector in Bangladesh and specifically the BDP2100.

1.4 Research questions

The before mentioned study objective resulted in the following research question: "*How is the concept of Tidal River Management perceived by different stakeholders, in the context of the Bangladesh Delta Plan 2100?*". The sub research questions that will be explored in order to answer the main research question are listed below.

1. What is the historical context of the water sector in Bangladesh?
2. What is the historical context of TRM in Bangladesh?
3. How is Tidal River Management perceived by different stakeholders?

The first question will be answered in the second chapter of this thesis, the third chapter will answer the second question and the final question will be discussed in chapter four. The main research question will be discussed in all chapters and answered in the conclusion and discussion of this report.

1.5 Research design & Methodology

The first two research sub questions will be answered mostly with an in depth literature study. Part of the literature used was collected from the database of the research project Communities and institutions for flood resilience. This is the project of the four PhD students, this thesis supports their larger research project. There has also been a further search for new documents and specific projects documents in Bangladesh, from people who have directly worked on those projects. The documents used are varied; reports, policy documents and research papers have all been used.

Information on perceptions was gathered by the means of qualitative, in depth interviews. The main group of people interviewed are experts working on a national level. Furthermore, local officials and people living and working in the areas where TRM has been implemented or is planned, have been interviewed. The local interviews were conducted in order to collect their perceptions and opinions, but also for a personal understanding of the issue and for me to visualize the actual situation on the ground. The interviews with the locals were only extractive, in order to not give the impression that the research was done for the government of Bangladesh. The interviews with experts in Dhaka began only as completely extractive. However as experts were interviewed that were not actively involved with TRM towards the end, information on TRM was also shared towards the end of the fieldwork period. A good example of such an interviews was with Mrs. Kazi of the World Bank.

The interviews with the experts focussed on their background and experience working in Bangladesh, and on their opinions of projects that had taken place or that they were involved with at that moment. Perceptions are not a straightforward concept to identify, with the help of qualitative interviews that focussed on their ideas I collected information on their perceptions. The first people that were interviewed were selected from the contacts M. van Staveren had. Others were selected via the snowball method once the fieldwork in Bangladesh was started and local contacts were made. Furthermore I had the opportunity to work from the official BDP2100 project office in Dhaka, which allowed me to gather valuable information that otherwise would not have been available to me. For example; I made notes of meetings where TRM was discussed, and I once assisted as an official note taker during a large conference. This direct connection with the BDP2100 influences the research and gives it a bias. However, without this direct link it would have been much more difficult to determine the existing perceptions.

Framing and perspectives

How people perceive something influences their reaction towards it, their perceptions are influenced by their personal background and experiences they have had. When there is a conflict, often it is because of how different people are perceiving the issue. With large cultural differences between the people the difference in perception will only be greater. Because of the significance of this, this research will try to identify the different perceptions of TRM that exist in the different stakeholders groups. With the differences identified the current use of TRM and its problems can be better understood and explained.

Perception is similar to framing, of which DeWulf (2007, pg2) wrote: "When people from different backgrounds work together, they tend to frame the issues at hand in very different ways by defining differently "what this is all about"." Framing is a sense making device, according to Weick (1995), and that is how it will be used in this study. In order to focus this study it will research the perceptions of the people interviewed, which can be understood as a part of their frame.

The literature collected and the interviews are used to determine the specific perceptions of the experts interviewed. The official documentation of projects can give valuable insights in the processes and strategies that existed within the projects. Information on the decision making process and the final implementation can show clear perceptions of different work methods and different concepts like TRM. The interviews are the main source of information that is used to determine the perceptions. All interviews are audio recorded so that they can always be referred to, and a compact summary is made of each interview with the most important points and quotes. Because of the small number of interviews they have not been coded as the summaries and the audio recordings were enough to determine the perceptions.

Limitation of the study

This study is limited in a number of ways, one of the most constraining ones was time. The actual field work in Bangladesh was for a period of three months. This limited the number of interviews I was able to conduct, which therefore limits the amount of data that can be used to answer the research questions. Furthermore the interviews with local farmers, fishermen, landless and land owners were all done with the help of an interpreter. Without an interpreter these interviews would not have been possible and they were vital for the research, but working with an interpreter can decrease the quality of data that is collected.

The political situation in Bangladesh during the time of the fieldwork prevented easy transport between the Dhaka and Khulna. Because of delays and uncertainties and the overall limited timeframe I was unable to go to the field a second time. The first time transport back to Dhaka was delayed for a week. The political situation did not lead to direct troubles in Dhaka, although it was at sometimes uncertain if it was possible to move around the city during the day.

A final limitation to the research is related to gender. Almost all the experts interviewed were males as they were often leading the organisation. The interviews were mostly done with the higher level management, as they were more freely in expressing their opinion. lower level employees expressed their opinion less freely due to the strong hierarchical system within the organisations in Bangladesh. The interviews with the locals were also male dominated as they were working in the fields during

the days I was there, and they often took control of the conversation. Furthermore Bangladesh as a predominantly Muslim country, has specific gender roles where it was more problematic for me to approach females compared with males. Therefore I was not able to balance the gender aspect within the research.

Theoretical framework

This thesis will use part of the ideas on state building and social engineering that James C. Scott (1998) outlines in his book: "*seeing like a state*". In his book James Scott explains his vision on large government projects and what strategies they employ to reach their goals of to improving the livelihoods and quality of life, of the people in the country. Scott identifies four elements used in these state projects; administrative ordering, high-modernity, an authoritarian state, a weak civil society. He is critical of the combination of these elements and claims they fail in bringing the promised improvements for the people.

Scott sees a logic in the failing of these social engineering schemes, with the help of four elements. He identifies these four elements as the tools a state can use to govern its people. The first element is the administrative ordering of the society and the nature, within a nation. All governments need an administrative ordering to govern a nation, it is needed for a social welfare system and to maintain order. It can also be used to implement projects and control residents. The type of government determines the use of their administrative ordering. The second element that is needed is the concept of authoritarian high modernity, in which government is expressed in policies and schemes. The concept of high modernity stand for the principle of using scientific data and technical progress to control the nature and order the society according to what it sees as the needs of the human. As well as to make it legible and governable. It calls for a highly ordered society that controls nature and is rationally designed according to the understanding of natural laws. Scott gives examples of plans and cities based on this ideology in his book. Le Corbusier was an architect that used this high modernity school of thought and planned entire cities. His plans for a new Paris were never realized, but his principles are clearly visible in the example of Brasília, the new capital of Brazil. This city was planned with a completely high modernity perspective. After it was constructed it became clear that the design was not appreciated by the new residents who called it a city without crowds; they could not make the city their own. The city did not succeed in its goals of creating a new kind of life for its residents, currently it is changing to encompass the same form of social life as is common in Europe (Williams, 2005). Scott comments on these kind of cities in his book (pg 342, 1998): "The order and certainty that had once seemed the function of a God was replaced by a similar faith in a progress vouchsafed by scientists, engineers and planners". Scott discusses in his book that this faith is misplaced and resulted in disasters. The examples in the book of Scott are based on large scale engineering projects or city planning. In this research it is applied to water management projects. There are large differences between city planning and water management, however the elements of Scott are still represented in the water management projects in Bangladesh as this thesis will discuss in chapter 2. The third element is an authoritarian state that is convinced of the ideology of high modernity. The state furthermore has the ability and the wish to use their administrative ordering to full effect to enforce their high modernity schemes on the population. The fourth element is a weak civil society that does not have the capability or wish to resist the government plans. According to James Scott this combination can disrupt and large scale government schemes and let them fail.

Other researchers have similar ideas and study large projects with the same concept as J. Scott uses. Pritchard (2011) looks at the projects and infrastructure that were built at the river Rhône in a post second world war France, it was a time France was trying to show its identity and strength. Another example of this theoretical framework is the study of Mukerji (2009) on the Canal Du Midi in south France. Canal Du Midi connects the Mediterranean Sea with the Atlantic Ocean, it was constructed in 1667-1680. Mukerji studies this infrastructure project with the framework that James Scott describes, where the government is using the large project as an identity project.. Although the governmental projects can be based on the ideology of high modernity, it can also be a means to legitimize the authority of the state. With such projects the state will be validated as they are invariably needed to regulate them. By endorsing these schemes the state causes an increased need for a strong government. Next to this they increase the governability of the people or the region where the project takes place.

There is criticism on Scott's work; the distinction of the great state actor who would have all the power and the poor farmers who have superior local knowledge is too simplistic. Other aspects like nationalism and militarism, also influence what is achieved in name of the state. It is not merely high modernism that influences the actions of the state. Scott furthermore is accused of ignoring the part capitalism plays in the case studies he discussed (Mann, 1999). Another review of his book discussed the use of the concept of 'community', which is proposed as substitute to the state in relation with managing the local society. Many are critical of the concept of 'the community' and the attributes that are given to it (Geschiere, 2007). Li (2005) perceives "seeing like a state" as a good understanding of how states can operate, however she tries to amplify his work. Scott identifies the State as having a monopoly on power and decision making according to Li (2005). This is not correct as many other agencies are also capable of implementing large programs, examples are non-government agencies or institutions like the World Bank (Li, 2005). Li argues that Scott treats "the state" as a singular aspect, the same thing he proclaims the state does to "the community" the work with. This is relevant to the situation in Bangladesh, as the country is not very powerful. It is considered as a "alert" on the failed state index (FFP, 2015) by the Fund for Peace organisation, "alert" is the third worst category for a state to be in. Although the country is growing economically (World Bank, 2015) it is not a powerful state that can implement large scale interventions. The commentary of Li that the state is not the only actor that implements large scale projects, with possible the elements from James Scott, is used for this research.

The framework Scott gives in his book through his four elements is used in this thesis, together with the criticism on his work. As Li (2005) argues; Scott simplifies matters and tries to fit everything within a few phrases, this may be because of his background in political science, where they devise models on big topics (Li, 2005). The simplification can however help to understand the changes in the water sector in Bangladesh, and to identify the different perceptions of the experts interviews for this thesis. The literature study has yielded no research done on water management in south-east Asia that used the framework of Scott. His ideas are however still applicable as the water sector in Bangladesh has been controlled by large institutions, that have used rigid planning as their strategy. Chapter 2 will discuss these projects and policies, where not only the state was the powerful actor, but also institutions like the World Bank or the Asian Development Bank (ADB). The four elements of Scott; administrative ordering, high-modernity, an authoritarian state, a weak civil society are used in this thesis to analyse the different projects and policies in Bangladesh. The idea of the state as the

only actor with power will not be used in this thesis. The comments of Li (2015) are considered, there are more institutions that have to power to implement projects.

In order to comprehend the current practice of Tidal River Management and the perceptions of the interviewees on the subject, it is vital to understand the history of the water sector in Bangladesh. The relevant projects and policies can be compared to the ideas of James Scott, in order to create an overview of the changes that have ensued within the recent history of the Bangladesh water management sector. Finally TRM and BDP2100 can be placed in relation to the previous projects and policies according to the ideas of James Scott. Scott emphasizes in his book, that only when all four elements (administrative ordering, high-modernity, an authoritarian state, a weak civil society) come together it will lead to schemes that can be disastrous. He stresses the importance of certain elements, such as a particular administrative ordering and the use of proper scientific knowledge in planning. This thesis will explore how the water management sector in Bangladesh relates to these concepts, what progress has been ascertained and what the near prospective future for it will be.

Study area

The bulk of the interviews have been carried out in Dhaka. The experts who work for government agencies or international organisation are situated in Dhaka so consequently most of the interviews were conducted there. The fieldwork took place in an area where TRM has already been practised, in the South West of Bangladesh, close to Khulna (figure 1.1). A visualisation of the beels where TRM has been implemented or is planned is presented in figure 1.2 below. Since it is an older map it is no longer up to date, however there is no other map available. The beels of Bhaina and Kedaria (blue) and the Beel Khuksia (green) have had TRM projects. Beel Kapalia was intended as a new beel for a TRM project but this has been delayed indefinitely. Local farmers, fisherman and landless labourers that work and live in the beels Kapalia, Khuksia and Bhaina have been interviewed. Unfortunately, it was not possible to go for the second planned fieldwork period, due to the political unrest and time constraints.

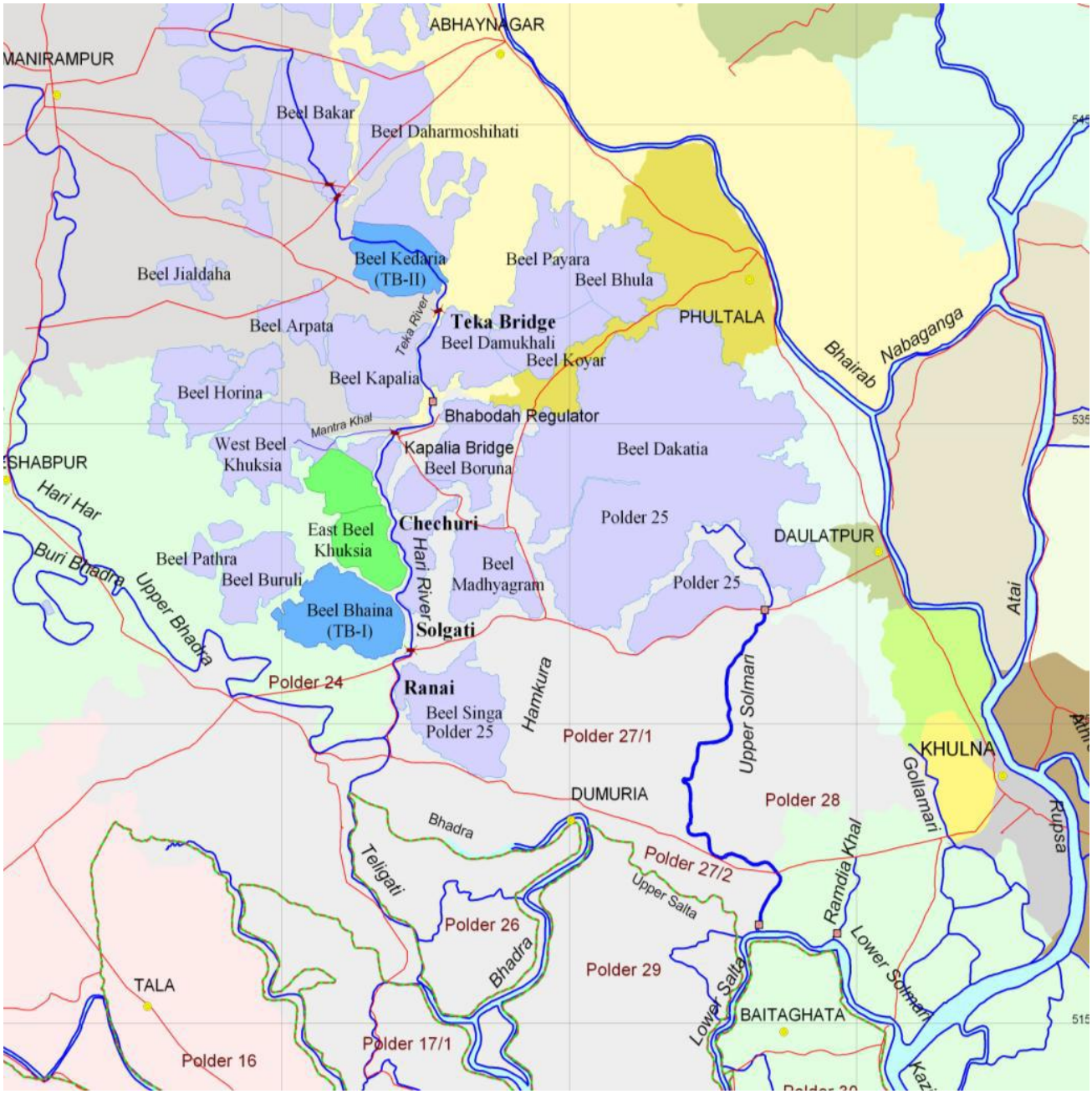

FIGURE MAP TRM AREAS 1, (IWM, 2010)

Figure 1.2 Map TRM areas South West Bangladesh

Source: (IWM, 2012)

Chapter 2 Historical background.

Introduction

Tidal River Management has originated in the South West region of the Bangladesh delta. This chapter will review and analyse the history of this region and will give an overview of events that have had an impact on the water management in the South West of Bangladesh. After this, both projects and policies that have determined the direction and the changes within the water sector in Bangladesh will be discussed. The projects and practises of the water management in the South West of Bangladesh will be related to the framework of James Scott.

2.1 Before 1950

The region of Bangladesh was governed by numerous empires and nations before it became independent. Between 1200 and 1757 AD the region was controlled by the Sultani, the Turkish and the Mughals in consecutive order. During this time there was already water management. The Sultani and Turkish rulers concerned themselves mainly with the construction of reservoirs that were filled during the rainy season, channels and embankments were improved during the Mughals period. During this period, most of the local governance was done by the Zamindars (Ali, 2002).

A *Zamindar* was a large land owner (Dewan, 2012), they governed the water management on their land. The practice local people used in that time was called *Doser Badh* (Embankment construction by community). More commonly known as *Ostomasi badh* (embankment for eight months) (Islam & Kibria, 2006). This practice was adapted to the local processes of upstream water flows during the rainy season, and tidal flows from the Bengal Bay year round. It was a balanced process between sedimentation and land subsidence (Nowreen, et al., 2013). The Zamindars were still governing when the British arrived in 1757, colonizing a large part of the India subcontinent. The British rulers were mostly interested in trade and abolished the previous water management systems from the Mughals. This resulted in badly maintained water management structures and policies. When the British colonial rule ended in 1947, flooding, crop damages and siltation of rivers were frequent issues (Ali, 2002). The British colonial region of the Indian subcontinent separated into the India region, and the two partitions of Pakistan and current-day Bangladesh. This division was created along religious regions as the Indian partition was mostly Hindu and the Pakistan and Bangladesh partition mostly Muslim. The region that is now Bangladesh was called East Pakistan and it was governed from current-day Pakistan.

The above mentioned *Ostomasi badh* system did not protect the land and the people against the cyclones, storms, flooding and water logging that Bangladesh experiences frequently (World Bank, 2005). During the 1950s there were multiple devastating floods as indicated in the timeline (figure 2.1). Following these events a united nations mission (the Krug mission) published a report in 1957. The timeline in figure 2.1 shows the response after numerous disaster events in the 1950. This repeated itself in the late 80's where numerous disaster events resulted in new projects and policies (figure 2.1). The KRUG report emphasized the shortage of engineering data and the need of careful study before any large-scale construction of embankments (Hughes, et al., 1994), (Hardin, 1963) (Thijsse, 1964). Based on the recommendations from the Krug mission the East Pakistan Water and Power Development Authority (EPWAPDA) was created in 1959. The WAPDA would later change into

the current Bangladesh Water Development Board (BWDB). Its main objective was to develop power and water infrastructure in East Pakistan and they started the water planning sector in Bangladesh. With USAID assistance the EPWAPDA created a 20-year Water Master Plan in 1964 (Chadwick & Datta, 2000). Furthermore it started the Coastal Embankment Project (CEP) in 1961 that was funded by USAID and followed the Dutch engineering practice of polder systems (FAO, 1985). The Water Master Plan focussed on a strategy of flood control and drainage first, and after this irrigation. The realization of this plan was structural with the construction of embankments and polders across the country (Chadwick & Datta, 2000). The CEP is an example of this vision of large governmental structural projects, as it encompassed large scale construction of embankments and polders. This strategy followed the advice of the KRUG mission, it did not however carefully study the effect the CEP project would have as is discussed in the next segment.

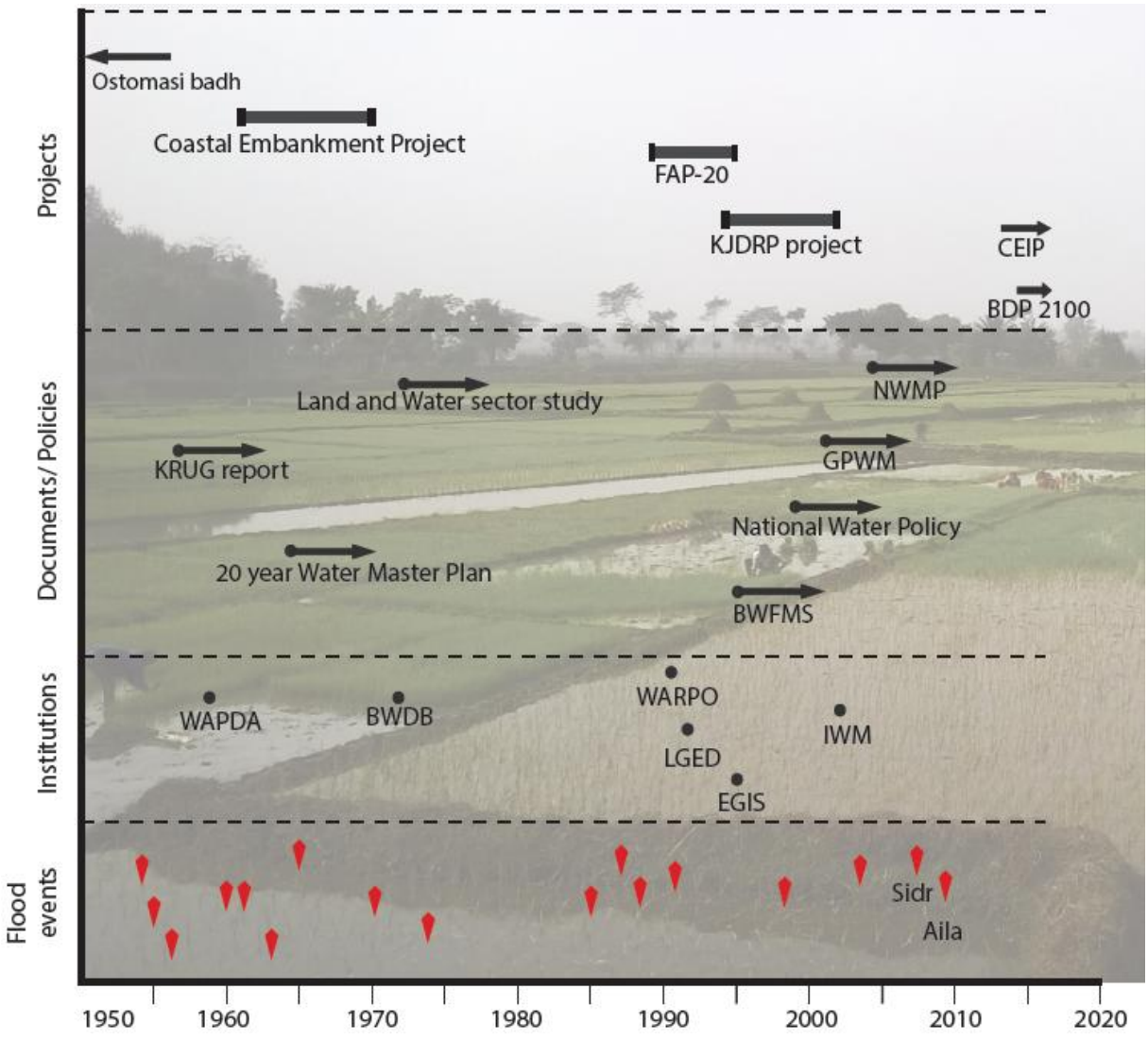

Figure 2.1 Timeline water management in Bangladesh, original concept from Dewan, 2012

Due to the number of floods in Bangladesh not all the floods that happened are presented in the timeline above. The ones indicated are the floods that have had the most impact on Bangladesh (BWDB, 2015), (Karim & Mimura, 2008).

2.2 CEP project

The Coastal Embankment Project was created by the WAPDA with help and financing from USAID. It goal was to increase the agricultural production in its project area, by increasing the flood control and drainage capabilities of the coastal region in Bangladesh[1]. The original plan was conceived in the early sixties. In 1967 the CEP was divided up into two phases with the first phase part of the 'grow more food' program (indicating its focus), it was approved in 1968. During the first phase of the CEP 92 polders in total were constructed, with roughly 4,022 km of embankments and 780 drainage sluices. The total polder area created by CEP was estimated at 1.01 million ha, and covered the entire coast of Bangladesh. Figure 2.2 shows the CEP project area which is indicated in red, the dark red line represents the KJDRP area which will be discussed later in this chapter. All the embankments constructed whether they were inland or coastal, had a design based on a flood return period of 20 years. Phase I of the CEP was completed in 1971 (Ali, 2002).

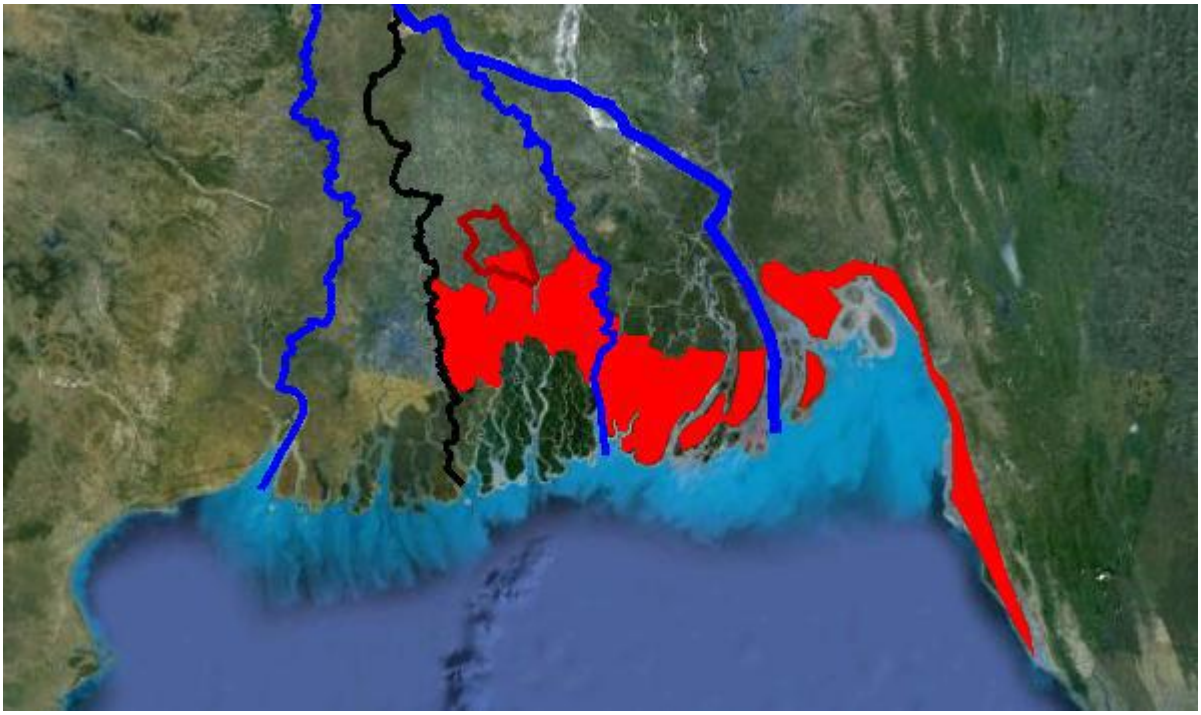

Figure 2.2 CEP project area

Source: **(van Minnen, 2013)**

With the construction of the embankments during the CEP the hydrological characteristics of SW Bangladesh changed drastically. Where surface water used to be mostly free flowing, especially during the rainy season, the flow of water was now restricted to the channels. Embankments were constructed to prohibited the intrusion of saline water into the polder areas, in order to allow farmers to grow more crops (CEGIS, 2007). The CEP succeeded in this, most local farmers were able to increase their production to two/three crops a year (de Die, 2013), (Firoze, 2003).

The benefits of the CEP were short lived, already in 1968 the first negative effects were known. There was a decrease in fish habitats and transportation routes, and an increase in sedimentation in rivers

[1] Sarafat Hossain Khan, BWDB, Project Director of CEIP-I, 16-02-2016, Dhaka

(van Minnen, 2013). It was clear that during the conception of the CEP there had been no consideration for external effects of the proposed embankments (FAO, 1985). This contradicted with the advice from the Krug report where the need of careful study was emphasized. The river sedimentation proved to be the largest issue, due to the confinement of the rivers all the silt that used to be deposited across the south west of Bangladesh was deposited in the river beds. The new constraint flow resulted in heavy sedimentation of the water ways. There were multiple contributing factors to the decreased upstream flow during the dry season. The Farakka dam in India (1975) decreased the influx of water from India[2&3]. Furthermore an upstream irrigation project north of the Jessore district[4] decreased the flow to the South West of Bangladesh. This led to the situation that during dry season the tidal flow could flow freely inland without a strong upstream flow that would push against it. During transition between high and low tide at which point there is no strong flow, sediment would be deposited in only the river bed, constricted by the embankments build. With the level of the river bed higher compared with the level of the polder, drainage by gravity becomes difficult for the local farmers (Alam, 2015). The accumulation of issues became a problem in the 80´s, causing wide spread flooding and water logging (FAO, 1985) (Ali, 2002) (Ahmed, et al., 2003) (Amir, et al., 2013). In early 1990's the water logging became a permanent problem, effecting 109.000 hectares of land in the SW of Bangladesh (CEGIS, 2007).

During Phase II of the CEP there was a major shift in strategies, with a shift to more small scale projects like cheap flood control, drainage schemes, low lift pumps (LLP) and tube wells (TW). This shift was a result from the conclusion drawn in a report by the International Bank for Reconstruction and Development (IBRD, World Bank) (Ali, 2002). The IBRD reviewed the water sector and the investments in Bangladesh and published the Land and Water Sector Study in 1972. The government of Bangladesh never officially accepted the study, it was however used by donors which effected the new projects in the water sector, like phase II of the CEP (Chadwick & Datta, 2000). This is a shift in the former large-scale governmental projects thinking which resulted in the first part of the CEP. The new plans were more small scale although the focus was still completely technical. It does indicate a change from large government projects; this is already a change from the elements that Scott identifies as problematic.

Related to Scott

The Coastal Embankment Process fits well with at least three out of the four elements that Scott identified (the administrative ordering, high-modernity, an authoritarian state, a weak civil society), not enough is known to discuss the fourth element for this particular project. However because the project has happened it can be assumed that there was not a civil society that was willing and strong enough to stop it. The government was using an ideological high modernity approach and have planned their scheme completely according to that ideology. There was no consideration of the local systems, both social and natural. It shows a need to control the people who live there by settling them, and improving their production in order to become self-sufficient as a country. Those two aspects together with the perceived need to control nature are the three most important goals of the CEP scheme. The government was at the same time using this project to expand their administrative

[2] Sarafat Hossain Khan, BWDB, Project Director of CEIP-I, 16-02-2016, Dhaka
[3] Alamgir Choudhury, Deputy team leader Blue Gold Project, 05-02-02, Dhaka
[4] Manoranjan Mondal, IRRI, collaborative research scientist under the Crop and Environmental Sciences Division and the Social Sciences Division, 02-02-2015, Dhaka

control over the lands by formalizing regions, polders and land ownership. And similar with most project that Scott discussed the project failed in most of its goals, and new problems were caused because the local situation was not considered.

The project has also brought benefits that exist until this day. When there is no waterlogging the local people are able to have an increased production. Although the local farmers don't reap the benefits of this increased income, the extra money goes to the middle man, not to the farmer[5]. Furthermore the construction of the embankments has helped brought a higher safety level to the local people. The embankments do not stop every storm but as Mr Mondal[6] said in his interview (2015): "*because of the poldering they survived, if there was no polder he could have died*".

In the CEP all the four elements of Scott were present, and the project has yielded result that Scott would specify as failure by state projects. The CEP has however also had positive effects so the results are not as simplistic as Scott's framework would suggest.

[5] Khaled Khaleduzzaman, Water expert Dutch Embassy Dhaka, 03-02-2015, Dhaka

[6] Manoranjan Mondal, IRRI, collaborative research scientist under the Crop and Environmental Sciences Division and the Social Sciences Division, 02-02-2015, Dhaka

2.3 Master Water Plan

The Master Water Plan of 1964 as seen in the timeline (figure 2.1) was developed by the WARPO with the help of the International Engineering Company Inc (IECO). It was the beginning of the development of an integrated approach towards water resource management and flood control in Bangladesh according to some (Ali, 2002). The Master Water Plan had a similar focus to the CEP, both envisioned an increase in total crop production. It did not consider any interdisciplinary issues or external impacts. The plan encompassed 58 projects selected on purely engineering and economic criteria (Hughes, et al., 1994). The interventions carried out under the Master Water Plan brought immediate results similar with the CEP; although the same problems also existed. Evaluations showed a decrease in effectiveness of the interventions and specific problems with the operation and maintenance. The increase in agricultural production which was the main focus of Master Plan failed to materialize as envisioned (Hughes, et al., 1994).

Water sector development was completely oriented towards flood control and drainage which would lead to irrigation in a later phase. This bias resulted in mostly interventions on Flood Control Drainage and Irrigation issues (FCDI projects). There was little to no cooperation between different agencies during that time and most interventions were carried out by the WAPDA (Chadwick & Datta, 2000). The WAPDA was, as the current BWDB still is, an engineering institute and were inclined to envision structural solutions for all water related issues. Given there was no resistance of other institutions with other visions on water management, new development in this period were done with an engineering perspective. This resulted in only structural solution for water management issues, even when non-structural solutions would have been better or most cost-effective (Chadwick & Datta, 2000).

Related to Scott

The goal of a country that is safe from disasters and has an increased agricultural production, is an exemplary case of a government trying to show its power and legitimacy. It strengthens the identity of a country while at the same time increases the administrative order of the society, an example of what Scott would identify as state building. “Developing” the South West of Bangladesh with large infrastructural projects has brought the national government to the local level. This was done with high modernity projects like the previous discussed CEP and the Master Water Plan. The Master Water Plan was constructed at the same time as the CEP started. Therefore it is not a surprise that their focus is very similar. The CEP can be perceived as the manifestation of the Master Water Plan, although it had already started when policy document was published. They both come from the same ideology of the government and both projects were supported by USAID. Both are high modernity projects and administrative order to increase the living standard of their people by controlling nature and using the resources available. Both are also based on scientific research and the data is used as an explanation for the project. The four elements of Scott can be applied to the Master Water Plan, especially the first three elements of administrative ordering, high-modernity, and an authoritarian state.

2.4 Flood Action Plan

In 1987 and 1988 Bangladesh experienced two extreme flood events, the 1988 flood was a 1 in 100 year event and disastrous for the country. 45 Million people were affect, it inundated almost 60% of Bangladesh for two weeks and was a direct cause for 2.300 deaths (Wood, 1999). These events attracted international attention and in 1989 the World Bank initiated the Flood Action Plan (FAP), existing of 26 studies and 3 pilot project. The Government of Bangladesh set up the Flood Plan Coordination Organisation (FPCO) in 1990 to coordinate the efforts of the FAP (Ali, 2002). FAP was only one of the new projects and policies that were started in a reaction to the flooding in the late 80's, as can be clearly see in the timeline (figure 2.1).

The FAP symbolized a change in the water sector as more emphasis was placed on safeguarding lives and livelihoods, a result of the 1987 and 1988 flood experience. The programs encompassed a more holistic approach including social and environmental impact analysis, flood preparedness programs and early warning systems. This is a shift compared with the methods of the CEP, the main focus was however still on structural implementation. Large embankments along the Ganges, Meghna and Brahmaputra were designed at a total cost of 5-10 billion US dollars (World Bank, 1990). There would be controlled flooding via sluice gates and compartmentalization. This policy was partly because the planners reckoned the economic benefits of protecting mostly agricultural land against periodic flooding would be minimal. Furthermore there was reluctance from local people and international donors to support more large structural measures. As they were perceived to be governed top-down with a lack of attention to social and environmental issues (Brammer, 2010). FAP-20 which was a flag-ship project, focussed on compartmentalization of the polders in order to let local user committees manage the flood control and drainage of their areas (Warner, 2010). So while the project was based on the structural bases that was already there, it had a strong new social focus.

FAP received during and after its time a lot of criticism from local and international actors. The programme envisioned participation from local people, however it lacked ownership which decreased its effectiveness. In reality the implementation were mostly structural and did not consider landless, fisherman and char inhabitants outside the polders (Warner, 2010). Participation was mentioned as one of the main goals in the project documents (World Bank, 1990). The actual participation of local people was not realized until the 4^{th} or 5^{th} workshops organized for the FAP (FAP, 1993). There were some individual project that continued after FAP, most of the projects did not. Foreign aid and many international consulting companies who did not have sufficient knowledge on possible impacts, shaped the project with their views. Combined with no clear ownership and a project that kept changing it created a negative perception of the FAP project (Hughes, et al., 1994).

Related to Scott

The FAP already shows a major shift in the methods and principles used in the project. There is no longer a singular ideology focus on large scale engineering structures based on high modernity methods to reach the project goals. The project was started by the World Bank, as another institute with the power to implement large scale interventions. The goal of the project is broader and was framed with attention towards the safety issues of the population. The overall projects used less structural implementation and state construction compared with the CEP. There is still a strong focus on high modernity with the majority of the interventions. Even with the different ideas that FAP used, most of the implementation were structural projects inspired by high-modernity thinking.

There are notable exceptions like the FAP-20 compartmentalization project which depended on the local community.

Overall most of the elements discussed by Scott in his book can be applied to the FAP. The government still plans projects with a high modernity focus and uses their administrative system to implement their scheme. There are differences in how well Scott's elements can be applied to FAP, high modernity is no longer the only way of thinking, although it still has a strong impact there are also other types of schemes being done. The project was also initiated by the World Bank instead of the state, this follows the comments that Li (2005) provided in here commentary of Scott. It represent a shift from a complete focus on high modernity to a more inclusive way of making schemes. The elements from Scott are still applicable but less so compared with the CEP and Master Water Plan.

2.5 KJDRP

The Khulna Jessore Drainage Rehabilitation Project (KJDRP) is the most important project related to this study. Its project area is in the south west of Bangladesh (figure 2.3), a region that was also part of the CEP. The KJDRP was funded by the Asian Development Bank (ADB). During the KJDRP there were multiple events that shaped the project and the water management sector in the SW of Bangladesh since. This was also the first time Tidal River Management was practised as part of an official governmental project. This chapter will first discuss the inception of the KJDRP before moving on to the problems it faced and the final results of the project.

Inception of KJDRP

In the chapter on the CEP the problems that it caused in the SW of Bangladesh were discussed. The construction of the embankments resulted in sedimentation issues which caused drainage issues and water logging problems. In the 1980's most of the waterways were no longer usable due to the heavy siltation, the problems started first in the northern polders. This problem resulted in large area's remaining water logged for multiple years (CEGIS, 2002), (Islam & Kibria, 2006). To deal with these problems the Khulna Coastal Embankment Rehabilitation Project (KCERP) was launched In 1987/88. The project was suspended in 1990 because the proposal document was not accepted by the donors and stakeholders (CEGIS, 2003). In that year the local people of Beel Dakatia cut the embankment of their polder and received some immediate relieve when the stagnant water was removed. However the cut in the embankment resulted in saline water entering Beel Dakatia. This salt water remained and lead to environmental degradation, and a decrease in the quality of the livelihoods of the local people. In 1995 the area which was to become the KJDRP area experienced flooding, which resulted in water logging. A total of 58 villages were inundated[7]. These events triggered the need for solution that would permanently solve the drainage congestion, and in 1995 the GoB together with the ADB initiated KJDRP (CEGIS, 2003).

The focus of the KJDRP was, as the name suggests on the drainage issues in the project area. The lack of proper drainage that was caused by the silted up rivers and low lying polders, resulted in the water logging that plagued the region from the early 80's. The KJDRP was the first project that had some success in solving some of the waterlogging issues. By then part of the SW in Bangladesh had been experiencing waterlogging for almost 15 years (Amir et al., 2013). The focus was on the waterlogging issue, if that would be solved the overall situation of the region would improve[8]. The focus of the project was mainly technical, although it did had a social mobilisation of beneficiary participation component[7&9] under the supervision of the BWDB.

[7] Shorab Hossain, Blue Gold, Community Organization Expert, 05-02-2015, Dhaka
[8] Maminul Haque Sarker, CEGIS, Deputy executive director development, 15-02-2015, Dhaka
[9] Alamgir Choudhury, Deputy team leader Blue Gold Project, 05-02-02, Dhaka

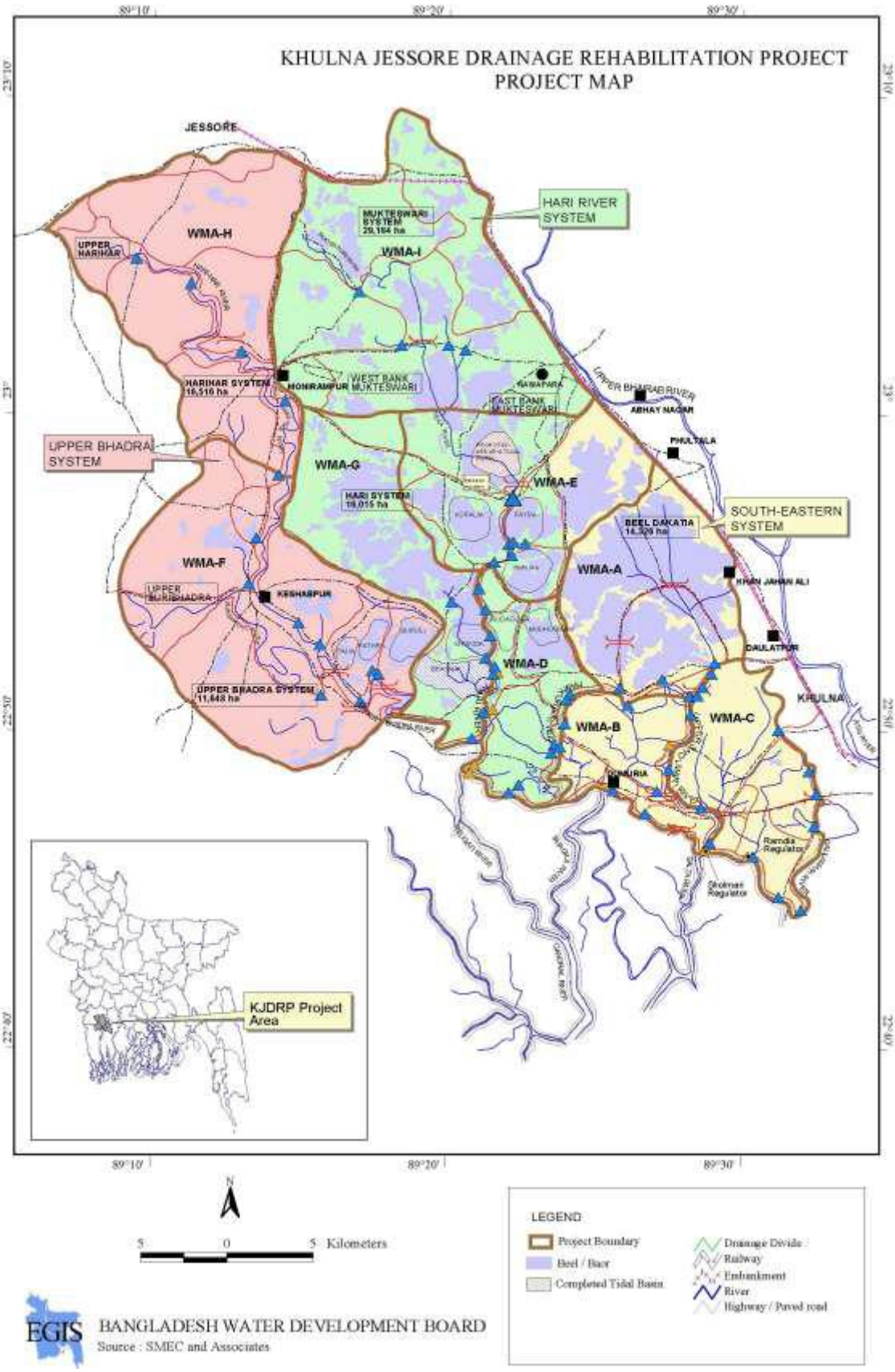

Figure 2.3 KJDRP area map

Source: **(CEGIS, 2003)**

Creation of the KJDRP

The Khulna Jessore Drainage Rehabilitation Project encompassed an area in the districts of Khulna and Jessore of roughly 100.000 ha. An estimated amount of 800,000 people lived in the area at that time. The project objective of the KJDRP is summarized as follows: "*Poverty reduction through increased agricultural production and creation of on-farm employment in the project area.*" (Arcadis Euroconsult, 1999a). With the project divided up in four components.

A. Mobilisation of beneficiary participation
B. Rehabilitation works
C. Agricultural development
D. Fisheries management

The BWDB was responsible for the components A and B, the Department of Agricultural Extension (DAE) supervised component C, and component D was the responsibility of the Department of Fisheries (DoF). The DAE and DoF were supporting executing agencies, BWDB was main executing agency for the KJDRP (Ahmed, et al., 2003).

Because the BWDB was responsible for the structural as well as the non-structural aspect of the KJDRP it was divided up in two. Both segments were supported by a team of technical assistants (TA) as is shown in figure 2.4.

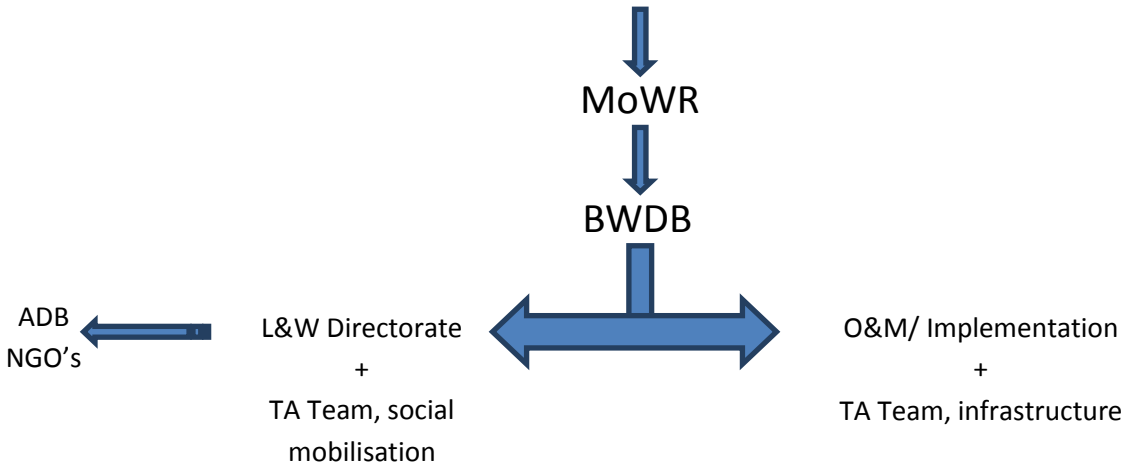

Figure 2.4 Structure of KJDRP management

The social mobilisation of the KJDRP was responsible for the participation of the local people in all the aspects of the project (CEGIS, 2002). This would be achieved with the TA team and NGOs who would facilitate the formation fisherman groups, landless groups, Water Management Groups (WMG), Water Management Committees (WMC) and Water Management Associations (WMA). In 1998 the first groups were created, however not all groups that were created during the KJDRP had benn registered in 2001. In total 491 WMG out of 507, all 9 WMAs, 34 out of 58 landless groups and 12 out of 48 fisherman's groups were registered in 2001. WMC did not have to be registered, a total

of 58 were created (CEGIS, 2002). After the KJDRP ended in 2002 the active funding into the groups also ended, they would be depended on income generating activities. Currently not many WMAs are active because the groups failed to sustain themselves, the economic benefit brought to the region did not translate into any sustainable income for the WMAs[10].

Proposed interventions during KJDRP

The BWDB started emergency dredging in 1993-94 in the Upper Sholmari river, the dredging was extended in the following three years to the Hari, Upper Bhadra, Harihar and Buribhadra rivers. This resulted in partial drainage of Beel Dakatia which had been waterlogged, and was a temporary relief for the local people (CEGIS, 2002). The improvements achieved by the dredging were temporary with the heavy siltation in the SW of Bangladesh, the benefits only lasted for three months[11].

In 1995 the BWDB started designing regulators, and they consulted the local population at the end of 1996 with four different proposal by different institutions. All these proposals were variants on the same idea of constructing more regulators to improve the drainage. The major difference in the four proposals was the number, or the location of proposed regulators (Euroconsult, 1997). Because the WMO were yet to be formed the KJDRP staff used local government as a representation of the local population. The local government or Union Parishads as they are known are appointed by the national government, they are not directly elected. There were in total 42 meetings with an attendance of 50 people on average. The outcome of the study was that the majority wanted the "BWDB option". The construction of a regulator to drain the Beel Dakatia was present in all the four proposal and this was fully supported by the local people according to the study. There was no support for any option other than the four proposed and no alternative received widespread support. According to the official documentation an request was made by the local people for an Environmental Impact Assessment (EIA). (Euroconsult, 1997). This request was noted down by the social mobilisation team of the KJDRP project, and approved by the ADB[10]. The local farmers said they were worried about the impact of the proposed structure, he translated that into the wish of an EIA[10].

The data from the 1997 Euroconsult report does not comply with later findings and actions undertaken by the local population. Any report, paper or information collected during interviews after 1996, describes opposition of the local people against the construction of new regulators[7&12] (CEGIS, 2002), (CEGIS, 2007), (Nowreen, et al., 2013) (Islam & Kibria, 2006).

In 1996 local people cut the embankment of Beel Bhaina in order to relieve the area of water logging problems. After some discussion with the BWDB who opposed the action and sued some of the locals for destroying dikes that were government property, the cut was allowed[11&13] . It was briefly closed in 1998 but opened again a couple of months later in 1999; the cuts were completely closed in 2001. In 1997 EGIS (now CEGIS) undertook an Environmental Impact Assessment (EIA) and a Social Impact Assessment (SIA) on the two proposed regulators of the BWDB, this followed the wishes of the local population. But with the cut of the embankment of Beel Bhaina the EIA/SIA study shifted to the tidal basin and concluded that resistance to the proposed regulators was growing. Furthermore a tidal

[10] Khaled Khaleduzzaman, Water expert Dutch Embassy Dhaka, 03-02-2015, Dhaka
[11] Andrew Jenkins, Head of the BRAC Research and Evaluation Division, 04-02-2015, Dhaka
[12] Alamgir Choudhury, Deputy team leader Blue Gold Project, 05-02-02, Dhaka
[13] Shorab Hossain, Blue Gold, Community Organization Expert, 05-02-2015, Dhaka

basin in Beel Kedaria could be much smaller with 400ha instead of 1700 ha which was proposed by Haskoning. After more public consultation and workshops, the decisions to start tidal basin management in the river Hari was taken in 1998 (EGIS II, 2001), this was the first time TRM was used within a government project[14&15&16].

Related to Scott

When only the official documentation of the KJDRP is considered it looks like a logical next step compared with the CEP, Master Water Plan and the FAP. It is more inclusive of local ideas, and actively calls for the involvement of local representatives in the creation of the specific plans for the project (Euroconsult, 1997). It was a project funded by the ADB, not the state, although the institutions used for the implementation were all government departments. The original interventions proposed by the BWDB fit within the high modernity thinking, large regulators to control the water flow. However during the project TRM was used which is not an high modernity project, indicating a change in strategy. With only the official documentation it can be seen as a notable change for the water sector in Bangladesh. Although it still favours engineering options, it is no longer the only ideology. Therefore the four elements that James Scott identifies are not applicable to the KJDRP. There is some high modernity planning used but it is not forced upon the local people. The use and collection of data is comparable with the proper use of scientific knowledge in planning that Scott identified as positive.

Other reports, interviews and evaluation reports show however a different picture. The TRM was first not accepted and was only officially implemented when the local farmers cut their own embankment. After that moment it was adapted into the KJDRP plan[17], and TRM was used in official planning documents (EGIS II, 2001). There is an inconsistency in the documentation of the plans, the first plans that were published were also based on the wishes of the local people in the KDJRP area. The local people expressed a strong wish for the BWDB original plan of the construction of large scale regulators to control the flow of water, the people did not come forward with their own option (Euroconsult, 1997). A year before the report was published the people in Beel Bhaina cut their own embankment to allow the free flow of tidal water. The fact that nothing about that event is written in the 1997 report shows that there are large inconsistencies between the data presented in the report and the actual situation on the ground. Although social mobilisation and participation was emphasized in the project it did not deserve a lot of attention and care. The official evaluation report reflects that the process of social mobilisation was started to late, did not get the proper attention and was not sustainable (ADB, 2007). There was disinterest and lack of attention by the implementing agencies towards the social aspect and the demands of the local people in the KJDRP area. This has been recorded in official documentation and reports (ADB, 2007) (Islam & Kibria, 2006) (Nowreen, et al., 2013), it was also often mentioned by some of the experts interviewed [18&19]. These findings raise questions on the trustworthiness of official documentation. If these large inconsistencies can exist within the KJDRP they could also exist in other projects.

[14]Sarafat Hossain Khan, BWDB, Project Director of CEIP-I, 16-02-2016, Dhaka
[15] Maminul Haque Sarker, CEGIS, Deputy executive director development, 15-02-2015, Dhaka
[16] IWM employee, worked on TRM research of IWM, 26-02-2015, Dhaka
[17] Giasuddin Chowdhury, Deputy team leader BDP2100, 23-02-2015, Dhaka
[18] Alamgir Chowdhury, Deputy team leader Blue Gold Project, 05-02-02, Dhaka
[19] Shahidul Islam, Uttaran, Development activist expert, 22-03-2015, Dhaka

Compared with the actual situation the elements of Scott are more applicable to the KJDRP. The engineers that implemented the scheme paid no attention to the local knowledge until they were forced to. Only big structural measures were proposed that were based on a high modernity ideology and needed an administrative ordering to implement and maintain. However, although the ideas of Scott can be retraced in the KJDRP. They are not the only factor that steered this project, to say it all depends on the elements identified by Scott is not a correct representation of the actual situation. Bad management, lack of good governance and bad financial motives also influenced the choices that were made. The implementing agency has a strong high modernity ideology, it does however not fully dictate their actions, it is not completely black and white.

The KJDRP is the next step after the FAP, it ended farther away from high modernity than the previous projects, it did however take a lot of local action to change the project from the starting position that fitted well with the first three elements Scott described. The protests and actions of the local people can be seen as the opposite of the unable or unwilling population needed for the fourth element, and the lack of the fourth element made it impossible to continue the project as it was. The KJDRP made progress in the end but it was is not the start of a new focus within the water management sector in Bangladesh.

2.6 CEIP

The Coastal Embankment Improvement Project (CEIP) is a new project that will soon start its implementation phase, the project is funded by the World Bank (World Bank, 2013). The CEIP will also partly deal with the South West of Bangladesh and with the polders located there, that is why it will be discussed in this paper. As with the previous projects discussed an analysis will be made of its goals and focus points, and how it will try to achieve its goals.

In 2007 Bangladesh already experienced riverine flooding that affected over 13 million people, when on 15 November 2007, cyclone Sidr made landfall across the south coast of Bangladesh. Sidr caused 1.6$ billion in damages, destroyed crops and resulted in 2,400 fatalities. Briefly after Sidr, cyclone Aila reached the south west of Bangladesh in May 2009, causing 3-6 meter storm surges, 0.5$ billion in damages and 179 deaths (World Bank, 2013). In both cases it was fortunate that the cyclone reached Bangladesh during low tide[20]. The embankments created during the CEP are designed on the tidal flow, not on cyclone surge levels, they have a 1 in 20 year return period[21]. Spurred by these events and the danger the present to Bangladesh the government together with the World Bank proposed the CEIP project in 2013. With a main long term objective of increasing the resilience of the coastal population to tidal flooding and natural disasters (World Bank, 2013).

The CEIP has just started and is an enormous project, to reach the main objective the existing 6000 km of embankments in and around 139 polders need to be repaired and upgraded. Because this is a huge undertaking, the project has a multi-phased approach over a period of 15 to 20 years, CEIP-I is the first phase of the project. Like previous projects in Bangladesh this project is also divided in multiple components, four out of the five total components are related with the polder improvement, the fifth is about governance (World Bank, 2013).

According to the proposal CEIP-I document from the World Bank (2013) the components are as follows:

A. Rehabilitation and Improvement of Polders (US$286 million)
B. Implementation of Social and Environmental Management Framework and Plans (US$56 million)
C. Construction Supervision, Project Monitoring and Evaluation, and Coastal Zone Monitoring (US$32 million)
D. Project Management, Technical Assistance, Training and Strategic Studies (US$21 million)
E. Contingent Emergency Response (funds on request after disaster)

A total amount of US$400 million has been made available for this project, slightly more compared with the budgeted amounts for the different components. Because this project has just begun the proposed budget will be studied as an indication of what the priorities and work method of this project are. This does give an indication on if and how the concept of high modernity is used in the CEIP-I it will be difficult to compare it with the previous projects like the KJDRP, since it is not possible to look at the result and what the actual methods of the project were. However the proposed budget and the concept document is sufficient to discuss the use of high modernity ideas and concepts within the CEIP-I.

[20] Andrew Jenkins, Head of the BRAC Research and Evaluation Division, 04-02-2015, Dhaka
[21] Sarafat Hossain Khan, BWDB, Project Director of CEIP-I, 16-02-2016, Dhaka

Of the overall budget US$56 million has been made available for component B, which will establish WMO's, create resettlement action plans, fund land acquisition, and prepare environmental impact assessments. For a full overview of the budget and the proposals see World Bank proposal document (2013). Component B of the project deals with the social aspects. Component A will finance the main aspect of the project and for the repair and upgrading of all the embankments and polders. For this of course more money is needed, but component B was indicated as a very import aspect with a comparatively high budget[22].

Related to Scott

The budget of the CEIP and interviews with the World Bank and the project leader of the CEIP will be used to compare it with the elements from Scott (the administrative ordering, high-modernity, an authoritarian state, a weak civil society). The program has just begun and there are no result yet to evaluate, furthermore it is again not funded by the state but another institution, in this case the World Bank. The planning show a more inclusive approach then was used with the previous projects. In total 14% of the funds have been intended for the social aspect of the project, this is a relatively large amount according to the World Bank[22]. Also there are no large scale plans and for every polder that the CEIP will improve there will be an individual study to determine the best approach, be it technical or social. This information is available in the proposal documents (World Bank, 2013), and was reiterated in an interview with the project leader of the CEIP-I[23].

The review of the KJDRP showed that for a multitude of reasons the actual plans and implementations of the KJDRP differed greatly with what the proposal promised. Since the CEIP is also only in its first stage it is difficult to say what will actually happen, so far it can be said that the proposal does not fit at all within the elements that Scott describes. Whether that stays is unclear until the project can be evaluated, however it is very likely that the slow progress that can be seen between the different projects and policies discussed in this thesis will continue with the CEIP, in what matter will be unclear until the end of the project.

[22] Swarna Kazi, World Bank, Disaster Risk Management Specialist, 01-03-2015, Dhaka
[23] Sarafat Hossain Khan, BWDB, Project Director of CEIP-I, 16-02-2016, Dhaka

2.7 BDP2100

After initial consultation about the necessity of a delta project in Bangladesh, the Delta Preparatory Team (DPT) started assessing if a possible delta plan in Bangladesh was something that would be accepted. The aims of the DPT were to learn whether there was enough commitment and a robust demand for a long term integrated and holistic planning for a Bangladesh Delta Plan. If this would be applicable to Bangladesh the second aim was to outline the contours of such a plan (Chowdhury, et al., 2012).

The Delta Preparatory Team published a report in 2013 that identified a strong need for a holistic and long term plan according to the official documentation of the BDP2100. According to the report Bangladesh already has multiple projects and policies in place that deal with the water management. The country is however lacking in an holistic plan with a timeframe of up to 100 years. Such a plan is needed to deal with the current and future problems that Bangladesh faces. Examples of future problems could be an increase in population, and climate change, these will have an impact on the country. A integrated and coordinated plan can be used to manage the natural resources and have integrative water resource management. Good governance is probably the most important factor to improve the livelihood and the safety of the people and the economy of Bangladesh.

Building on the work of the DPT and Memorandum of Understanding formally signed between Bangladesh and the Netherlands in May 2012, the Government of Bangladesh requested the formulation of a Bangladesh Delta Plan 2100. An interdisciplinary team of national and international experts would assist the GoB in the creation of the BDP2100, the project is led by the General Economic Division (GED) which is responsible for the holistic long term planning in Bangladesh on a national level. In their inception report of the BDP2100 (GED, 2014) they call for an integrative, holistic adaptive strategic plan that is long term (50 to 100 years). The overall goal of the entire project is do develop a strategy for the integrative development in Bangladesh. This strategy will contribute to disaster risk reduction, climate change resilience and adaptation, food security, water safety, environmental safety and economic development (Planning Commission, General Economics Division, 2014). Their specific objectives are stated below:

a) To support an enabling socio-political climate for BDP 2100 formulation and implementation process.
b) To create a common and inclusive and documented knowledge base.
c) To develop a Delta Framework and prepare a draft act for the establishment of a Delta Framework.
d) To create together with main stakeholders a delta vision, delta goals and measures.
e) To facilitate entrepreneurship of the private sector.
f) To promote regional and sectorial developments on the short term for future governance of water, land and related resources and spatial planning in Bangladesh delta.

In contrast with the often mentioned Dutch delta plan where a detailed plan was created, the BDP will be a strategy guide for the already existing policies and future plans that will be constructed for Bangladesh. Annex A shows the schedule of the BDP2100 as it was determined in its project document (Planning Commission, General Economics Division, 2014).

Related to Scott

The BDP2100 is a continuation of other projects and policies that already exist in Bangladesh; the people who worked on those now contribute directly or indirectly to the BDP2100. Compared with the previous projects the BDP2100 is a logical next step in how it approaches the issues it is confronted with. Similarly with the CEIP the goals and the specific objectives of the BDP2100, differ from the elements that Scott identifies (the administrative ordering, high-modernity, an authoritarian state, a weak civil society). Also similar with the CEIP, it is not a project that is fully controlled by the Bangladeshi state, it is controlled by the GoB but the GoN is a large contributor to the project.

The call for an integrative and holistic approach does not comply with the elements from Scott and the overall goals are a far cry from a call for a large scale high modernity project. On aspect that is similar is the focus on scientific data that Scott describes as a good method as long as it does not control every aspect of a project. The inception document talks of an integrative approach so it envisions a more broad approach. However as with previous projects, the concept of a project does not have to comply with the actual practise of the project. A further comparison of the BDP2100 and the elements of Scott can be made based on the perceptions of TRM and the water sector in Bangladesh by experts who are working on the BDP2100. These perceptions and others will be discussed in the fourth chapter.

Conclusion to chapter 2

Multiple project and policies have been reviewed in this chapter in order to create an understanding of the recent history of the water management sector in Bangladesh. Significant changes have been recorded, from the native water management method of “Ostomasi badh”, to the more recent projects like CEIP and the BDP2100. All the official projects and policies have been compared with the ideas of James Scott. In the recent years there already has been large changes in direction, and the newer projects have been further away from the elements of Scott compared with the old. Before the comparison can be made between the water sector in Bangladesh and its perception of TRM, the concept of TRM needs to be discussed. Chapter three will do this by focussing on the history of TRM projects in the South West of Bangladesh, and on the new proposed project and its problems.

Chapter 3 Tidal River Management

Introduction

The previous chapter reviewed the recent history of water policies and projects in Bangladesh, and the change in methods and perceptions in the water management sector have been discussed. There have been large shifts in the how and why projects are implemented, however some aspects have remained similar with the first large projects and policies like the CEP and Master Water Plan. There is still a focus on engineering projects with a strong high modernity thinking and planning; it is no longer the only approach in new projects but it is still an important factor. An in-depth study of a specific water management concept can help to further identify what the changes have been in the water management sector in Bangladesh. This chapter will therefore concern itself with Tidal River Management, it will be more in-depth and use the data collected in the interviews that were done for this thesis study. The data collected from the in-depth interviews will also be used to identify the perceptions of TRM of people working on a national and regional level. First four TRM projects will be analysed from a technical as well as a social perspective.

3.1 Beginning of TRM

Tidal River Management is not a formally defined concept, there are many different ideas and perceptions on what the water management concepts is, what it does, and how it should be done. Often TRM is identified as allowing free tidal flow into tidal basins in order to let sedimentation occur which will decrease the water logging problems. At the same time the water flow will erode the river bed increasing the drainage capacity (Shampa & Pramanik, 2012), (Paul, et al., 2013),- (Khadim, et al., 2013). This concept of TRM is also used by many of the people and institutions interviewed for this report[24&25&26] and it is also how TRM is perceived in this thesis. Most of the local farmers interviewed identified TRM as a water logging issue solving method, the other effects of TRM were acknowledged but not often emphasized by them (local interviews 1.6 and 1.8).

The time in which TRM was first practised is debated, It could be linked back to the indigenous water management concepts of *Ostomasi badh* (embankment for eight months. Another possible starting point of TRM is the first official use during the KJDRP, when it was researched and scientifically tested. The basics effects and problems of TRM will be studied by looking at four different TRM projects that were done during and after the KJDRP. The four projects start with the Beel Bhaina project, proceed to Beel Kedaria and Beel Khuksia, and end with the proposed Beel Kapalia project. This report will not look into the cut in the embankment of Beel Dakatia. Although the cut was on some aspects similar with the cut in Beel Bhaina, the size of Beel Dakatia changes the effects the cut could have and it was not controlled. It was free tidal flow in a polder area, but it is not considered an example of TRM by most. Figure 1.2 shows the area of the TRM projects. Since the map is from 2010 Beel Khuksia is indicated as an active TRM project, Beel Kepalia is located between Beel Khuksia and Beel Kedaria. Ranai located just below Beel Bhaina is a point where many measurements were taken by CEGIS during the study of the effects of TRM.

[24] Sarafat Hossain Khan, BWDB, Project Director of CEIP-I, 16-02-2016, Dhaka
[25] IWM, worked on TRM research of IWM, 26-02-2015, Dhaka
[26] Maminul Haque Sarker, CEGIS, Deputy executive director development, 15-02-2015, Dhaka

The method of TRM will not be applicable in most other areas, the region of SW Bangladesh is unique and suitable for a TRM project but this is because of its current situation. Within the region of SW Bangladesh TRM is not needed everywhere or would succeed everywhere, it needs to be practiced in the region upstream where the tidal flow ends and the sedimentation takes place[27&28]. At the point where the sedimentation takes place the water logging issues are caused by the siltated rivers and low lying polder areas. Downstream the water will always be in motion so siltation is not as much of an issue. The siltation of upstream location versus downstream locations is presented in annex B. Furthermore upstream of a TRM location there will be no scouring of the river, this will only happen downstream of the TRM area when the water retreats during low tide. This process indicates that a TRM project with a schedule of sequenced TRM project area's should move from downstream polders to upstream polders, within the area where there is sedimentation (Khadim, et al., 2013). This was not done in the TRM projects so far with first Beel Kedaria and after that Beel Khuksia. However there were many social issues complicating and delaying the TRM that it did not matter, the rivers were silted up between the different TRM projects. If a project is made with sequenced TRM areas, it should consider the downstream-upstream approach.

[27] Alamgir Chowdhury, Deputy team leader Blue Gold Project, 05-02-02, Dhaka
[28] Sarafat Hossain Khan, BWDB, Project Director of CEIP-I, 16-02-2016, Dhaka

3.2 Beel Bhaina

The KJDRP area was experiencing water logging issues in 1995, a total of 58 villages were under water[29]. The heavy siltation in the rivers caused drainage difficulties for the entire area and the water logging problem persisted. Local people who already opposed some of the planned interventions of the KJDRP report, cut the embankment of Beel Bhaina on the 29th October 1997 on two places (van Minnen, 2013). One of those cuts was closed by the BWDB at the end of 1998 but opened again by the local people in February 1999, both cuts were closed in 2001 (CEGIS, 2002).

The effects of the cut in the embankment in Beel Bhaina were clear although the study of the hydro morphological differences was not organized in the beginning, because the cut was public and unplanned (van Minnen, 2013). Now there have been multiple studies, and although not all data is readily available, the data that is available show an effect of the tidal basin in Beel Bhaina. There are decreased sedimentation issues upstream and there is an increase in tidal volume in the Hari river that supplied Beel Bhaina (CEGIS, 2002) (Arcadis Euroconsult, 1999b). This result was reaffirmed during the interviews, according to one source who was working with the KJDRP, the diameter of the river increased from 1 meter, to 6-7 meters[30]. This statement is partly supported by the research of CEGIS (2007), which measured a four-folds increase in tidal level and an large increase in total tidal volume (figure 3.1). The increased tidal volume is caused by the scouring of the river when the water flows back during low tide, after it deposited its silt upstream in the beel area, this process increased the depth of the Hari river with 10 meters at some points **(**figure 3.2). This figure also shows the rapid sedimentation after TRM ended in Beel Bhaina, in a couple of months the river was almost back to its original state pre-TRM. The fast sedimentation of the riverbed reaffirms the need of continues TRM. A longitudinal profile of the Hari river with the effect of TRM in Beel Bhaina that shows similar data is presented in annex C.

[29] Shorab Hossain, Blue Gold, Community Organization Expert, 05-02-2015, Dhaka
[30] Andrew Jenkins, Head of the BRAC Research and Evaluation Division, 04-02-2015, Dhaka

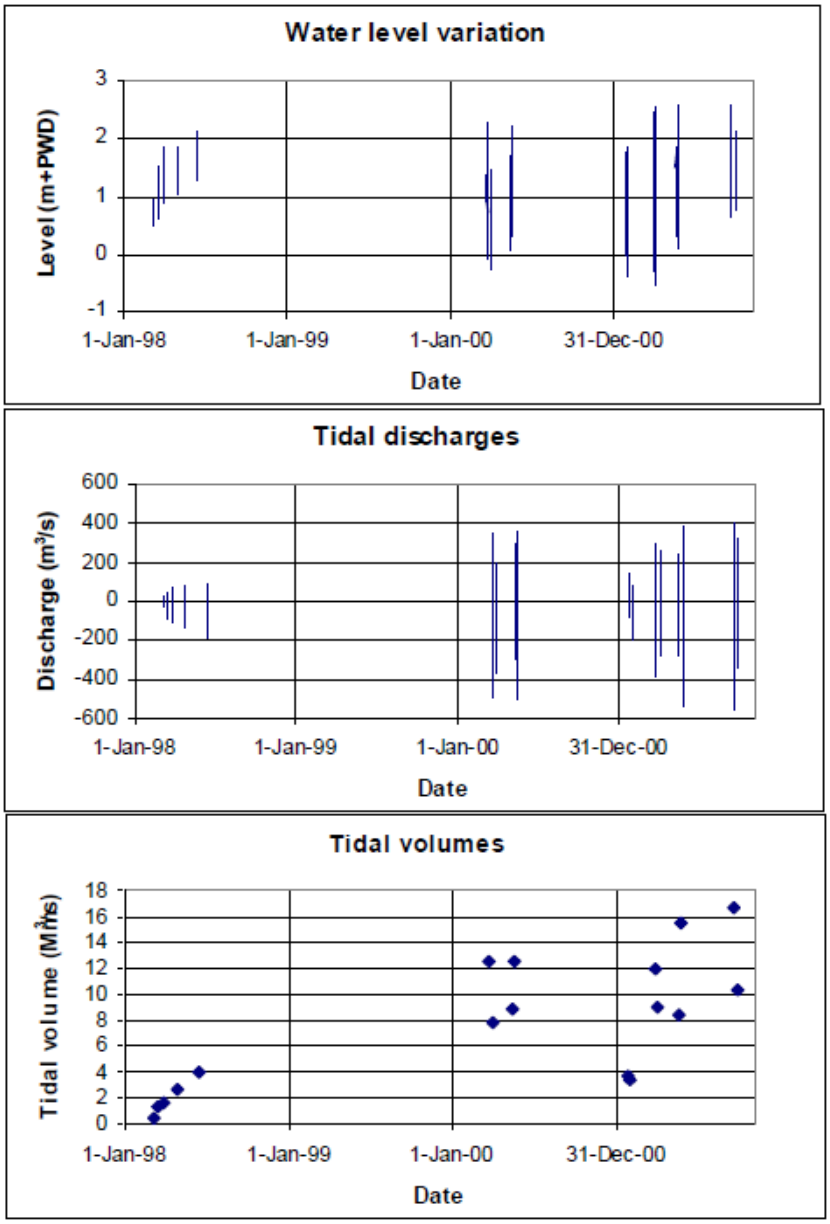

Figure 3.1 Effect tidal flow Beel Bhaina

Source: **(CEGIS, 2007)**

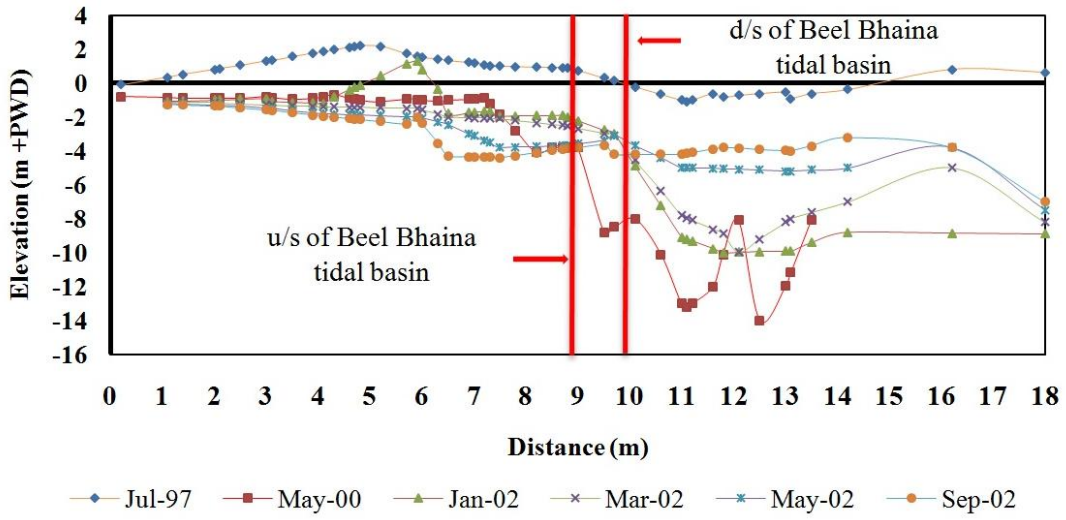

Figure 3.2 Long profile of Hari river from Bhabadaha regulator

Source: **(Khadim, et al., 2013)**

The land level increase caused by sedimentation in Beel Bhaina reached at some points 2 meterss as is presented in figure 3.3 (SMEC 2002)**.** At the location where the cuts were made the sedimentation reached a total of 1.95m. Figure 3.3 also shows that the sedimentation is much lower in the Beel Bhaina area further away from the public cut. This indicates the need for proper management of sedimentation which was also emphasized by Jenkins[31].

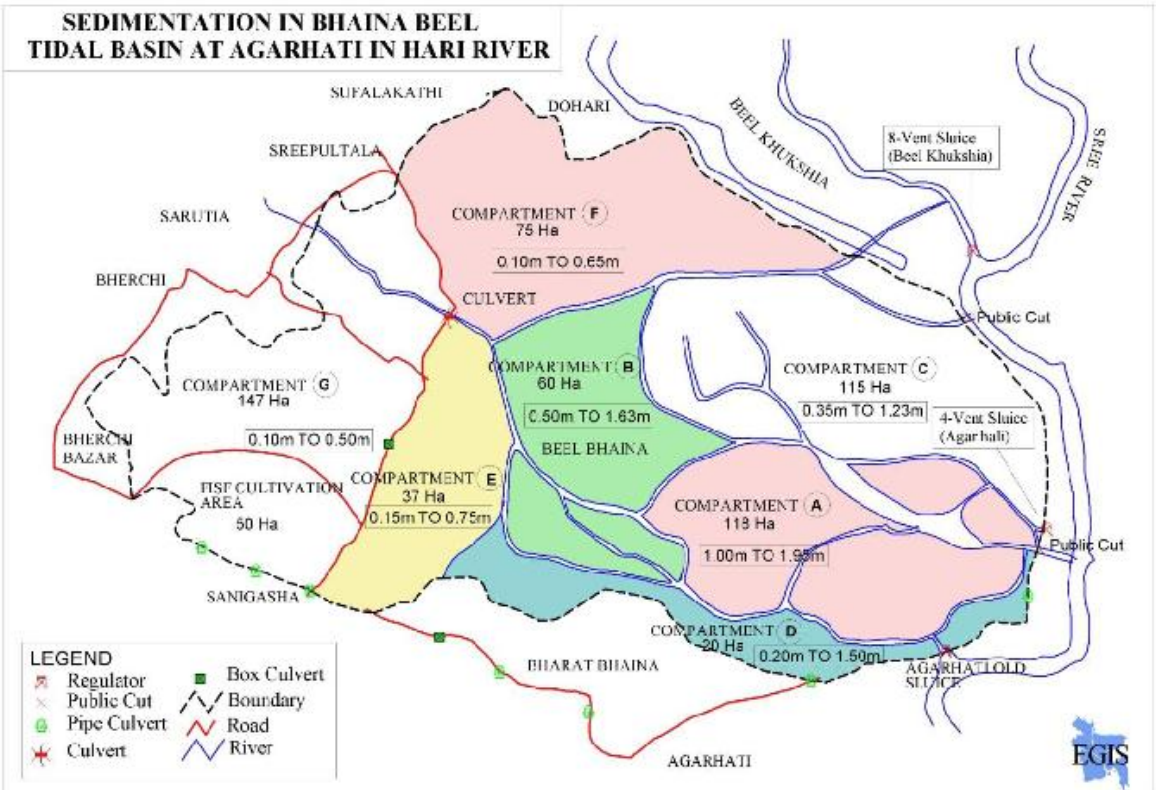

Figure 3.3 Sedimentation volume in different compartments of Beel Bhaina

Source: (SMEC, 2002)

[31] Andrew Jenkins, Head of the BRAC Research and Evaluation Division, 04-02-2015, Dhaka

3.3 Beel Kedaria

After Beel Bhaina was closed in 2001, the next TRM beel planned by the KJDRP would be Beel Kedaria, upstream of Beel Bhaina and north of the Bhabodah regulator (figure 1.2). The area in Beel Kedaria had been waterlogged since 1998. Because of this the implementing agency decided it would not be necessary to pay compensation, although the written approval of the local people was needed (Arcadis Euroconsult, 1999a). Ultimately no compensation was paid similar with the situation in Beel Bhaina. The farmers had been unable to use their land before the TRM project and therefore did not suffer a large loss of income because of the embankment cut and the open flow of tidal water. The BWDB proposal was to make Beel Kedaria a permanent tidal basin in order to relieve the rest of the area permanently of water logging. According to the official documentation, WMAs (Including WMC & WMG) should be created to facilitate co-operation on the infrastructure component of the project (Arcadis Euroconsult, 1999b). An interesting development in the documentation of the KJDRP planning was that the first reports all referred to TRM as Tidal Basin Management (Arcadis Euroconsult, 1999a) (Arcadis Euroconsult, 1999b), yet it was not until 2002 that the TRM was mentioned in official reports (CEGIS, 2002). This may indicated a certain reluctance of officials to use the local terminology, and instead of this they tried to create a new term, of which they would have ownership.

There was however not any social mobilisation or participatory planning with the local population during the construction of this proposal[32&33] (Islam & Kibria, 2006). After protest from local people the concept of rotational tidal basins was adopted instead of the permanent TRM plan, different beels would be used as tidal basins at different times (de Die, 2013). There were further delays caused by protest against the construction of embankments in Beel Kedaria, in order to close of the area that would not be part of the TRM. To resolve his issue an agreement was reached between local WMA and the BWDB after some open discussions (van Minnen, 2013). After the agreement was reached between the BWDB and the local population, Beel Kedaria was used as a tidal basin starting in 2002, the final year of the KJDRP project. This did raise questions on the sustainability of the TRM concept and whether the practical experience would be used after the KJDRP ended (CEGIS, 2002).

The TRM project in Beel Kedaria differed with the TRM in Beel Bhaina because it was not done with a cut in the embankment, the tidal flow was directed using regulators. The local people said it would not work because the tide had to pass the Bhabodah regulator downstream[30]. Considering the increase in river depth and drainage the project performed well, the area did not suffer from the 2002 Hari river flood (van Minnen, 2013) and it was not suffering from any water logging issues during the TRM project (CEGIS, 2007). The sedimentation in the beel was not as expected, this is partly because of the location of the beel, it only has a 0.2m tidal flow instead of the 2m tidal flow Beel Bhaina experiences. Furthermore the use of the Bhabodah regulator to regulate the tidal flow did have a negative impact (de Die, 2013), this had been a concern of the local population (Hossain, 2015). The actual sedimentation in Beel Kedaria during the TRM project is presented in annex D.

The TRM in Beel Kedaria ended in 2004 when local population protested against the loss income and demanded a compensation for the fourth year of TRM. According to the original agreements TRM should have ended after three years. The BWDB and the local people could not come to an

[32] Andrew Jenkins, Head of the BRAC Research and Evaluation Division, 04-02-2015, Dhaka
[33] Shorab Hossain, Blue Gold, Community Organization Expert, 05-02-2015, Dhaka

agreement and the TRM was closed in 2004. The new proposed TRM location in Beel Khuksia was not prepared yet, the absence of a TRM basin resulted in sedimentation problems, by September 2005 17km of the Hari river was completely silted up (CEGIS, 2007). The sedimentation caused drainage issues which resulted in water logging of an area around 18.100ha in 2006 (Paul, et al., 2013).

3.4 Beel Khuksia

In this report when the TRM in Beel Khuksia is discussed it refers only to the eastern part of Beel Khuksia which was planned and used for the TRM. Beel Khuksia was planned to start in 2005 but could not be started because of opposition from the local people in the beel. They demanded compensation for the loss of land and income that would be caused by the TRM project. The closing of Beel Kedaria and the Bhabodah regulator and the refusal to allow TRM in Beel Khuksia resulted in the water logging in 2005 (CEGIS, 2007).

The sedimentation issues in the region resulted in the immediate need of a new TRM project. The BWDB opened the TRM project in Beel Khuksia on 27 April 2006 but this cut was closed by local people on 15 July 2006 (ADB, 2007). The people were angry that their wishes had not been considered. An example of this is that only the eastern part of the Khuksia beel was planned for the TRM project, while the local population want the TRM to be carried out in the entire beel. The only reason according to the locals that the region was divided into two, was so that the local government could collect government money for a second time when the other part was used for TRM (local interviews 1.6 and 1.8). After more consultation between the BWDB and the local population the issues were resolved and the eastern part of Beel Khuksia was opened for TRM in November 2006. The BWDB did agree to pay compensation to the landowners of the beel; the compensation issue will be further discussed in at the end of this chapter.

The TRM project was however still not properly planned. The cut in the embankment was done with a bypass channel, while the local people demanded the original river would be used, which was in the beel area. The bypass channel was located in area that was used for agriculture and resulted in the erosion of agricultural land (CEGIS, 2007). Later a second cut was constructed upstream but this was partly blockaded by fishing ghers (van Minnen, 2013). Fishing ghers are small embanked fields where fish is cultivated. There were still a lot of fishing ghers located in the beel that obstructed the free flow of the water and because of this the sedimentation was uneven. Finally the sedimentation upstream of the tidal area should have been cleared to also allow free flow upstream of the TRM area, this was not done and the area remained waterlogged (CEGIS, 2007).

The TRM in Beel Khuksia did have its desired effect within the beel and on the channels although it was not a complete success. The depth of the sediment deposited at the second cut varied between approximately 2 and 1.5 meters. The scouring of the river did deepen de Hari river, the change in the cross section of the Hari river during the TRM project is presented in the (figure 3.4). The sedimentation deposition did not occur satisfactory according to the local people because of the fishing ghers obstructing the flow, there was no infrastructure in place to guide the tidal flow deeper into the beel area. The inflow of water into the beel was also less than expected (CEGIS, 2007). The TRM in beel Khuksia did have the positive effect that no drainage congestion in the project area, and no waterlogging within the KJDRP was recorded after the TRM started (IWM, 2012).

The TRM in Beel Khuksia was scheduled to close in 2009, 3 years after the start of the project at which point Beel Kapalia would be used a new tidal basin. The IWM study on Beel Kapalia was not finished before October 2008 and because of conflicts with the local population, Beel Kapalia was not ready. Beel Khuksia remained open after 2009, although the first cut in the south of the beel was closed in December 2010. This was because the southern part was already saturated with an average elevation of 1.57m silt (IWM, 2012). The northern cut remained open, during my field

research it had been closed. Reports mentioned that it was approximately closed around January/February 2013 (de Die, 2013). Most likely this is correct since the farmers in Beel Khuksia that were interviewed for this report talked of an TRM project of roughly 7 years. The delay of the closing of Beel Khuksia and the start of TRM in Beel Kapalia angered the population of Beel khuksia (Local interview 1.6). Furthermore it increased the apprehension of residents of Beel Kapalia against the planned TRM project. That anger together with other reasons that will be discussed in the next chapter, resulted in delays and protests.

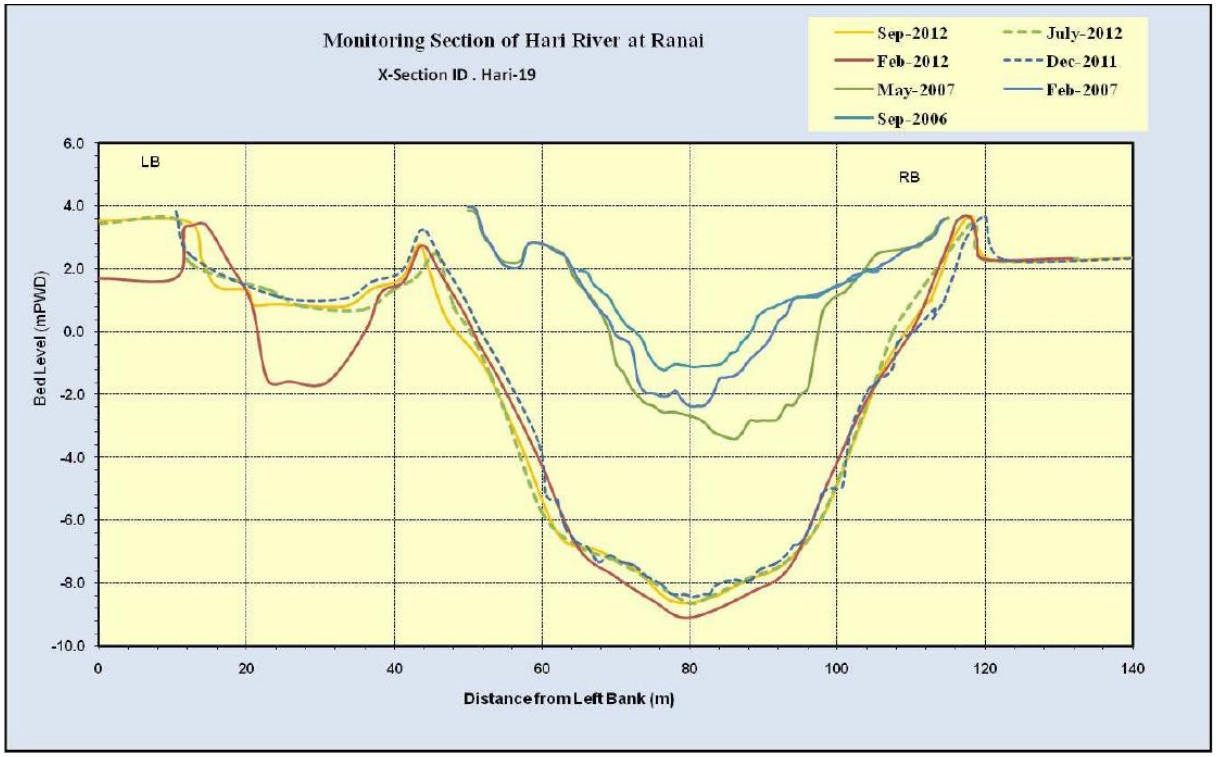

Figure 3.4 Cross section of river Hari at Ranai during TRM Beel Khuksia

Source: **(IWM, 2012)**

3.5 Beel Kapalia

Beel Kapalia was originally planned to start TRM in 2009 but this was delayed, the plans were not ready and there was no agreement with the local people. When Beel Khuksia was completely closed in 2012, there was no other active TRM project and the problems of siltation returned. The danger of siltation in the rivers, waterlogging and the effect TRM could have on these issues were well known by officials and experts by the time (IWM, 2012). The data collected in interviews with local farmers and experts presents the same picture; most people knew that the river would silt up, which could lead to waterlogging if heavy rain occurred (local interviews 2.7; 2.8 and 2.10). The problems that are discussed in this chapter still persist, and there is no TRM project to this day (July, 2015).

The issue that is mentioned the most in the literature and during the interviews is compensation. There was no compensation demanded during the TRM in Beel Bhaina or Beel Kedaria, at that point there was a lot of waterlogging and the farmers took action themselves to solve the water logging problem with TRM. When the government wanted to establish a system and a rotational schedule, the local people in the proposed TRM areas demanded compensation. They did this because they could still use their land at that point, and TRM would limit their income. Compensation was promised during Beel Khuksia and is also promised for Beel Kapalia. The compensation is only given to land owners, and a lot of people who depend on the Beel for their livelihood will not receive any compensation. Those people mobilized and there have been strong protests against the TRM in Beel Kapalia, the local people did and will not allow a TRM project until the compensation issue has been resolved[34&35&36] (local interviews 1.2 and 1.8). The compensation issue will be further discussed in the chapter 3.6.

A second issue is that there is little to no trust in the implementing agency and the government who are working on the implementation issue. The local people consider the government as the main actor who should work on implementing TRM. However they have little trust in the actual implementation process and the promises that were made[37]. The farmers in Beel Kapalia often referred to what went wrong in the previous TRM areas of Bhaina, Kedaria and especially Khuksia. Compensation was promised, but only paid partially or not at all (local interviews 1.2; 1.3 and 1.7). Plans and infrastructure were not finished when TRM started and the fact that the TRM continued in Khuksia for four more years than originally planned resulted in local people being hesitant to give up the land[36]. Especially if they fear that the compensation will not be paid out for the extra years, as was the case in Beel Khuksia.

Furthermore, at the location where the BWDB engineers proposed the cut in the embankment there is a small Hindu temple. Understandable there is a strong opposition from the local Hindu population to destroy the temple when the cut could also be located just above or below that location. The proposal was completed in 2008 (IWM, 2012), and the plans for the location of the cut are still the same according to the local farmers (local interview 1.8). This shows a lack in flexibility from the implementing agency which is expressing a strong tendency to high modernity thinking with little consideration of the local wishes, the plans are made with only engineering and mathematical considerations.

[34] Khaled Khaleduzzaman, Water expert Dutch Embassy Dhaka, 03-02-2015, Dhaka
[35] Nasim al azad Khan, IWM, junior specialist IWM, 26-01-2015, Khulna
[36] IRV, Kazi Zaved Khalid Pasha, CEO initiative for Right View, 28-01-2015, Khulna
[37] Shahidul Islam, Uttaran, Development activist expert, 22-03-2015, Dhaka

Violent protest Beel Kapalia

A group of BWDB officials and representatives of the Bangladeshi government including the honourable Whip Mr. Sheikh Abdul Wahab (a member of parliament), travelled to Beel Kapalia on June the 2nd 2012 to visit the proposed TRM project area (IWM, 2012). They were stopped by a group of locals who were protesting the proposed TRM, and this protest turned violent. The exact figure of protesters remains unknown and different estimates varied from 5000 protestors to only 100 to 150 protesters (de Die, 2013). In total about 40 people were injured and the BWDB personal and government representatives had to run away after their cars were burned (figure 3.5).

Figure 3.5 Cars burning after protest in Beel Kapalia

Source: **(de Die, 2013)**

According to Mr. Sheikh Abdul Wahab the people protesting were local gher owners, land grabbers and NGO workers (IWM, 2012). People who the government sees as land grabbers could be exactly that, or just people who do not have landownership papers and for that reason are land grabber in the opinion of the government. Many of the people in Beel Kapalia do not have these papers, or are landless and still use the beel for their livelihood.

The identified groups protesting are the same groups with the most complaints about TRM that were raised in the years before. The many who would be outside the system of the proposed compensation, and the large landowners that do not want to the TRM. The interviews with some of the locals of Beel Kapalia give the same information, they will protest the TRM as it is currently proposed. They do want the TRM system in their beel, but the implementation process and the conditions have to be improved first (local sources 1.2; 1.6 and 1.8). It is representative of the enduring social conflict that the cars are still located in the same area where they were burned (figure 3.6). During my fieldwork I came across these cars, 2.5 years after the initial protest there where they were destroyed.

The data presented in this TRM chapter shows clearly that technically the concept of TRM is sound, although there are many social issues that prevent the proper implementation of a new TRM project

in Beel Kapalia as is planned. These issues have halted the process of a TRM program in this region since the 2012 attempted opening of Beel Kapalia and the protests and violence that followed (de Die, 2013).

Figure 3.6, burned out cars located in Beel Kapalia

Picture taken by Rik Heinen, January 20

3.6 Compensation program for TRM projects

Problems with the compensation system were mentioned in almost all the interviews and it was identified as one of the main reasons why there is no TRM project at this moment (de Die, 2013) (Paul, et al., 2013). The BWDB used a compensation system for the first time in Beel Khuksia, local people demanded it as compensation for the loss of income they would suffer during the TRM project. Beel Bhaina and Beel Kedaria were both mostly waterlogged when the TRM started so there was no loss of productive farming land, therefore there was no compensation demanded/given. In Beel Khuksia land owners could receive Tk.128.37 per decimal of land (100 decimal is one acre) owned (IWM, 2012), per year of TRM. The compensation offered for land owners in Beel Kapalia is TK.479.79, the higher rate of compensation was determined by the BWDB and government officials and account for both rice and fish production, this was not done for Beel Khuksia (IWM, 2012).

The proposed compensation did not eliminate the protests against the TRM. The continuing discussion delayed the opening of Beel Khuksia for years, and is still delaying Beel Kapalia. The amount of compensation is always a point of discussion but this was not the main issue according to the local people (local interviews 1.2, 1.8, 2.8). The compensation system is not efficient and very complicated. People who want the compensation are required to file their paperwork at the office in Jessore, which can be difficult to reach for local farmers (de Die, 2013). People who want to receive the compensation must have title to their land, and have to file all their tax papers from 1962 up to 2014 (local interview 1.2). Even when these papers were all collected and accepted, the compensation was not always paid (local interviews 1.1, 1.3, 1.6), or people had to pay a bribe which accumulated to the total compensation amount for two years (local interviews 1.2, 1,8).

The titles needed for the application are often not available for the farmers, in some cases the land used to be so called “enemy land” most often owned by people that left the country. And although the new owners have cultivated the land for many years they don’t have the ownership papers. In other cases the ownership papers are registered in the name of a deceased family member and the family members that currently use the land do not officially own the land. There are a lot of landless people in the beel that fish or are day labourers, these people will never receive any compensation because they are not landowners while they do depend on the beel for their livelihood. This group of people is left out of the current system, and can be easily mobilized by themselves or other actors to protest against new projects.

Conclusion to chapter 3

The current problems and discussion show that the implementation is the largest problem. The vast majority of people both local as national are positive towards TRM; the current issues are however delaying the implementation. The problems with the implementation and the lack of co-operation between the implementing agency and the local people has resulted in the current situation. Without the TRM or another proper water management system the region will experience waterlogging again very soon. In the near future it is very unlikely that the problems regarding Beel Kapalia will be solved and TRM will start, while it is much more likely that the region will experience water logging. In that case there will probably be a rushed TRM project (like it was with Beel Khuksia), which will not solve any of the issues and only increase the trust issues that already exist.

The next chapter will focus on the perceptions of TRM, both the perceptions of local people and of national and international experts are presented. Chapter four is the final chapter before the main research question is answered.

Chapter 4 TRM perceptions

Introduction

Chapter 2 briefly presented different projects and policies in the recent history of the water management sector in Bangladesh and related these to the ideas of Scott. Chapter 3 discussed TRM, from its starting phase to the current situation. This chapter will deal with the main questions of this thesis; how TRM is perceived by the stakeholders, and what relevance it will have within the BDP2100. This thesis, as already mentioned, will partly elaborate on the work of Leendert de Die (2013). Most of his work focussed on the local perceptions or institutions like the BWDB that were actively involved with TRM. The data that is used in this chapter was mostly collected from experts working on a national level, considering they make most of the decisions that impact the Southwest region of Bangladesh. The fieldwork to identify the perceptions on a local level is there to "update" the work of the previous student 2 years ago, and to enhance my own understanding of the TRM issue.

The perceptions of TRM are ordered in different stakeholder groups in order to present the data in a comprehensible fashion. It is not a perfect separation of the different stakeholder groups, and a great deal of the people interviewed can be categorised into multiple groups. Sources used in one group could also be used in another group if their background and occupation allows it, but they have been allocated to be a part of the group that fits the best with their professional background and current work.

Firstly the local stakeholder group will be discussed in this chapter, then the perceptions of government agencies. The third group consists of experts that work for international organisations or projects, The fourth group are experts working for NGOs operating in Bangladesh. The final and fifth group of stakeholder whose perceptions are identified are the experts related to the BDP2100.

4.1 Local Perceptions

In his thesis, de Die (2013) identified different perceptions frames for different stakeholder groups on the issue of TRM. According to his conclusions local people can be categorized into three different frames. Local farmers identify TRM as a method of raising their land, while having a limited understanding of the physical and political dynamics surrounding TRM. The farmers in Beel Kedaria that he interviewed therefore considered TRM a failure, it did not raise the land in the beel. Local leaders and government officials distinguish TRM as a siltation management system, improving drainage and as a secondary benefit raising the land in the beels. Finally there is a small minority of local people that are opposed to TRM, these are mostly landless or shrimp farmers. They are against it because the compensation system is only for landowners, so a TRM system would have a negative impact on their economic interests.

The data related to the local perceptions that was collected for this research presents comparatively the same picture as the data from the work of de Die (2013). There are however some small differences that can be viewed as representative of the changes over time and the location where the people were interviewed.

The local people (mostly farmers) that were interviewed in Beel Kapalia identified water logging as the main threat to their livelihoods and TRM as the solution to that issue (local interviews 1.1,1.2,1.6, 1.7) they did not talk about the increase in soil level for their beel. The increase in land level was discussed by farmers in Beel Khuksia and Beel Bhaina (local interviews 2.2, 2.4, 2.5, 2.7). In these areas TRM already has been implemented and practised. In Beel Khuksia and Beel Bhaina waterlogging was identified as a problem that would return if there was no active TRM project soon in Beel Kapalia (local interviews 2.7, 2.8, 2.9). One farmer said the following: "*In a few years the river will die and this will result in the villages also dying, the people should think about the future*". The local people see TRM as a technical solution to the water logging as well as the soil level problems they face. The larger land owners I spoke to as well as the shrimp farmers, in contrast to de Die (2013), perceived TRM positively. However they were less enthusiastic to implement it saying they would lose money, even with a compensation system. They did say that the region needed a new TRM project to stop the waterlogging (local interviews 1.8, 2.4, 2.5). The shrimp farmers in Beel Khuksia said that before the TRM it was not possible for them to use their land, but because of the increase in soil level they could now use their land for fishing and shrimp.

These perceptions do not differ greatly with the perceptions identified by de Die (2013), although the people interviewed cannot be divided in the groups de Die identified. For the reason that, the answers the local people gave showed a more complete understanding of the larger situation compared to the conclusion of de Die. Often farmers would refer to the other beels and the effect it would have on the overall region if there was no new TRM practice. It could be that in the years since the research of de Die the understanding of TRM grew among the local people. There has been more research and more discussion, this may be a reason why there now is a more complete understanding of the issue.

Similarly as with the data from de Die, there was a small minority that expressed their negative opinion on TRM (local interview 1.5). according to these people there was no water logging problem, the TRM project and the compensation scheme was just a ploy of the government in order to collect their papers, in order to seize their land. In contrast, they did not see the waterlogging as a problem

(local interview 1.4), and therefore TRM was not a solution. This opinion is connected to TRM but also with an embedded distrust in the government. There were also numerous remarks about compensation as already mentioned in chapter 2. People did not get their reimbursement or complained about the system, or financial wrongdoings, there was a certain complacency in how most local people talked about the problems they faced.

The general perceptions of the social issues surrounding TRM did not stop the overall majority of local people interviewed, to express their wish for TRM. Some farmers in Beel Kapalia did make it explicit that without a good compensation system and the certainty that TRM would stop after 3 years. They will prevent the TRM from being implemented (local interviews 1.2, 1.6, 1.8), as already has been blocked before in recent years.

4.2 Perceptions governmental agencies

This stakeholder group is the largest and in some aspect the most divers, while all experts interviewed work for agencies that are a part of the government of Bangladesh. The organisations BWDB, WARPO, IWM and CEGIS differ greatly in their focus and work method. Perceptions are not uniform across this stakeholder group but there are similar characteristics that I encountered in the interviews on their perceptions of the water governance and TRM.

Generally TRM is perceived as a concept that existed before it was used in the KJDRP, most experts from government agencies identify the concept as something that was already used locally in the southwest region of Bangladesh[38&39&40&41]. Maminul Haque Sarker the Deputy executive director development of CEGIS said of TRM: "*TRM practice is not a new innovation, it was always there".* However is was often said that the organisations (IWM and CEGIS) researched the effects of TRM, and because of their research it is now usable in official projects[41]. There was also a suggestion to rename the concept of TRM to Tidal Plain Management, to focus on the main goal the rising of the land trough sedimentation[38]. These statements indicate that the governmental institutions are expressing a certain ownership over the concept of TRM, since they have now used TRM in official projects. The need for the government to work closely together with the local people in case of new projects was also expressed in multiple interviews[38&42&43]. It shows the focus of the governmental agencies how they perceived the success of TRM in the KJDRP. IWM engineer Al-azad Khan who researched the effect during Beel Bhaina said: "*The TRM project in KJDRP is successful, before that TRM was only a theoretical concept and now it is proven that it works*"[42]. He also referred to the social issues, but saying TRM was successful because it is technically proven, shows a certain perception.

Similarly in the perception of the local stakeholders compensation was often mentioned as something that needed to change in order for TRM to succeed. Many people who depend on the beel for their livelihood are landless day labourers or fishermen. They will not receive compensation in the current system, until this is fixed TRM will be impossible[38&41]. Different compared with the local stakeholders was that local elites were also mentioned as opposing the TRM and using day labourers and fishermen to protest the TRM[38&41]. Another interesting insight was that there is an issue with how the locals in the SW of Bangladesh perceive the government projects. The local people think that everything the government does should be free, so they are unwilling to support the BWDB in their projects. This is a mind-set problem and this needs to change in order for a governmental project to happen according to Maminul Haque Sarker of CEGIS[39].

The government agency of the Local Government Engineering Department (LGED) has experience in combining the technical and the social aspects in their projects. They work in sub-projects below the BWDB, on topics like flood management, conservation and drainage[44]. The LGED has experience with compensation system, in situations where land rights, ownership papers and social conflicts are

[38] Sarafat Hossain Khan, BWDB, Project Director of CEIP-I, 16-02-2016, Dhaka
[39] Maminul Haque Sarker, CEGIS, Deputy executive director development, 15-02-2015, Dhaka
[40] Saiful Alam, WARPO, Director at Water Resources Planning Organisation, 05-02-2015, Dhaka
[41] IWM, worked on TRM research of IWM, 26-02-2015, Dhaka
[42] Nasim al azad Khan, IWM, junior specialist IWM, 26-01-2015, Khulna
[43] BWDB, Executive Engineer Office of the Chief Planning, 25-02-2015, Dhaka
[44] Mohiudin Ahmed, LGED, Institutional Development Specialist, 17-02-2015, Dhaka

issues. I interviewed Mohiudin Ahmed from the LGED, and although the organisation has had no experience with TRM, their work methods are a possible solution to some of the problems discussed by the other experts. In their projects they assign local representatives that will assess which of the land users will lose money during the project. These people will get compensation, land ownership papers are not always a requirement in these cases[45].

In the different interviews done with experts from the governmental agencies it became clear that they would identify the problems with TRM as social, and when they spoke of how the concept of TRM worked they only discussed technical aspects. They spoke of the risk of flooding if there was no new project soon[46], or discussed the sedimentation issue and the effect TRM could have on this[36]. When the social issues were discussed the only thing frequently said was that the problems needed to be solved, but no detailed solutions were offered[46&47&48].

These different government agencies all perceive themselves as the technical experts in their particular fields. They see themselves as an agency that can help to improve TRM and to properly implement it, and given their expertise and history they are partly right in this assumption. They have made improvements considering TRM plans, and their help is needed to implement TRM. The sedimentation difficulties are a good example where possible technical improvements can be made. Saiful Alam the director of WARPO said in his interview that the BWDB does not give a lot of importance or attention to the local people, they are engineers and concerned with structures, not with people participation[47]. The following discussion I had with an BWDB engineer is exemplary of this issue[49]; I asked a BWDB engineer if he thought the BWDB was the right agency to implement TRM considering its social problems, and BWDB being an engineering agency. He said this was indeed difficult and that they needed to co-operate with other social organisation like NGO's, however according to the Bangladesh water development act BWDB governs any activity inside the river, so they BWDB needs to be included in TRM projects. It was not a question of suitability, but of rules and regulations.

Related with Scott

The perception of TRM by the governmental institutions is partly similar with the perceptions held by the local people, there are similarities in how they perceive TRM and each other. They identify TRM in slightly different ways but the problems and issues are the same. The perceptions of these experts working for the government are not similar with the elements from Scott (administrative ordering, high-modernity, an authoritarian state, a weak civil society). They identify issues that would have been ignored in a high modernity perspective, and look to co-operate with other agencies for an implementation that is more locally adapted. The actual practice of TRM projects show more similarities with some of the issues identified by Scott, but the perceptions vary greatly and are far away from how government agencies operated during projects like the CEP. One aspect where there is a similarity that is part of the high modernity aspect is the use of scientific data. Multiple experts described that TRM could only be used once it had been researched by IWM and CEGIS, this shows their need and use of scientific data that Scott described as a good practice.

[45] Mohiudin Ahmed, LGED, Institutional Development Specialist, 17-02-2015, Dhaka
[46] IWM, worked on TRM research of IWM, 26-02-2015, Dhaka
[47] Saiful Alam, WARPO, Director at Water Resources Planning Organisation, 05-02-2015, Dhaka
[48] Maminul Haque Sarker, CEGIS, Deputy executive director development, 15-02-2015, Dhaka
[49] BWDB, Executive Engineer Office of the Chief Planning, 25-02-2015, Dhaka

4.3 Perceptions NGO's

Different NGOs have been active concerning TRM, some working with the government to implement the issue, and other agencies protesting the implementation method or mobilizing the local people to protest proposed projects. They are perceived by some experts interviewed for this study, as a voice for the people. Whether this is correct or not, they are often mentioned as part of the solution or part of the problem. They are therefore an important group for this research, and I have tried to collect their general perceptions on the issues of TRM and how it relates with the water governance in Bangladesh. I have spoken with two large NGOs (Uttaran and BRAC) and a smaller local NGO (Initiative for Right View, IRV) located in the southwest of Bangladesh.

The NGO's differed in their views, their work methods, and the intensity with which they do their work. A common perceptions they all share is that TRM was first practised by the local people[50], and the same system was used before the first large governmental projects were implemented in the region[51]. Shahidul, the director of Uttaran described TRM as: "*a new innovation by the people, it is a historic innovation"*. In contrary with most of the experts from governmental institutions they place a large part of the ownership of the concept with the local people. One of the NGO experts who shared this opinion was the director of Initiative for Right View (IRV). This Khulna based NGO states that ownership of TRM belongs with the people. According to him the people who pay the taxes should be the owners of the projects that are financed with these taxes. Correspondingly to this he argued that: "*This is similar to the TRM, where it is also a project and an idea from the local people. Just like they are the main donor through their taxes for the most projects"*[51]. This is an perception that shows a strong belief in the ownership of TRM by the local people.

They also stated that given the local origin of the concept it was of vital importance that the local people participated with the implementation of TRM by the government. The local people are the main "donor" of TRM, government should take note of the ideas and the wishes of the local people[51]. According to Shahidul the director of Uttaran; now the government has adopted the concept of TRM, they need to the local people to implement it properly. Talking about the need of local participation Shahidul said the following: *"The people are from that area, they know how to manage the river"* and "*Compare them with a mid-wife, without a mid-wife it is not possible, it is needed!*[52].

The perceptions on the problems of TRM vary more between the different interviews. All identify compensation as an issue, some say that there are only problems with the system and land ownership rules, once these are resolved the compensation will work well[51&52]. In contradiction with the focus on the compensation, Jenkins does not see compensation as a solution to the problems. He would rather focus on changing the livelihoods of the local people who are affected by a TRM project, so that they themselves can create their income, not depending on a flawed and non-functioning system[50].

In the interviews, there was often frustration present in different levels against some of the government agencies who are working with TRM. Some of the problems within the KJDRP project were caused by the BWDB and their focus on technical solutions[50]. TRM with its social methods and

[50] Andrew Jenkins, Head of the BRAC Research and Evaluation Division, 04-02-2015, Dhaka
[51] IRV, Kazi Zaved Khalid Pasha, CEO initiative for Right View, 28-01-2015, Khulna
[52] Shahidul Islam, Uttaran, Development activist expert, 22-03-2015, Dhaka

low financial cost would not be interesting for the implementing agency, Jenkins: "*BWDB wants concrete solutions"*. The social and low investment characteristics of TRM were seen by Jenkins as a positive aspect. *"TRM is easily adaptable, it can be changed. With a construction of a concrete sluice gate you can't change it after it is constructed, you're stuck with it."*

Related with Scott

The differences in perception of the issues by the experts of the NGO's and governmental institutions differ less then I originally expected. There are some differences in perceptions on the problems and the solutions, but the roles of the different groups are perceived in the same way. The NGO's have not claimed that there is a lack of knowledge with the implementing agencies, citing other reasons why the implementation failed. There is a problem with the governance and the system but not a lack of knowledge. The difference in perception of the problems and where the solutions are, is the main difference between the government experts and the local people. The governmental institutions are implementing the TRM concepts because they have the knowledge and it their job according to the law. However the expertise they build upon limits their scope, which creates problems that are difficult to solve by the technical institutions[53&54&55].

The research of TRM by the experts from IWM and CEGIS did result in more credibility for the concept. There are however frustrations in the perceived lack of use of the local knowledge, while it is the original source of the TRM concept. The focus of the implementing agencies that the NGO stakeholder identified is similar with the ideas of Scott (administrative ordering, high-modernity, an authoritarian state, a weak civil society). In his book he talks of government using high modernity knowledge and large projects to accomplish their goals. The NGO's perceive this to be mostly still the case, with the BWDB as a force for engineering and large scale implementations, with little to no lack of attention to social/locally based solutions. From chapter 2 it is clear that there still is a preference for large-scale engineering solutions, although it is no longer the only focus. The data collected from the interviews with the NGO stakeholders show that they still identify an engineering focus as present in Bangladesh[53&54]. In other interviews the expert affirmed this problem, but still identify other situation where the implementing agencies did not follow a single focus of engineering solutions[55].

[53] IRV, Kazi Zaved Khalid Pasha, CEO initiative for Right View, 28-01-2015, Khulna
[54] Shahidul Islam, Uttaran, Development activist expert, 22-03-2015, Dhaka
[55] Andrew Jenkins, Head of the BRAC Research and Evaluation Division, 04-02-2015, Dhaka

4.4 Perception of International experts

This stakeholder group is the most difficult to define compared with the other stakeholder groups of this study. Whereas the other stakeholder groups all have a distinctive defining trait (NGO personnel, local people, governmental employees) this group is not as homogenous. The common aspect is that all experts interviewed and placed in this group, work for an international organisation or for an international project that is active in Bangladesh. There are still large differences between the experts. Some are native to Bangladesh and have decades of experience with TRM, others are foreign experts and have a limited experience with TRM and the issues. They are an important group because they have a lot of influence on the water sector and water governance. Foreign governments invest large amounts of funds that have a huge impact on the water governance in Bangladesh. Examples range from the KRUG report in the late 50's, to the KJDRP financed by the ADB and the current Blue Gold Project financed by the GoN. These influences are represented by the stakeholder group of "international experts". Their perspective of TRM is distinctly different with other groups on multiple aspects. Some of these experts have a large role in deciding on future projects (for example the World Bank). It is important to not let the lack of particular knowledge present itself as a distinct perspective. The perspective can be related to multiple ideas and beliefs, but not to a simple lack of knowledge on details of an issue.

Similarly with the previous stakeholder groups, the experts who were knowledgeable on the details, identified TRM as concept that originated from local people[56&57&58]. NGO's were also identified as an important player in the first conception of TRM during the KJDRP[59]. The experts from this stakeholder group were not as concerned with the "ownership" of TRM, in contradiction with the previous groups.

The process of TRM and its main benefits were perceived in a somewhat different way by the international experts. Where NGO's mostly see a technical solution constructed out of a social process, and government agencies see a technical solution that is researched and proven but has social issues, the international experts often described TRM as a natural process. It was a solution to the problem of waterlogging because it worked technically, but it was perceived as a good solution because the process is natural[57&60&61]. Marcel Marchand from Deltares said on TRM: "*It is a great example of climate change adaptive management*[58]*".* The problems that persist with TRM were perceived in the same fashion as by previous groups. The one difference is that although compensation was still often mentioned as an important factor that needed to be implemented properly, different experts called for more active participation of local people. The implementing agencies have failed in the continuous implementation of TRM partly because they did not enable the local people to participate, this should be rectified in future projects[56&57&58&59]. The experts from this stakeholder group were more adamant in this statement compared with the experts from governmental agencies.

[56] Manoranjan Mondal, IRRI, collaborative research scientist under the Crop and Environmental Sciences Division and the Social Sciences Division, 02-02-2015, Dhaka
[57] Mofazzal Ahmed, Blue Gold, Deputy Component Leader water resources, 09-02-2015, Dhaka
[58] Shorab Hossain, Blue Gold, Community Organization Expert, 05-02-2015, Dhaka
[59] Alamgir Chowdhury, Deputy team leader Blue Gold Project, 05-02-02, Dhaka
[60] Khaled Khaleduzzaman, Water expert Dutch Embassy Dhaka, 03-02-2015, Dhaka
[61] Marcel Marchand, Deltares, Coastal and flood risk management expert, 10-02-2015, Dhaka

While TRM was discussed in the interviews the process of implementation was a much discussed topic. There is a dissimilarity between various experts, overall they identify the same problems but some are more specific in the stated causes of these issues. A shared opinion is that the local people have a lot of knowledge and this should be used[62], however they are also lacking the very specific technical knowledge[63&64]. Alamgir Chowdhury from the Blue Gold project: "*The local people are not engineers/experts. But from their experience they definitely have some arguments, they are talking from their experience and history"*[63]. The perception of the implementing agencies varied widely, as the different experts had very varied backgrounds. Swarna Kazi from the World Bank said the following while discussing the BWDB: "*They have the people and they have the knowledge to do the projects*[65]*".* Shorab Hossain of the Blue Gold project: "*The TRM project right now is implemented by the BWDB and they have no social mobilisation, the problem now is with management*[62]*".* Finally Sifayet Ullah from the UNDP expressed the following opinion: "*The way BWDB is doing TRM is more a traditional approach towards water management, the participatory is less or not there*[64]*".* The differences in perception may be related to the position of the person evaluating their value. Where Hossain and Ullah both had local experience, Kazi always reviewed the projects from a national level. This could cause a difference in perception of the BWDB practices.

One distinctive characteristic of the international experts was how they perceived TRM in a certain timeframe. Where other experts were mostly discussing current issues and possible solutions to this, multiple experts from this group identified the maximum duration of TRM as an issue. TRM was perceived as a solution that would solve the current problems of waterlogging but it would only work for the next few decades, it is not a long term solution[63&66]. This perceptions was not the same across the complete stakeholder group. Mofazzal Ahmed who is working with the Blue Gold project did describe TRM as a long term plan with a maximal duration of 20-30 years of an individual TRM project. An opinion that was shared across the stakeholder group was the need for more research and knowledge especially considering the long term solutions[63&65], this opinion was more deeply expressed in this stakeholder group compared with other groups.

Related to Scott

Compared with the elements of Scott, these perceptions don't change the conclusion that can already be drawn from the previous stakeholder groups. Based on these perspectives and how the experts are working and discussing TRM it cannot be compared with the way Scott identifies large projects and a dangerous use of the high modernity ideology. TRM is not a concept that fits within a high modernity ideology, and here it is accepted by many of the people who in Scott's theory could cause the massive failures and problems he discusses in his book. The one aspect that is partly similar between the ideas of Scott and the ideas of the international experts is a certain focus on large scale projects. TRM was perceived as a positive but relatively small part of a larger possible policy that

[62] Shorab Hossain, Blue Gold, Community Organization Expert, 05-02-2015, Dhaka
[63] Alamgir Chowdhury, Deputy team leader Blue Gold Project, 05-02-02, Dhaka
[64] Md. Sifayet Ullah, UNDP, Programme Analyst-Disaster Management, 25-02-2015, Dhaka
[65] Swarna Kazi, World Bank, Disaster Risk Management Specialist, 01-03-2015, Dhaka
[66] Marcel Marchand, Deltares, Coastal and flood risk management expert, 10-02-2015, Dhaka

should be created, there was often a call for a more integrative approach across the water governance sector in Bangladesh, of which TRM couldform a part[67].

With the focus on large-scale projects, which the international experts explored more deeply compared with the other stakeholder groups comes a focus on the long term projects. These two methods are clearly visible within this group, especially with the experts who work on the national level. This can be compared with the element of large scale planning that Scott identifies in his book. Their perception of TRM is not as positive because it may not be useful as a long term project in their opinion. A government will always do large scale planning and this is not an issue according to the theory of Scott. But their perception of TRM as less useful because of its supposed duration shows that this element of Scott is represented in the group of international experts.

Finally there is a difference in perception of BWDB and large scale projects by the different experts. Multiple experts share the opinion that BWDB is not successful in getting the local people to participate in their projects. From interviews with BWDB employees that are discussed in the previous segment it is clear that their official guidelines call for active participation. The fact that this is not perceived by some of the international experts shows that there is still work to be done. Especially the experts who have worked on a more local level shared this negative opinion on the BWDB implementation practises[67&68&69]. While an expert who is working on a national level with big projects, is much more positive on BWDB. Experts who are working on local level see the implementing agency more negatively compared with people working on a higher level[70]. This is not directly related with the elements that Scott describes in his book (administrative ordering, high-modernity, an authoritarian state, a weak civil society). It is however important in order to understand the water sector in Bangladesh more fully.

[67] Manoranjan Mondal, IRRI, collaborative research scientist under the Crop and Environmental Sciences Division and the Social Sciences Division, 02-02-2015, Dhaka
[68] Shorab Hossain, Blue Gold, Community Organization Expert, 05-02-2015, Dhaka
[69] Alamgir Chowdhury, Deputy team leader Blue Gold Project, 05-02-02, Dhaka
[70] Swarna Kazi, World Bank, Disaster Risk Management Specialist, 01-03-2015, Dhaka

4.5 Perceptions from BDP2100

Perceptions by their nature are already difficult to measure and compare, the perception of TRM by the BDP2100 is even more complicated to measure. As with the CEIP the project is only just starting so the product cannot be reviewed. It is a project which will try to produce a strategy not an exact plan with specific projects, although they will share some proposal projects via the upcoming sixth five-year plan (Planning Commission, General Economics Division, 2014). This makes it difficult compared with the other stakeholder groups to identify the perception of TRM for the BDP2100. In order to do this the proposal and inception reports will be used, that have already been discussed in chapter two. Furthermore the interviews with experts working for the BDP2100, discussed the water sector in Bangladesh more broadly compared with other interviews. Finally my own experiences from working at the BDP2100 office for three months will be used. I was working as an independent researchers at the office and did not do any actual work for the project, with the minor exception of taking notes during large conventions, which allowed me to attend those conventions. Working at the BDP2100 office provide me with the opportunity to see how the work was done, and what was discussed. I could also sit in at meetings and workshops, where TRM was often discussed. The information collected has been important in the construction of the perception of BDP2100.

Giasuddin Choudhury the deputy team leader of the BDP2100 mentioned the importance of people's participation, he worked to improve this during his years with the KJDRP. During this time he also experienced TRM first hand, he sees it as a good solution although there are large problems. The concept was an "happy accident" that originated from the local population, and was partly voiced by the NGO that were active at the same time as the KJDRP. At the moment TRM is problematic as there is no consensus between the stakeholders on the issue because of the different social characteristics. Overall TRM could be attempted within the BDP2100 but it remains very unsure.

Jaap de Heer the project leader of the BDP2100 identified the purpose of the delta project as the creation of a strategy that over time can achieve an optimal level of water safety, while taking care of the water related aspects of food security and economic development. These three issues he viewed as a triangle (figure 4.1). At the moment the water safety is done with the CEIP and the dikes that already exist, which is a "hard" measure approach, that demands constant maintenance and pumping. He further discussed the singular focus of implementing agencies and called for a better arranged institutional/national level, this gap is where BDP2100 could make a difference. In relation to participation the BDP2100 was still facing a challenge, NGO's cannot fill the gap and the local government in Bangladesh is not directly elected by the people. Finding proper representation on a local level remains a goal for the BDP2100. During the writing of this thesis new reports have been published on the official website of the BDP2100 which mention the participation of local stakeholders during their field visits and meetings.

TRM could be a possible more natural solution that utilizes a building with nature approach. There are however large social problems and it calls for modifications so that the acceptance and feasibility is increased, it needed to be attuned with the local people[71]. Compensation was a possibility but certainly not the only solution, a change of livelihoods could also be successful. The implementing agency still has a mono-disciplinary approach, resulting in no new TRM projects. Jaap de Heer

[71] Jaap de Heer, Project Leader BDP2100, 22-03-2015, Dhaka

perceived TRM as a possibility within the BDP2100, but emphasized their broader goals and objectives.

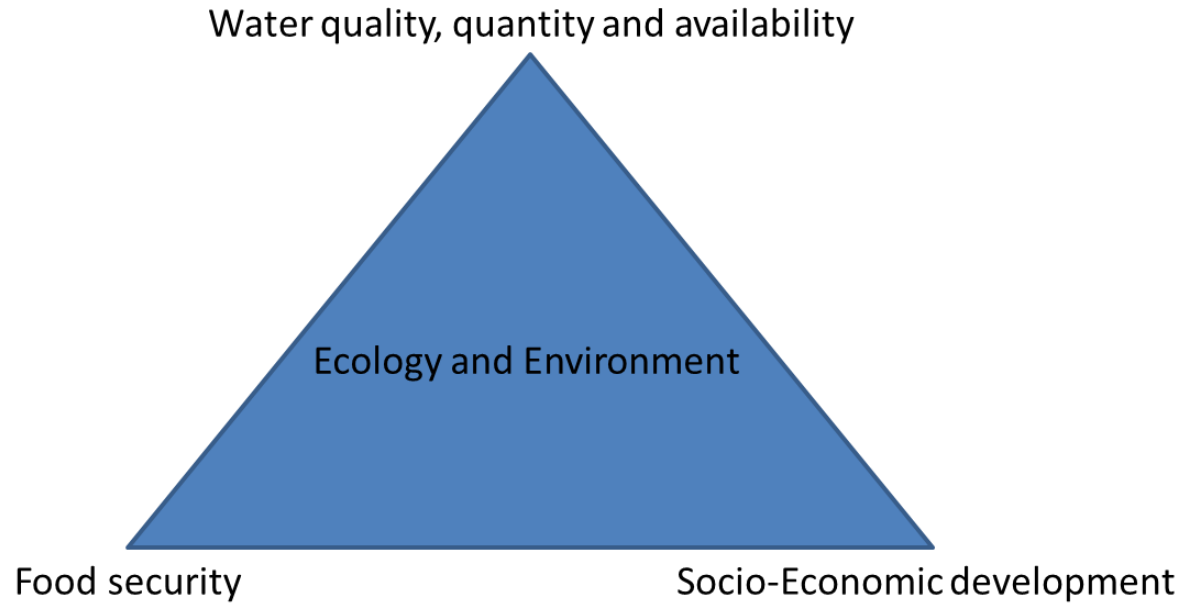

Figure 4.1, BDP2100 strategy triangle according to J. de Heer

Own experiences

The information that Mr Chaudhury and Mr De Heer supplied do not contradict the data collected from the workshops and meetings that I attended while at the BDP2100 office in Dhaka. During the three months when I was in Bangladesh the first meetings were done on the topic of possible projects that the BDP2100 could recommend. It was still early in the process so at that point it was mentioned that all ideas are good ideas and all proposed projects would be discussed. This resulted in many different and ambitious proposals that were maybe not realistic, but it did present a good opportunity to measure the general perceptions of what the BDP2100 could do. It was a good time for the question of what the perceptions are of the experts working or contributing to the BDP2100. Before some of the proposed projects are mentioned I want to emphasize that these were discussed as a brainstorm activity and not as serious already planned proposals.

TRM was often mentioned and highlighted by some as a very good measure that should be used, other were more critical given the known social issues. The concept was discussed at length and also presented as a possible solution to rising sea levels and waterlogging during brainstorm sessions. This was not what was expected with the hypothesis of this research, but the project was seriously discussed as one of the possible solutions.

Other options that were often mentioned were projects that have already often been implemented in Bangladesh, projects like dredging and the construction of structures to regulate the water flow. These plans were proposed for the entirety of the coastal zone, not only the south west. Experts working for technical engineering agencies often proposed these kinds of implementations, and overall were very technically focussed in their proposal as can be expected given their expertise. The first meetings and workshops were not attended by any local representatives or local government personal, these would be brought into the discussion later in the year during field visits.

There was a large variety of ideas proposed during these meetings, overall there was a preference to large scale engineering projects. This was related with the experts present at those meetings, who were mostly working for technical organisations. Other type of proposal were also mentioned and discussed, TRM being an example of this.

Related to Scott

As could be expected the perception of TRM by BDP2100 is similar with the perception of the previous stakeholder group of international experts, and has similarities with the governmental experts. As these groups are the contributors to the BDP2100, their perception on TRM is therefore similar. The experts interviewed see TRM as a possible project, it is perceived as favourable because of its building with nature approach. However it would always be a small part of a much larger strategy as the BDP2100 wants to produce. In this aspect the BDP2100 has similarities with the elements that Scott identified. They see a need for a large scale government project to increase water safety, food security and economic development, similar with the goals that Scott mentions in his book as motive for the large scale projects he describes (Scott, 1998). The difference is that there is no singular focus based on hard scientific data, but call for an integrative approach with room for different types of projects based on different types of knowledge. How far the BDP2100 will go with this only the future will tell, but similarities with some of elements from Scott are there. Scott said that only if all the four elements (administrative ordering, high-modernity, an authoritarian state, a weak civil society), were combined it could be disastrous. BDP2100 does encompass administrative ordering and especially high modernity, however not all four elements, what Scott would think of it would be interesting to know.

summarizing chapter 4

This chapter has presented the main data collected for this thesis. All the interviews have been used to identify the perception of TRM between the different stakeholder groups. Overall the differences have been less large than expected, although there are still differences between the groups. Especially when compared with the ideas of Scott differences are visible. The group of international experts and the BDP2100 are much closer to the ideas of Scott compared with the NGO stakeholders. Within the group of governmental experts there are differences between the experts in how much they relate with Scott. This is to be expected considering the large differences between the organisations the experts originate from. When the different organisations are compared there are similarities. For example: the perceptions of the experts from the BWDB generally are closer to the ideas of Scott compared with the experts who started as local social mobilizers. Overall the perceptions on TRM have been identified and discussed, only the general conclusion remains in which the research questions will be answered and summarized. This will be done in chapter 5, conclusion and discussion.

Chapter 5 Conclusion and Discussion

In this chapter the different results of this study will be discussed and some issues that have not been mentioned so far in this thesis but do have an impact will be mentioned. The first part of this chapter will be the conclusion of this thesis, the research questions that have been formulated will be answered. After the conclusion there is a short discussion, in which I will also share my own opinion on some issues. Before the discussion however there will be a short reflection on the process of the study and fieldwork.

5.1 Conclusion

The data has been presented and analysed in the previous chapters, now the research questions will be answered in this conclusion. Firstly a short overview of what this thesis this far has discussed. The historical context of the water sector in Bangladesh has been presented in chapter 2. It has shown that there have been changes in how the water sector operates in Bangladesh, and which ideologies are used. The early policies and projects like CEP are identical with the elements of Scott (the administrative ordering, high-modernity, an authoritarian state, a weak civil society). The more recent projects and policies have been much more nuanced and try to be more inclusive and adapted to the local situation. This was at least according to the proposal documents. The review documents from (for example) the KJDRP show, that the proposed project can be very different compared with how the project was done and what was implemented.

Chapter 3 was a short review on how TRM was started and how it is currently used. There have been successes with the implementation of TRM. Water logging issues were solved and rivers were deepened after a TRM beel was opened. New social issues are now a problem and the new TRM projects have been delayed indefinitely, which will result in water logging in the near future. TRM has proven to be very successful, however there are currently social issues and implementation problems that prohibited it from being used.

Chapter 4 presented much of the interview data collected for this thesis. Different groups of stakeholders were identified and their perceptions have been analysed. A difference in perceptions have been identified between the different groups. Generally it is clear that the current perceptions do not comply with the elements that Scott identifies. There is no single focus on high modernity and an administrative ordering, especially with local stakeholders and NGO's. The other groups are in varying levels still comparable with the elements from Scott, but are never completely similar. Ideas and ideologies are now more broad and almost all call for an active participation of different stakeholders. Still there is a difference between proposals and actual practice, this is also reflected in the perceptions that the some experts have of the BWDB. Officially they are required to actively use participation, in practice this sometimes does not take place according to some experts.

Now the main research questions remains: "*How is the concept of Tidal River Management perceived by different stakeholders, and what will its relation be with the Bangladesh Delta Plan 2100?*" The perception of TRM has not been similar with the hypothesis that was constructed before the fieldwork started. It was expected that there were large differences in how the concept was perceived, with at national level little to no attention to it. This was not what was found, overall there was a good understanding of the concept and active attention for it. There were differences in

how elements of TRM perceived, but the overall picture was clear and similar across all the people interviewed. How it will be used within the Bangladesh Delta Plan is a more difficult question to answer. Within the BDP2100 there is certainly a willingness to adopt concepts like TRM, they want to be broad and inclusive. Next to large structural projects, TRM is perceived as a welcome change. Whether it will be actually used and in what manner is less clear. The project is still in an early phase and no exact plans have been created. There is enough understanding of the concept in order for it to be used, although there is still a request for more exact data on TRM and its effects. The social issues are also identified as an aspect that needs to be solved before it can be implemented. Overall the perceptions have been identified of the different experts and it has been possible to create a "rough" separation between different stakeholder groups. The perceptions have clarified why and how TRM was used. They have also shown a change in the overall water sector and its strategies and projects. The use of a concept like TRM is not much more likely than it was in the sixties or seventies. The water sector has also changed completely from being similar with the four elements of Scott (Administrative ordering, high modernity, authoritarian state, weak civil society). The new projects and policies still have parts of the elements of Scott but no longer a comparison can be made.

Answering the question of the possible relationship between the BDP2100 and TRM it is expected that TRM or a version like it, will be practised or advised by the BDP2100. Separate from general knowledge there is little known about the specific of TRM. This while the BDP2100 has already been running for more than a year. However there are no specifics of any possible implementation yet, so TRM is not unique in this, it does not indicate a disinterest in such a concept. There is general on the effects of TRM on water logging and river siltation. Furthermore, because of it climate adaptive and social aspect, it is received in a positive light. It differs compared to other proposed technical options and therefore becomes a more attractive option for a project that wants to involve both technical and social instruments. One major risk to the practice of TRM are its social issues, if these continue possible implementation will be more difficult or impossible. Although if the affected regions become waterlogged again, most of the social issues will no longer exist because the land cannot be used. At that point there will be a new TRM project, comparably to the adoption of the TRM in Beel Khuksia.

5.2 Reflection

Before the discussion there needs to be a reflection, especially if I am sharing my own opinion. There have been some standard limitations to this study that have already been mentioned in chapter 1. I do not speak the local language and needed an interpreter for some aspects of the research, my interviews are examples of this. Furthermore, the stakeholder groups that are identified are not homogeneous. There are multiple experts that do not fit in only one group, but could be placed in multiple groups. The chosen selection criteria can be questioned but has been done based on their current workplace and professional experience. The perceptions identified of the different groups have been logical and differ between the groups, I take this as a validation of my stakeholder categories.

My presence as a young white European male in Bangladesh also coloured the information I would be able to collect. These aspects make it impossible to follow “the fly on the wall” principle that a researcher should not influence their field of study. Although I have never believed that a researcher can have no influence on the situation he/she is studying, or is able to be 100% objective for that matter. Being in a certain area already influences it, especially being someone foreign to that area. And your own original knowledge and viewpoints always colour your own perspective, so complete objectivity is not possible.

That said, I have been in Bangladesh for a period for three months for fieldwork, and I have carried out literature studies before and after being in Bangladesh. Because of this I believe that I am now in a position where I can share my opinion and that it has some value to the situation. However there is still a huge difference between my knowledge and the knowledge of some of the experts and local people interviewed, that have lived in the region their entire live. I am still a young researcher with a lot of theoretical knowledge but little practical experience. Me sharing my opinion can be perceived as a young European student that thinks he knows a great deal about the situation given his “superior” educational background. Although I try to avoid this I am not fully able to comprehend my exact limitations. I do understand how some of the opinions that I have formed in the last few months can be received, by people who have worked for a much longer time in Bangladesh. That said, my independent research has still yielded interesting data. Furthermore I have spoken with many different people from many different organisations, something that is not common since most people do not have the time for this. Therefore I will still share my own opinions in this discussion, keeping in mind my own limitations that I have reflected upon.

5.3 Discussion

As already mentioned in the conclusion, my original hypothesis with which I arrived in Bangladesh did not prove to be correct. Differences in perception of TRM are smaller than expected. And there is no significant difference between the local and national level. My own perception of TRM was heavily influenced by the previous WUR students that researched the concept two years ago. This perception did not change much after my own fieldwork and experience in Bangladesh. I perceive is as a concept that works technically very well, and can still be developed further, especially concerning siltation management. The social issues concerning it are serious and prevent it from happening at the moment, but they can be solved in my opinion.

Many of the social issues were not present when TRM was first done in Beel Bhaina. This was mostly because the land was not useable before, so there was no substantial income loss for anyone. Now the land can be used there are much larger economic factors at play, and the short term thinking prevents TRM from happening. The implementation problems that have been present with more recent TRM projects in Beel Kedaria and Beel Khuksia have also had an impact. In contrast with the official proposal there was not enough co-operation with the local people. Furthermore the compensation system is inefficient and difficult to use, the demands for compensation are also to difficult or impossible for most people working in the area. Finally there is bad governance of the projects and maintenance and unfortunately there is a high level of corruption present that limits the effectiveness of the projects. Corruption is very difficult to deal with, as Giasuddin Chowdhury of the BDP2100 said during the interview; "*You can't really blame the people that accept the money under the counter if they have a have a need for it to support their family*". Corruption does not disappear easily, and it is a way of governance and getting things done. Unfortunately it is somewhat of a constant factor and will limit the possibilities and effectiveness of programs, including TRM.

I have come across opportunities that can solve some of the current issues that face TRM. The UNDP is working on a new TRM program that is trying to create a framework for implementation. When they have a successful method of implementation this could be used by the BWDB in larger projects. Furthermore the LGED is a government agency that has ample of experience with compensation systems. They have an adaptive system that does not only look at land ownership but also at lost income, this system would include many people who are now excluded and are protesting the implementation. The knowledge of the LGED could be used to better implement TRM. Finally based on multiple interviews I detected an interest to focus on livelihoods instead of compensation, because the compensation system is difficult to implement. This is something I think that could be a successful approach to TRM.

Unfortunately these proposed solutions or any other solutions will not be in time to prevent the next water logging disaster. Multiple experts and local people say that during the next rainy season there already is a strong possibility of water logging, because the rivers are silted up. Once there is water logging again the possible yields will go down, defeating the argument that people are losing income when TRM is practised. It will create a short time opportunity to do TRM, like it was with Beel Khuksia where water logging also sped up the process. It will however not be beneficial in the long term if land keeps getting flood and waterlogged. There needs to be a sustainable solutions, but this is not possible before the next water logging event.

Compared with Scott.

The comments of Li (2005) that were discussed in the methodology are applicable in the situation of Bangladesh. The state has no monopoly on the power, there are other agencies that can implement projects on the same level. This has become clear with the ADB, World Bank and the GoN all funding large scale projects in Bangladesh. This does however not mean that these other projects are completely non comparable with the elements of Scott. Li looks at these projects with the help of the elements of Scott and goes further in identifying new focusses that are more modern and accepted, but still have an impact that is similar with what the elements of Scott could have. An example of this are projects that are bottom up, but local people have to qualify by the standards of the World Bank. Li writes of this project in her paper (Li, 2005), the method of implementing can be compared with the examples that Scott gives in his book.

Scott is not subtle in how he frames his ideas in his book. It seems only fitting that I myself reflect on Scott after I compared it with many projects and policies published by the water sector in Bangladesh. I wanted to use his ideas because they fitted well with the older projects like the CEP and I was curious how they would compare with the more recent projects. I still think as I have mentioned in the methodology that Scott can be simplistic and contributes to much to the government. There are similarities between his ideas and the projects and policies in Bangladesh. It could be understood as an indication that some of the problems that Scott identifies in governmental projects, are present in Bangladesh. I however think this is no longer the case. There are many problems and issues that still exist in Bangladesh, however they are not comparable with the elements of Scott and the issues he describes in his book.

From my fieldwork in Bangladesh and the in-depth literature study that was conducted for this thesis, an overall trend can be identified on the relevancy of Scott's ideas in relation to the water sector in Bangladesh. This trend is my own personal assessment in how much the concept of Scott can be applied to the water sector, in the last roughly 70 years. Starting with the Coastal Embankment Project, until the present day. The trend visualized in figure 4.2 is based upon the literature study and my own fieldwork, it is not objective. It does however help to clarify and visualize the relevancy of the ideas of Scott.

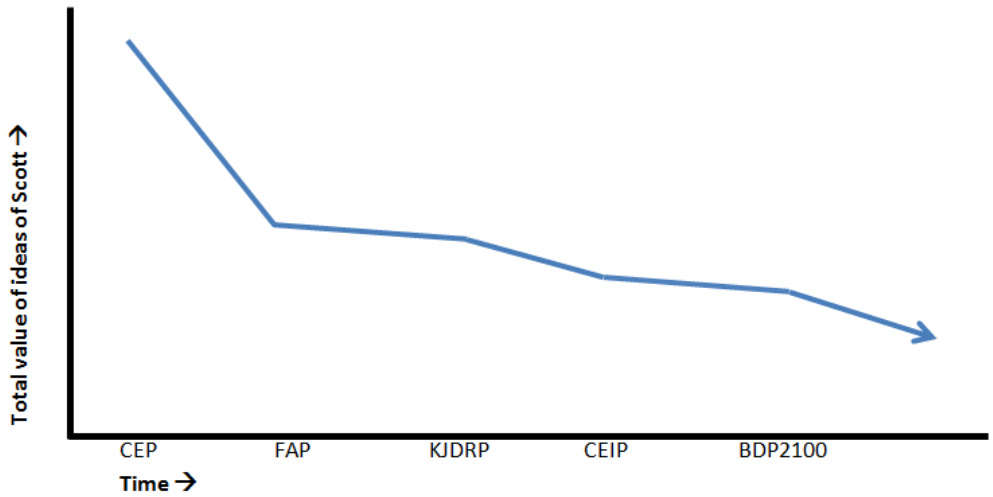

Figure 4.2, Relevancy of the ideas of Scott in relation to the Bangladesh Water Sector

The story of a man and his donkey

At the end of this thesis I want to share a story that was told to me by Andrew Jenkins one of the people who was kind enough to be interviewed by me during my time in Bangladesh. This old Arabic tale has a message that I think is very applicable to the current situation in Bangladesh.

Once there was a man living with his wife and their donkey. At one point he and his wife were no longer happy with their donkey and they decided to sell the donkey. It was an old donkey, who was no longer hard working and never did what they wanted him to do. The man went with the donkey to the market and hired a trader that would sell the donkey for him. The trader agreed to do it on the condition that he would collect 10% of the amount for which the donkey would be sold. The man agreed to the terms and the trader took the donkey to the middle of the market. He gathered people around him and started to praise the donkey. "This donkey is hard working, and smart and gentle with people. It is a great donkey and its new owner would be very happy with this donkey". The man was listening to what the trader was saying about his donkey and was suddenly regretting selling him. He changed his mind and decided to keep the donkey, in order to do so he started bidding on his own donkey. The price went up between different people but the man ended up paying 100 dinars for his own donkey. After he gave the confused trader 10 dinars, he got 90 dinars back and went back to his house with his donkey. The man went back to his wife and when she angrily confronted him with the fact that he still had the donkey he replied: "It was a bargain, for only 10 dinars I have learned to appreciate what I already have!"

The moral of this story is to first appreciate and maintain what we already have, before begin with new things. This idea is applicable to the current situation in Bangladesh. I also hope the BDP2100 will use the lesson, I'm definitely not against new projects but there can be done a lot with the infrastructure that already is in place.

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Khaled Khaleduzzaman, Water expert Dutch Embassy Dhaka, 03-02-2015, Dhaka

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Mohiudin Ahmed, LGED, Institutional Development Specialist, 17-02-2015, Dhaka

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Saiful Alam, WARPO, Director at Water Resources Planning Organisation, 05-02-2015, Dhaka

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Shorab Hossain, Blue Gold, Community Organization Expert, 05-02-2015, Dhaka

Swarna Kazi, World Bank, Disaster Risk Management Specialist, 01-03-2015, Dhaka

Shahidul Islam, Uttaran, Development activist expert, 22-03-2015, Dhaka

Interviews with locals

Each interview has its own identification number, below are the interviews categorized per data and location. For the data collected please contact Rik Heinen.

Interview Code	Date	Location
1.1	20-1-2015	Bhabodah Regulator
1.2	20-1-2015	Beel Kapalia
1.3	20-1-2015	Beel Kapalia
1.4	20-1-2015	Beel Kapalia
1.5	20-1-2015	Beel Kapalia
1.6	20-1-2015	Beel Kapalia
1.7	20-1-2015	Beel Kapalia
1.8	20-1-2015	Beel Kapalia (high part)
2.1	28-1-2015	Beel Bhaina
2.2	28-1-2015	Beel Bhaina
2.3	28-1-2015	Beel Bhaina
2.4	28-1-2015	Beel Khuksia
2.5	28-1-2015	Beel Khuksia
2.6	28-1-2015	Beel Khuksia
2.7	28-1-2015	Beel Khuksia
2.8	28-1-2015	Beel Bhaina
2.9	28-1-2015	Beel Bhaina
2.1	28-1-2015	Beel Bhaina

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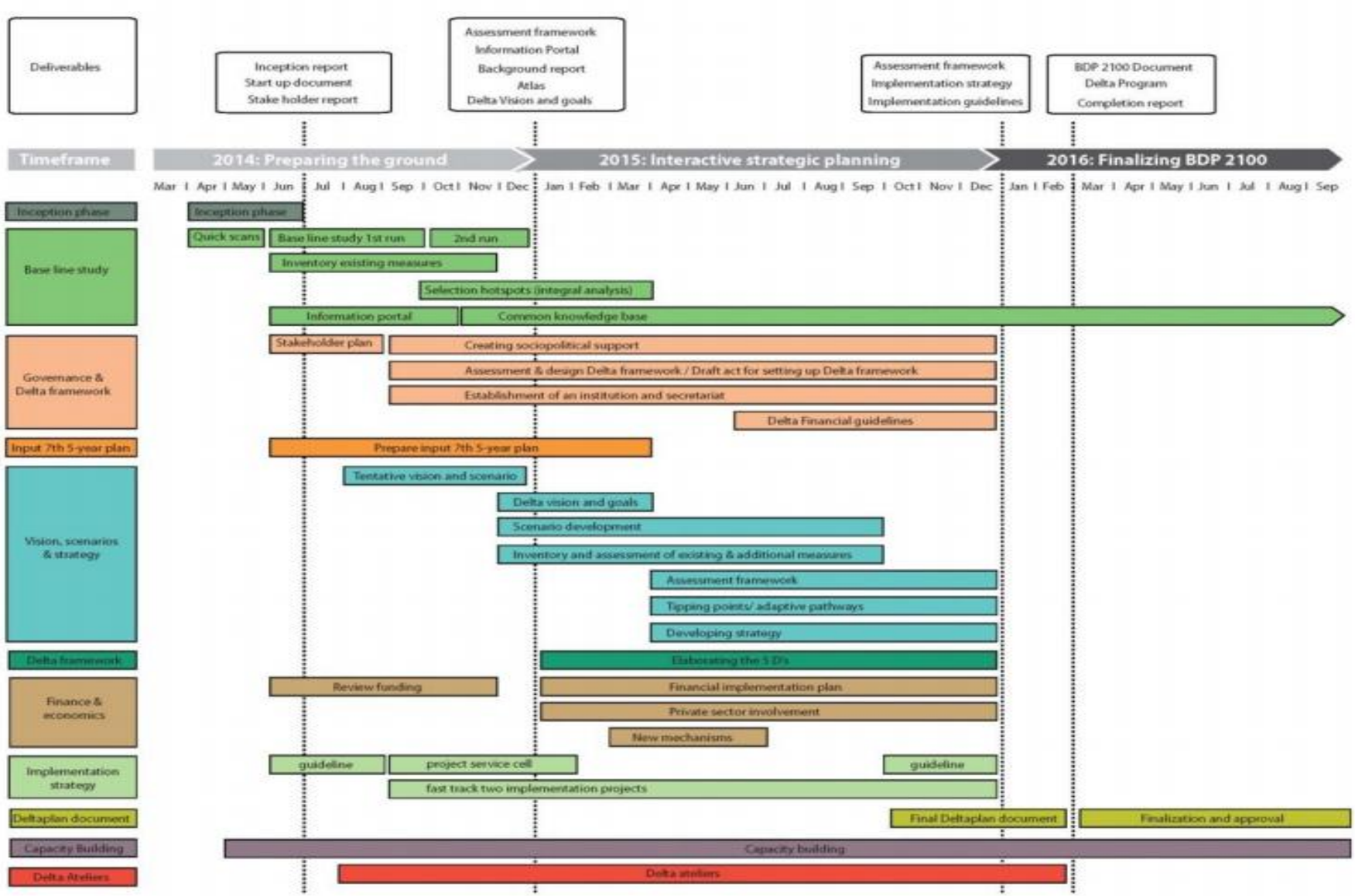
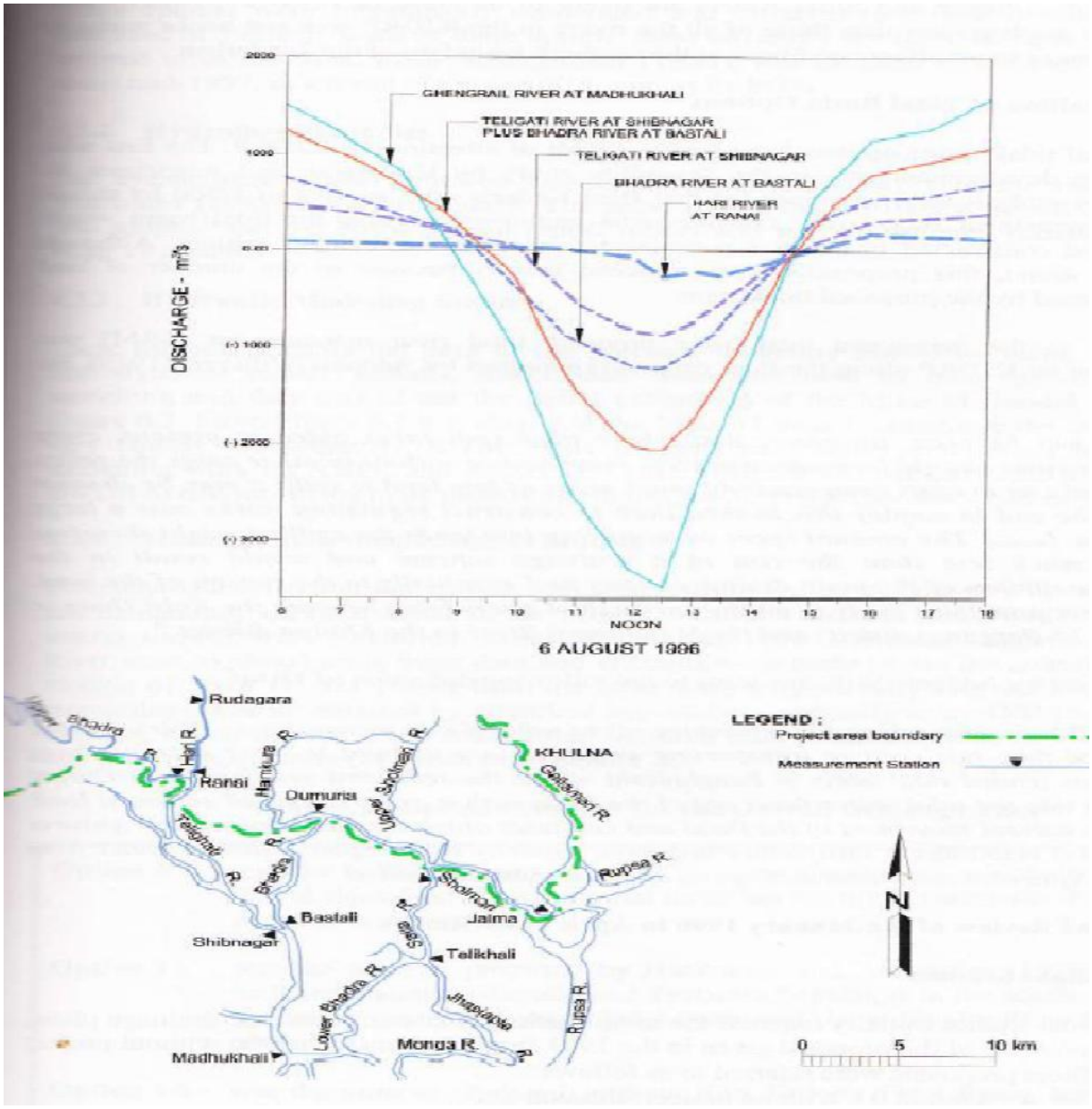
Annex

Annex **A**



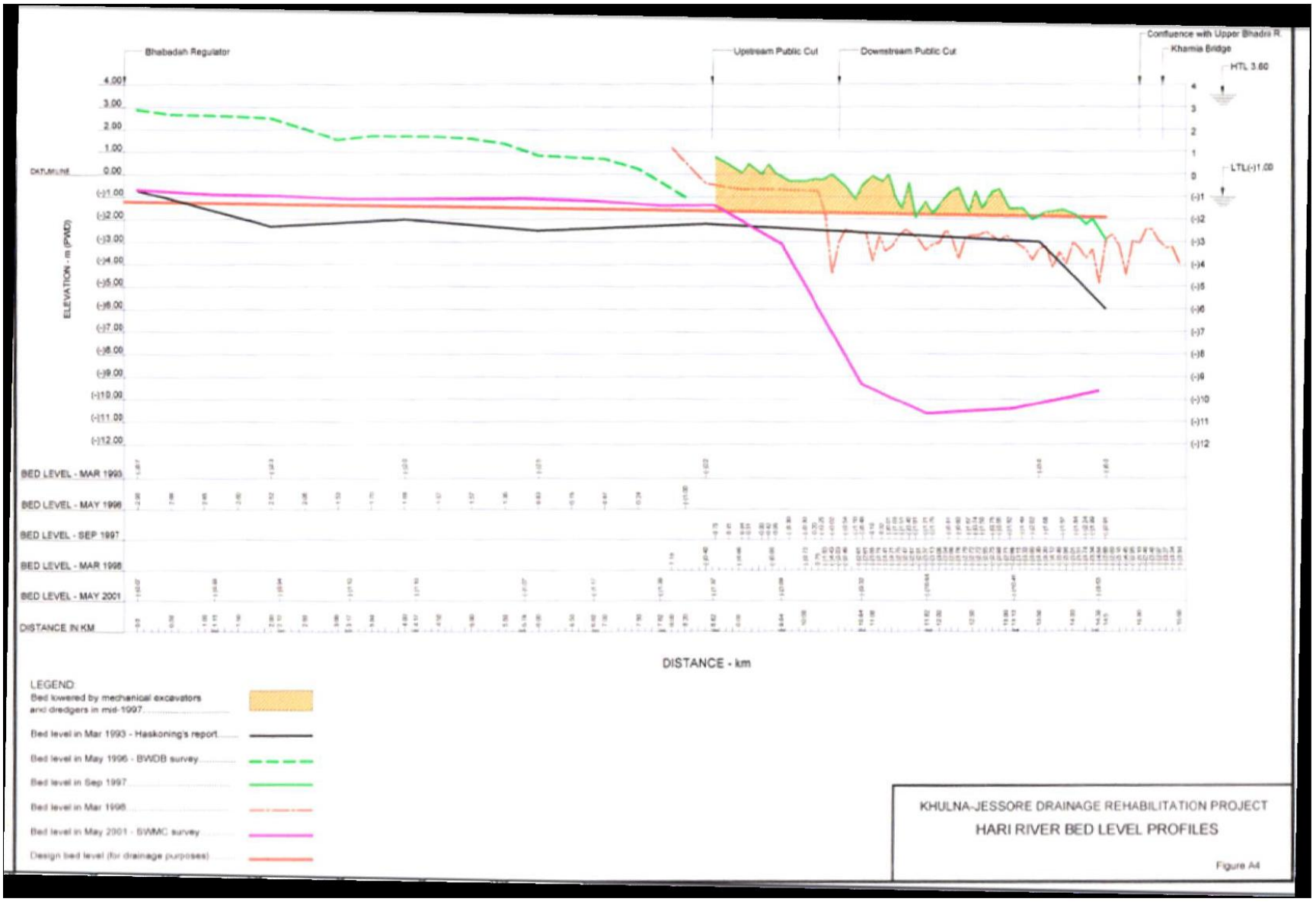
BDP2100 schedule 0-1, (Planning Commission, General Economics Division, 2014)

Annex B



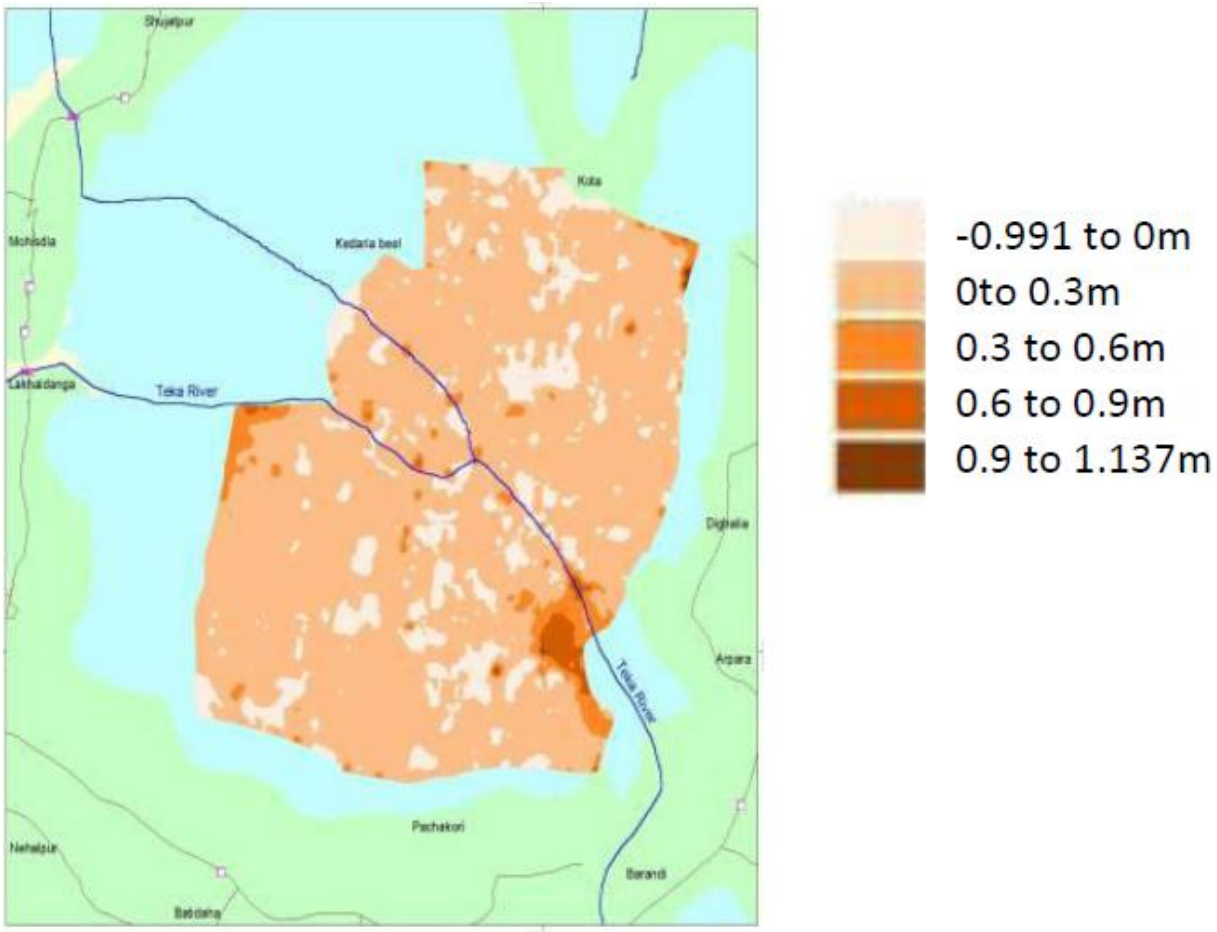
Discharges in the KJDRP river system at Rhaina and downstream, **(SMEC, 2002)**.

Annex C



Longitudinal profile of the Hari river (1997-2001), (SMEC, 2002).

Annex D



Beel Kedaria sedimentation during TRM IWM 2006, **(van Minnen, 2013)**

Annex E

Question list experts interviews

The interviews that were done with the experts in order to collect the data were semi-structured. This way the interviews could be in-depth and adapted to the individual that I was interviewing and his/her specific expertise. The layout below of the questions I asked only served as a red line through the interview. I used it to check of the specific topics that I asked everybody, however most interviews were of a conversation type. This is because perceptions is more easily to identify when people can talk more freely, they will talk about the topics they think are interesting. This is not the case when it is a structured interview with determined questions. The question below were used in all experts interviews but only show the basic questions I asked everyone.

General information

Location:
Date:
Name:
Occupation:

Can you in a couple of sentences describe your job/profession?

How long have you worked in your specific field?

What projects in Bangladesh did you previously worked for?

Questions on TRM

In what way did you first learn/came across tidal river management?

What are the main positive effects and negative effects of TRM.

What in your words is the purpose of TRM?

Does it fulfil this purpose according to you?

Do you consider TRM to be something from the government or from the local people.

Would you consider TRM as a new innovation, or the product of an ongoing process?

In KJDRP a version of TRM was implemented after protest by local population, was the TRM successful in your opinion?

What do you consider that makes the Blue gold project different compared with previous large projects like the IPSWAM, the Khulna Jessora Drainage Rehabilitation Project (KJDRP) or LGED's small Scale Water Resources Development Sector Project (SSWRDSP) or FAP.

What do you consider the most important lessons learned from these projects that the blue gold (and if possible BDP2100) will need to adapt to.

Questions on BDP2100

Do you have a connection with the Bangladesh Delta Plan (BDP2100)?

Do you see a place within the blue gold/BDP2100 for TRM? Why yes/no

If positive: In what consideration would you like to see TRM within the BDP2100?

Annex F

Question list local interviews at field level

In practice is was often not possible to ask all the question, because of time constrains of the people interviewed. Also the informal setting in the fields and the communication through a translator limited the precise information I could ask.

Local interview questions:

Beel/location:
Occupation:
Land status:

Have you experienced Tidal River Management on your land / the land on which you work?

If yes:
Were you informed before the TRM began?
Was there an opportunity to give your opinion on the matter?
What happened to your land?
What happened to your average income?
What problems were there before TRM in this beel?
What problems during in this beel?
(if applicable) What problems were there after in this beel?
Do you consider TRM to have had a positive or negative effect on your live and income?

If no:
Do you know the TRM is planned for this area?
Was/is there an opportunity to give your opinion on the matter?
What do you think will happen to your land?
What do you think will happen to your average income?
What problems are there now in this beel?
What problems will there be when TRM will happen in his beel?
Do you think TRM will have a positive or a negative effect on your live and income?