



# MISSION REPORT

Reconnaissance mission  
Bangladesh,  
16-28 January 2015

## PREFACE

After some delays in 2014, we were invited on a mission to explore the possibilities of cooperation of the Dutch Water Authorities and Dienst Landelijk Gebied with the Blue Gold project in Bangladesh. We received a warm welcome by the project team and had a lot of open and useful discussions with many stake holders.

We like to thank all participants for their help, with a special “thank you” to  
Team leader mr. Dirk Smits  
Deputy team leader Alamgir Chowdhury and  
deputy component 2 leader Mofazzal Ahmed

We hope our proposals will be appreciated and to get back again soon in the beautiful country of Bangladesh where a lot of meaningful work can be done!

Kind regards,

Michael Bentvelsen,  
Michel Boom,  
Henk Weijers,

27 January 2015

## CONTENTS

<b>PREFACE</b> .....	<b>2</b>
<b>CONTENTS</b> .....	<b>3</b>
<b>SUMMARY</b> .....	<b>5</b>
<b>1 PROVOCATIVE</b> .....	<b>6</b>
<b>2 BLUE GOLD</b> .....	<b>7</b>
2.1 Brief description .....	7
2.2 Objectives .....	7
2.3 Approach .....	8
<b>3 OBSERVATIONS</b> .....	<b>11</b>
3.1 Operational / technical level .....	11
3.1.1 Maintenance failures .....	11
3.1.2 Innovations .....	12
3.2 Tactical level .....	13
3.2.1 `New´ polder set up .....	13
3.2.2 The water management – agricultural production value chain .....	13
3.2.3 Geographical Information .....	13
3.2.4 Institutional setting, food security from agricultural and economic development .....	14
3.2.5 Participative Water Management Development Plans .....	15
3.3 Strategic level .....	15
3.3.1 General .....	15
3.3.2 River dynamics .....	15
3.3.3 Lining up various programs/project scopes .....	16
<b>4 COOPERATION POSSIBILITIES</b> .....	<b>18</b>
4.1 Operational / technical level .....	18
4.1.1 Life Cycle Costing .....	18
4.1.2 Getting maintenance and enforcement of rules done .....	18
4.1.3 Innovation .....	19
4.1.4 Knowledge sharing .....	19

4.2	Tactical level .....	20
4.2.1	‘New’ polder set up .....	20
4.2.2	The water management – agricultural production value chain.....	20
4.2.3	GIS implementation and maintenance.....	21
4.3	Strategic level .....	21
4.3.1	Silted rivers .....	21
4.3.2	Sparring partner EKN and project management team.....	22
<b>5</b>	<b>EVALUATION.....</b>	<b>23</b>
5.1	Discussions on and reformulation of possible cooperation.....	23
5.2	Continuous improvement procedures .....	23
<b>6</b>	<b>PROPOSED ACTION PLAN .....</b>	<b>25</b>
6.1	Operational level .....	25
6.1.1	Training .....	25
6.1.2	Assistance on implementation of innovation .....	26
6.1.3	Knowledge exchange with other projects .....	26
6.2	Tactical level.....	26
6.2.1	Water resource management and improvement of agricultural production.....	26
6.2.2	GIS implementation, analyses and maintenance .....	28
6.3	Strategic advice .....	28
	<b>ANNEX: PEOPLE MET.....</b>	<b>29</b>

## SUMMARY

From 16 till 28 January, a mission from DWA/DLG was undertaken to find possible cooperation possibilities with ongoing projects in Bangladesh.

It was found that cooperation is valuable. Working methods and content of work of DWA/DLG is comparable to actions taken in the visited projects.

Most of the time was spent on the Blue Gold project, the TA-consultant showed the work done in Khulna and Dhaka. From field visits and discussions with many stakeholders it became clear that two specific actions can be taken in 2015 to start cooperation:

- Develop and execute a training for water management organization and Bangladesh Water Development Board staff on life cycle costing, creating maintenance awareness in design, implementation and operation of assets. The introduction of a plan-do-act-evaluate cycle is to be stimulated within the institutional setting of BWDB.
- In Polder 2 DWA/DLG will assist in the development of a polder approach through Participatory land use Planning and methods of participatory water management. This is to be organized within the Innovation fund of the Blue Gold project.
- A young Dutch academic posted in Bangladesh to cooperate with the Blue Gold project and to assist in abovementioned activities

Further cooperative actions will be defined after establishment of a trustful working relation.

The time schedule of the Bangladesh Delta Plan 2100 is very tight, because information shall lead to implementation of activities in the Bangladesh 7<sup>th</sup> five year 2016-2021. Possible cooperative activities have to be worked out further, but are awaiting results of the base line studies and scenario development which currently are being realized.

The Urban Dredging Demonstration Project has problems excavating a drainage tunnel. DWA will use its network in the Netherlands to try to find a solution for this.

## 1 PROVOCATIVE

From January 16th till January 28th the Dutch Water Authorities (DWA) and DLG Government Service for land and Watermanagement of the Ministry of Economic Affairs did a reconnaissance mission to Bangladesh. The aim of the mission was to identify in what way DWA and DLG can contribute to the Blue Gold project and the BD Deltaplan 2100 project. .

Both DWA and DLG as being public authorities, have a specific role, specific fields of expertise and a specific network which can be relevant, and are complimentary to the activities of private/ commercial actors. Think of:

- Asset management including risk assessment
- Participatory planning and land and water management
- Administrative procedures
- Decision making processes and good governance
- Programming
- Public Finance

The activities of DWA and DLG are primarily demand driven. Financial resources for follow up need to come from the specific projects and Embassy Funds. In addition the NWB fund can allocate funds for project costs, including travel costs and DSA for DWA input. In specific situations salaries of involved DWA personnel might be covered by the Water Authority. Staffed by a longer term committed team of employees from DWA/DLG with international experience.

DWA and DLG aim at a high participation of trainees and young experts in the project (YEP, either Bangladeshi or Dutch), backed by experienced committed team members from DWA/DLG on short term missions.

When discussing this draft report with the management of Blue Gold it was agreed to focus follow-up on i) the training ii) the participatory land use planning exercise with Polder 2 and iii) the 6-month input of a trainee (to be arranged for on short notice). It was agreed that funds for financing of the needed inputs are to be found within Blue Gold, the Netherlands Embassy and the NWB fund.

## 2 BLUE GOLD

### 2.1 BRIEF DESCRIPTION

Since around 1975 the Bangladesh and Netherlands Governments are working closely together in the coastal zone of Bangladesh to create an environment conducive for sustainable economic growth with close involvement of the local communities. The Blue Gold Program has been designed taking into account the lessons learnt over the past ten years, the new insights in how to deal with the challenges created by the very dynamic rivers of Bangladesh and the new communication technologies.

Blue Gold became operational in March 2013 and extends over a 6 years period, until March 2019. Its operations concentrate on the polders of three districts: Patuakhali, Khulna and Satkhira. The Program covers 160,000 ha (gross) where an estimated 150,000 household will have direct benefits from the Program.

### 2.2 OBJECTIVES

The overall objective of the Blue Gold Program is:

*“to reduce poverty for 150,000 households living on 160,000 ha of selected coastal polders by creating a healthy living environment and a sustainable socio-economic development”.*

*The specific objectives of Blue Gold are:*

- I. To protect the communities and their land located in polders against floods from river and sea (climate change adaptation) and to optimize the use of water resources for their productive sectors.*
- II. To organise the communities in cooperatives which will have to become the driving force for the natural resources based development (agriculture, fisheries and livestock), whereby environment, gender and good governance are effectively addressed.*
- III. To increase the household income derived from the productive sectors.*
- IV. To strengthen the institutional framework for sustained water resources development and related development services in the SW/SC coastal zones*

## 2.3 APPROACH

### **Component 1: Community Mobilization and Institutional Strengthening**

The IPSWAM polders have 246 Water Management Groups that are registered under the Cooperative Societies Act and these are mainly focused on routine operation and maintenance (O&M) of the water management infrastructures. While substantive work has been successfully carried out in organizing the communities to form WMGs, and WMAs at the catchment level, as well as in carrying out routine O&M work in joint collaboration with the Bangladesh Water Development Board (BWDB), further development is necessary to engage the communities in sustainable socio-economic development activities. In addition to the 246 WMG cooperatives, the Blue Gold program is tasked to form new 600 WMGs and strengthen these to jointly manage the water management infrastructures, engage in economic activities, and enter into market transactions within the local territories or with outside parties in order to enhance production income levels, raise the standard of living and sustain the environment. The WMGs need to develop into private business enterprises and be able to operate at a commercially feasible and solvent manner.

### **Component 2: Water Resources Management**

The objectives of the water resources management component are:

1. ascertain flood protection in polders with gross area of approximately 25,000 ha in total by rehabilitation of the embankments and water intakes and outlets and an improved water distribution and drainage system;
2. optimal use of the water resources for the productive sectors through the fine-tuning of the drainage and water distribution system for 45,000 ha of IPSWAM polders and 90,000 ha already rehabilitated polders;
3. the partnership between BWDB and WMGs/WMAs is effectively operational resulting in continuous and high standard O&M works and effective water management;
4. BWDB zonal offices are applying the IPSWAM guidelines (six steps approach); the planning, design, tendering, and construction are conducted following the highest standards of quality.

### **Component 3: Food Security and Agricultural Production**

Following the rehabilitation or fine tuning of water management in the polders (Component 2) and effective Operation and Maintenance by functional Water Management Organizations (Component 1), Component 3 will support the productive sectors (crops, aquaculture and livestock) so that performance will be higher for the benefit of male and female producers.



Immediate objectives are that production of the agricultural sectors will be increased, which will contribute to higher income and improved food security of the target population. Improved water management will create opportunities for diversification of agricultural production, such as the introduction of new crops or varieties, and for increasing production of fish and livestock. Improved technologies, such as farm mechanization and irrigation, will improve farm efficiency and increase productivity.

All WMG members will benefit from more effective research and extension services. The Farmer Field School (FFS) approach will be used to offer a wide range of learning opportunities to WMGs, based on their resources, wishes and opportunities.

#### **Component 4: Business Development**

The basic premise of the Blue Gold Program is the rehabilitation of infrastructure to facilitate appropriate water resource management and the subsequent increase of agricultural productivity. The Business Development Component supports the farming households, their association and other market actors to capture the full benefit of this increase in polder productivity. This component seeks to enhance the market linkages and systems, to identify opportunities for value adding and to develop enterprises through value chain improvements to the benefit of the polder community.



Meeting of a Water Management Group

Ultimately the objective is to increase farm household income from agricultural production, generate business income and expand employment to improve livelihoods and reduce poverty through market orientation and development. This will result in producer groups which farm on a more market oriented basis and pursue collective actions and benefit from better linkages with respect to inputs, processing and marketing, along with improved public and private services providers. Simultaneously, businesses will generate higher incomes and non-farm employment.

#### **Component 5: Cross Cutting Issues**

The following issues are tackled in the fifth component:

- Training and Capacity Building
- Gender
- Monitoring and Evaluation
- Environment
- Disaster Risk Reduction (DRR)
- Good Governance
- Innovation

### 3 OBSERVATIONS

We have distinguished three levels of observations: i) operational/technical, tactical and strategic. However we acknowledge that these levels are interrelated: e.g. observations on the technical designs or maintenance are related to improvements on an institutional level.

#### 3.1 OPERATIONAL / TECHNICAL LEVEL

##### 3.1.1 Maintenance failures

Assets for water management (canals, sluices, embankments, etc.) are constructed according to a standard design which is often implemented in the previous century. Experiences with failures of this assets are not continuously evaluated to revised designs. Failures lead to high maintenance costs.

Water Management Organizations (WMO) can only be made responsible for low cost/effort maintenance works. The Bangladesh Water Development Board (BWDB or Water Board) does not have a plan for continuous larger maintenance works, taking into account different life time of various material (concrete, steel, wood, paint, etc.).

Summarizing specific goals of water management assets clarifies the possible failure modes of the assets:

Goals of canals:

- Drainage
- Storage (irrigation)
- Quality (fish production)

Goals of embankments:

- Flood protection (at low water level difference: it is assumed that in the wet season the polder contains the rainwater volume since it is not possible to drain out water when river water levels are high. Water level can therefore raise up in the polder to 30cm up to more than one meter above ground level)
- Roads: normal transport and disaster evacuation

Examples of failing maintenance of assets are:

- Corroded slots of sluice gates cannot be replaced without demolishing the concrete structure
- Slots in sluices are located tightly to the culvert; it is not possible to enter the culvert with a closed gate for maintenance purpose. The narrow space between gate and culvert can easily be blocked by floating rubbish.

- The spindle rod is of a small diameter and can be bend by enforcing the gate. The operation wheel of the spindle is not locked when the gate is already down or blocked by rubbish under the gate.
- A gate which was damaged by erosion of the river was replaced by a new one, further inland. The new gate is too far from the river which creates a problem of siltation of the inlet-/drainage channel by tidal flows. Large maintenance costs/effort has to be invested every year to re-excavate the inlet-/drainage channel.
- Embankments in outer bends of rivers are constructed without protection against erosion. This leads to undercutting of the embankments and high maintenance costs have to be spend by creating new embankments more inland. Valuable agricultural land has to be given up to the river.
- Rules of administration (passive maintenance) are not enforced: embankments have been encroached by sheds, housing and trees (or elephant grass). Slopes of embankments are excavated to create more land. Canals have been blocked by extending fish ponds and fields into the canals. Canals are blocked by dams with too small culverts. Soil from re-excavation of canals (dredging sludge) dumped on the canal embankment slope is not removed and is flushed back into the canal.
- Many canals are blocked by water hyacinth. The plants are difficult to control. Up to now, no economic value can be given to these plants.
- Frequently, canals are silted and sluice gates are broken. In Blue Gold area, WMO's do maintenance and operation work, but it can be evaluated to which amount this is possible. At a certain extent, maintenance has to be done by the water board since some assets serve a large community and a public body is required to guarantee maintenance is done. Maintenance of sluice gates and re-excavation of canals (say every 10 years) is done by the water board or its contractor or labour contracting society (LCS). But yearly removal of plants and rubbish and operation of the gate is done by the WMG.

### 3.1.2 Innovations

Shortly, a new team member is added to the team, to implement the innovative component of the project. The new innovation fund manager has a good experience track in Bangladesh. He can use assistance in tendering innovation, dealing with risks including maintenance issues.

One of the proposed innovations is installing drainage pumping in polder 2 and/or polder 31-part. There is no experience in maintenance and operation procedures for pumping stations at WMG's.

## 3.2 TACTICAL LEVEL

### 3.2.1 'New' polder set up

Bangladesh Water Development Board, Union Parishad or Upazila and Water Management Organizations (WMA and WMG) lack the (political) power or instruments to enforce protection of the infrastructure and to execute adequate operation and maintenance in the water management system. Responsibility for the operations and maintenance within the water management system is not assigned to the main beneficiaries who need to be in decision making power in order to achieve a targeted approach in investment of input (labor and finance): the farmers.

To enable execution of earthworks and rehabilitation of works land needs to be made available (either through reclamation, clearing or expropriation). Government can stimulate expropriation of land but the compensation payments are very limited. Because of this discrepancy between actual value and compensation value there is in some cases lack in supportbase and implementation power to new developments initiated by the project.

### 3.2.2 The water management – agricultural production value chain

The focus of the Water Management Groups is not only related to water management but also to other socio-economic developments. In a way the WMGs function more like a Village Development Committee. The decisions that relate to water management are not made by the direct beneficiaries the farmers solely, but also by people who benefit in a secondary way (for example landless people).

To achieve the project objective of improvement of livelihood through the improvements in water systems, agricultural production and marketing a direct linkage in implementation between these three components needs to be stimulated. It seems that the interlinkage between these components needs in this stage of the project additional strengthening.

### 3.2.3 Geographical Information

GIS is in the start-up phase to be used for the development of relevant databases. The dutch company Neelen en Schuurmans is developing a satisfactory basis with open source QGIS. It has to be further investigated in what way GIS can have a surplus value to be used to support the decision making process in interactive planning approaches and to share databases between various government organizations. Proper development can contribute to the strengthening of (sub-)

district level organizations (especially Upazilla office level and to lesser extend Union Parishad).

The Centre for Environment and Geographical Information Systems (CEGIS) has an extensive database of relevant subjects but every request for data puts the project to additional costs.

### **3.2.4 Institutional setting, food security from agricultural and economic development**

At a local level, three parties have each their own role in water management and form the essential water management triangle: The BWDB, the general government (Union Parishad, Upazilas) and the WMO. The functioning of water management groups (WMG) with regard to water management tasks is still feeble and depending on assistance from the BG project. In spite of their name WMG's are also functioning as agricultural cooperation's, investing in machines, seeds, etc. Water management Associations (WMA) are being formed to combine the WMG-activities to a larger watershed scale and possibly this can also lead to the establishment of Water Management Federations (WMF).

Many WMGs that were founded under IPSWAM became less effective. The ideas about the roles of these three parties in the water management triangle are still evolving. Since 2014 the WMOs are not registered under the Department of Cooperatives but under the BWDB. WMGs are in the BG-project to be though active in water management tasks but are also agricultural and economic development cooperatives. Water management goals can be divided in three goals, which are public goods since no one can be excluded from the result:

1. safety against flooding,
2. water quality (salinity, toxic algae, pollution, etc.)
3. water quantity (control of water levels; drainage and irrigation)

Agricultural and economic development is a collective good, since collective action is efficient and stakeholders can be excluded from the result. Agricultural development has a direct link to improvement of the water quantity management.

In the combined goals, decision making is confusing and unclear. For example: landless people have to be convinced to make investments on drainage and agricultural equipment without getting direct benefits from it.

Gaps in the governance structure are: Neither BWDB, general government and WMO have the (political) power or instruments to enforce protection of the infrastructure and to execute adequate operation and maintenance.

### 3.2.5 Participative Water Management Development Plans

According to the BG approach, water management activities will be described in six steps according to IPSWAM guidelines and four fases: (agricultural) needs assessment; polder developments plans, polder action plans and village (maintenance and operation) action plans. For two polders, the needs assessments and polder development plans are generated, but the process was very slow and generated not enough action. The method was not sufficiently focused to stay on target with the project planning. The needs assessment and the agricultural and economic development by the WMOs has a broad perspective and does not solely focus on issues related to water management. Actions related to agricultural and economic development can be more focused on product (specific crop) related issues in a specific value chain.

## 3.3 STRATEGIC LEVEL

### 3.3.1 General

Observations:

- Investment decisions on operational level are not optimal steered by long term vision to achieve sustainable development
- The lack of funds for O&M will lead to deterioration of the watersystem after the Blue Gold project is finalized
- Water Management Groups are not anymore within Department of Cooperatives.

### 3.3.2 River dynamics

The river beds of the rivers that pass along the polders are not fixed. Due to natural river dynamics (and human activities upstream) a continuous process of erosion and sedimentation takes place.

It is observed that various rivers have been silted due to several factors, a.o. dams in the Phadma River in India. Presently, sedimentation occurs due to the lower flows in dry season, while this sediments in the past still were flushed to sea. The "sediment equilibrium point" is shifted upstream the river during dry season.

Due to this siltation sluice gates are blocked. Drainage and inlet of water is problematic. Maintenance by re-excavation of canals is very costly.

Examples of rivers which run dry in the dry period are:

- the Jhop Jhopia River between polders 22 and 31-part,
- Sailmari River between polder 31-part and polder 30,

- Joykhali and Mora Bhadra rivers between polders 29 and polders 26 and 27/1 These “dead” rivers have been transformed to floodplains. Peak storage is not optimized by closing of the mouth of these river arms.

In the main “active” rivers also sedimentation occurs, causing higher water levels in the wet season. It is recognized that water levels not only rise due to climate change, but also due to sedimentation.



Erosion of river embankment

### 3.3.3 Lining up various programs/project scopes

The Blue Gold program is limited to activities within the polder embankments. At some places (e.g. Polder 29, 30) the embankments are seriously threatened by river erosion and have to be protected. This is a task of the BWDB. However the Water Board is lacking money. A breach in the embankment will be very demotivating, if not destructive for the positive attitude of the people living in the Polder towards all improvements made by the Blue Gold project. Reconstructing the embankments on the landside of the endangered stretches would require resettlement of farmers, which is difficult if not impossible, and would be a temporary situation, since the erosion would continue. The Delta Plan is modeling the river system on national scale. Studies on intermediate level are lacking, to decide for specific embankments sections which strategy for reinforcement is possible and favorable. Awaiting the results of the BD Delta Plan, (no-regret) measures at regional polder level are not



formulated. At the moment, there is no cooperation with projects of other donors like the Coastal Embankment Improvement Project (World Bank) or the River Bank Protection Project (Asian Development Bank). It is even the rule to exclude polders of the Blue Gold Project from other projects or vice versa to prevent double financing. In the Urban Dredging Demonstration Project (UDDP), (for Dhaka Water and Sanitation Authority, DWASA) new types of equipment for dredging of relative small canals and culverts are used. The UDDP is planning to have a “road show” to present this equipment in other parts of the country. In the Blue Gold polders, many canals have to be re-excavated / dredged, including removal of water hyacinth.

## 4 COOPERATION POSSIBILITIES

At first some general remarks on the working principles of the cooperation of DWA/DLG and the Blue Gold project.

Introduction of new concepts will not be limited to public sector, private consultants should be involved where possible, for the reason that the continuity of staffing in the private sector is much higher than in the public sector.

An effective exchange of ideas, knowledge and working methods between Dutch parties and Bangladeshi parties require frequent contact and a strong intermediate role: parties who know both sides. Long term commitment of DWA/DLG members is essential.

### 4.1 OPERATIONAL / TECHNICAL LEVEL

#### 4.1.1 Life Cycle Costing

Since DWA are very experienced in maintenance and operation of polder systems, training can be given on life cycle costing. In this training engineers from the field offices are asked to present maintenance problems, after which designers and the engineers from the field together work on improved solutions.

Life cycle costing is used to create suitable solutions for specific locations. In this way it is prevented to generate resistance by local people on works which are inadequately detailed.

Together, the designers and field engineers present the results to policy decision engineers, after which all of them evaluate on the workshop procedure and decide on continuing these workshops in the future.

#### 4.1.2 Getting maintenance and enforcement of rules done

After thorough evaluation of detailed existing maintenance agreements, workshops can be given to find efficient ways to get the maintenance work done. DWA are experienced in getting maintenance done:

- often in an active way, doing it by themselves or have contractors do it if necessary,
- but as much as possible in an inactive way: letting people themselves do it and let the community speak out when it is not done.

The work shop will address the implementation of maintenance projects: maintain the water system as it is supposed to work, extending the life time of the system with a next period.

Also, it also will address the issue of getting small maintenance work done by the WMGs themselves. Rules, obligations and allowed activities will be clarified. Social pressure of the community can be generated to stimulate people to fulfill their obligations (bottom-up enforcement). Conflict solving without legal enforcement by authorities will be trained.

Bottom-up enforcement can also be done by enforcing rules on illegal issues like encroachment of embankments and canals.

DWA/DLG-experts can also assist on:

- Legal experts: secure legal agreements of maintenance and use of assets
- Financial/administration experts: efficient ways to administrate actions taken (financially and by labour)

#### **4.1.3 Innovation**

Senior staff of DWA/DLG can advise on the set-up of the innovation fund and assist on writing functional specifications of innovative solutions, specifically on contracting maintenance issues and management of long term risks. When applicable DWA/DLG can also assist in evaluating bids in these aspects.

On a more operational level, experts of DWA/DLG can suggest solutions which have already proven to be efficient in the Netherlands, but are not yet used in Bangladesh. These solutions will take into account the use of local available material and equipment. Examples of these suggestions which are already made during the reconnaissance mission:

- Using chemical anchorage systems (e.g. Hilti injectable two-component adhesive anchors)
- Using sloping bamboo poles installed with a flushing system into subsoil, combined with plastic (rice- or cement-) bags filled with soil as erosion protection.

DWA/DLG can also assist acquiring knowledge and resources from its network innovation funds.

#### **4.1.4 Knowledge sharing**

Since DWA and DLG are government based the main focus is to achieve the overall goals for Bangladesh as a whole. Therefore DWA/DLG can contribute to identifying crosscutting themes between the projects and relate them to overall objectives of EKN and GoB. Examples that already occurred in this mission are to actually bring together staff and ideas together for the UDDP demonstration of dredging equipment in the Blue Gold project and the identification of a possible fruitful relationship

between SAFAL and the pilot Polder 2 project in Blue Gold. This advantage was recognized by the 1<sup>st</sup> Secretary on food security from EKN.

## 4.2 TACTICAL LEVEL

### 4.2.1 'New' polder set up

To enable sustainable (re-)construction of infrastructure the provision of land and the establishment of a sense of farmer ownership of the water management system is needed. Polder 2 can be used as an example of a 'learning-by-doing approach' to address these issues. Specific issues that need to be dealt with in polder 2 are waterlogging and the improvement in shrimp and crop production. Participatory land use planning can assist in the establishment of a supportbase on WMG level to provide land and to develop the feeling of ownership of the water management system. By increasing this sense of ownership farmers, together with other local people are likely to be more directed towards sustainable self-organisation of O&M. In polder 2 the profound land uses are rice farming, freshwater fish and shrimpfarming. Blue Gold will not target on the shrimpparea because it is agreed that SAFAL deals with the shrimpfarming in coastal areas in Bangladesh. Therefore when implementing the pilot we will seek for cooperation with SAFAL and investigate the potential for marketchain development.

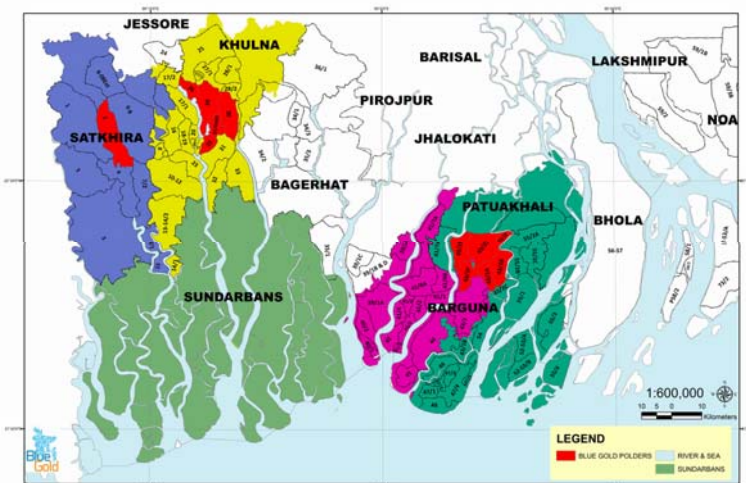


Figure:  
location of selected Blue Gold  
polders, incl. polder 2 at Satkhira

### 4.2.2 The water management – agricultural production value chain

The interlinkages between water management – agricultural production – marketing is strengthened by dealing with this chain on catchment area level and by ensuring that business development is targeted in the same catchment.

A catchment based approach, for instance in polder 22 and/or 31-part can contribute to the sense of urgency and can give farmers the needed responsibility to maintain and operate the water management system and to ensure that increased income from increased agricultural turn-over is partly invested again in the O&M of that specific water management system. To ensure the proper functioning of the chain the farmers in one catchment area should be enabled to take up responsibility to manage and operate the water management system in such a way that they can achieve the optimal agricultural production (one catchment area can entail 2 or 3 WMGs). Therefore it is suggested to facilitate a decision making process that acknowledges the objectives of the WMGs but also develops a sense of farmers ownership on M&O of the water system. In what way this could be organized is to be investigated. The Blue Gold project emphasizes that the focus on the broader Water Management Groups should be maintained in order to ensure sustainable social cohesion. However, by the DWA/DLG team it is a first opinion that you need to built on farmers ownership of the M&O of the water management system in order to achieve sustainable long-term visioned results.

Of: that Operation and Maintenance of the water system is primarily the responsibility of the direct involved stakeholders, being the land users.

#### **4.2.3 GIS implementation and maintenance**

Possibilities to develop GIS from a broader Government perspective can ensure that GIS is developed in a sustainable manner that will outlive the timespan of the project and contributes to institution building of district level organizations (mainly Upazilla and to lesser extend Union Parishad). The GIS centres from DLG-RVO and the DWA can assist in developing a strategy to implement GIS for broader use. This will be included in the pilot 2 exercise. Also it has to be investigated in what way cooperation with other GIS organizations can be cost-efficiently organized (CEGIS, WARPO). Possibly in some cases the DLG GIS-Competence Centre can access data from Bangladesh more easy and cheaper than the Blue Gold project. This has to be investigated in the pilot approach Poler 2.

### **4.3 STRATEGIC LEVEL**

#### **4.3.1 Silted rivers**

Blue Gold is working inside existing polders. Drainage and irrigation may be blocked because the river outside the embankment of the polder is silted. Bangladesh Delta Plan, ADB's River Bank Protection Project and World bank's Coastal Embankment

Improvement Project don't solve this problem (yet). DWA/DLG wants to address this issue with donor organizations.

DWA/DLG can propose solutions:

- “dead” river arms can be closed off and be changed to floodplain areas. Floodplain areas can serve for a longer time as agricultural production area. Overflowstructures/dams resist water from active rivers entering the area until it is really necessary: just before embankments of polders are overtopping. By doing so, the “room for the rivers” is optimized.
- “active” rivers can be trained to prevent embankment erosion and sedimentation in dry season. River training can be done by:
  - constructing floodplain areas
  - or parallel stream channels which fall dry in dry season,
  - or installing cribs or screens perpendicular to the flow

By doing so, the water velocity in the remaining channel in dry season can be enlarged. Sedimentation of the river will not occur: sediments will be carried further downstream towards the sea.

DWA/DLG can supply experience and knowledge from the Dutch “room for the rivers” and “Building with Nature” program.

#### **4.3.2 Sparring partner EKN and project management team**

As a colleague authority from the Netherlands, it is suggested to act as a sparring partner for the Embassy of the Kingdom of the Netherlands (EKN). From cooperative activities DWA/DLG will acquire better knowledge in the project . It can address this issues as a neutral partner to the EKN and the project management to improve solutions and avoid conflicts.



Drainage canal

## 5 EVALUATION

### 5.1 DISCUSSIONS ON AND REFORMULATION OF POSSIBLE COOPERATION

The possible ways of cooperation of DWA/DLG is discussed with:

- Team leader Dirk Smits
- Deputy team leader Alamgir Chowdhury and deputy component 2 leader Mofazzal Ahmed
- 1<sup>st</sup> secretary water section EKN, mr. Carel de Groot
- Executive engineer BWDB M+O office Khulna
- Executive engineer BWDB design office Dhaka

In general everybody recognizes the advantages of the proposed cooperation. It is suggested to start at the technical/operational level (“cherry picking”) and to start with the set-up of a projectproposal for Polder 2 that can be financed out of the Innovation Fund from the Blue Gold project. After establishing a trusted work relation the relationship could evolve towards a more strategic level on for example institutional cooperation with some of the Dutch Waterboards. This document is discussed with staff from Blue Gold. Where applicable the comments were incorporated. Possibly we will also get net comments on this version. We will incorporate them in the same way. In our last meeting with the management of Blue Gold we agreed on the following:

- To Develop and execute a training for water management organization and Bangladesh Water Development Board staff on life cycle costing, creating maintenance awareness in design, implementation and operation of assets. The introduction of a plan-do-act-evaluate cycle is to be stimulated within the institutional setting of BWDB.
- In Polder 2 DWA/DLG will assist in the development of a polder approach through Participatory land use Planning and methods of participatory water management. This is to be organized within the Innovation fund of the Blue Gold project.
- A young Dutch academic posted in Bangladesh to cooperate with the Blue Gold project and to assist in abovementioned activities

### 5.2 CONTINUOUS IMPROVEMENT PROCEDURES

It is targeted to close the Plan-Do-Check-Act cycle (PDCA, Deming) to improve procedures.

Standardized designs are now blocking improvement. Due to shortage of staff in the water board, projects are slowed and there is no time for evaluations to improve procedures and solutions.



The PDCA-circle is often presented as a method which needs investment to evolve “up the hill” to create improvement as in the picture above. Effort has to be invested in changing procedures and quality of solutions. It is believed that in this case changing standard practices and solutions somewhat, improvement can be easily realized “down the hill”: improvement of procedures and standard solutions will reduce costs and efforts.



## 6 PROPOSED ACTION PLAN

### 6.1 OPERATIONAL LEVEL

#### 6.1.1 Training

##### Life cycle costing

It is proposed to have an Asset Manager and a maintenance advisor of the DWA to give three workshops of two days at the BWDB in Dhaka. The workshops will be facilitated by the BG trainers working on community participation. Preparation of the workshops will start from the Netherlands: engineers in the field will be asked to make pictures of failing assets.

Participants:

- O+M Executive Engineers,
- Subdivisional engineers civil and M+E engineers from the M+O offices
- Design executive Engineers from the design department in Dhaka
- Engineers of private consultants in Bangladesh

In the training life cycle costing and maintenance plans are explained and trained in practice.

The subject of the workshops is Life cycle costing and maintenance of:

1. Sluice gates )
2. Canals and Embankments )
3. Pumping station

At the end of the training, the participants will present the findings to the

- D.G: director general
- Additional DG planning, administration ....
- chief engineers
- superintendence engineers

##### Getting the work done

An expert on maintenance rules will commence a mission of two weeks to establish knowledge of existing maintenance agreements and enforcement practices in the polders. He/she will then prepare two-days workshops on this issue in two weeks in September 2015. The workshops will be facilitated by the BG trainers working on community participation.

After the first workshops, it will be evaluated to continue with more workshops in the future.

### **6.1.2 Assistance on implementation of innovation**

Senior staff of DWA/DLG can advise on the set-up of the innovation fund and assist on writing functional specifications of innovative solutions, specifically on contracting maintenance issues and management of long term risks. When applicable DWA/DLG can also assist in evaluating bids in these aspects.

To assist the Innovation officer of Blue Gold by co-thinking on setting-up the innovation fund and supplying functional specifications on maintenance issues and management of maintenance risks can be done by mail and other digital means (e.g. skype) from the Netherlands. This also applies to assistance from DWA/DLG from their network of innovation funds.

For assistance in evaluating bids, it is required to gain field knowledge/experience. Experts involved in workshops and bid evaluation can define other suggestions for innovation from field experience during their missions.

### **6.1.3 Knowledge exchange with other projects**

Ideas for knowledge exchange, initialized by DWA/DLG:

1. Water bulldozer demonstration in polders
2. Biogas from water hyacinths: pilot projects in the Netherlands (Waternet) and Africa: can this be implemented in Blue Gold?
3. Pumping station maintenance: life cycle costing training in new DWASA pumping station in Dhaka; evaluating maintenance and operation activities?
4. Investigate possible cooperation with SAFAL on shrimpfarming in polder 2.
5. EKN mentioned possibility to check on programme of Institute Rural Development Academy. Possibly it can strengthen the marketing component in Blue Gold.

## **6.2 TACTICAL LEVEL**

### **6.2.1 Water resource management and improvement of agricultural production**

A possible activity on longer term might be:

#### **Development of polder 2 (or other)**

At present the project is working on a procedure to establish Polder Development Plans. In case of Polder 2 we can assist in the following issues that are likely to

contribute to a good support-base to establish this plan for Polder 2 and to strengthen the sense of farmer ownership on Operations & Maintenance:

- a. Assist in setting-up a GIS database that serves as a good support tool not only for the specific technical designs and zonal land use planning but also as a tool to be used in the participatory land use planning sessions (see also section 6.2.2)
- b. Assist in the inventory and analysis of the water management system and assist in the formulation of different scenario's
- c. Assist in the implementation of a participatory needs assessment with producers (fish, shrimp, rice)
- d. Formulate a land strategy to acquire land for execution of works and voluntary resettlement of people for example:
  - i) need assessment for the development of a land bank (that entails for example government ownership and negotiated voluntary transferred lease rights land) and
  - ii) to formulate compensation procedures and
  - iii) to formulate resettlement procedures
  - iv) through the implementation of smallscale voluntary exchange of lease or land use rights (f.e. groups of 5-10 farmers)
- e. Assist in the development of scenario's and impact assessment on business case level
- f. Assist in participatory land use planning meetings and safeguard relationships through the management of (potential) conflicts in areas with shrimp, fish and rice
- g. Include development of linkage water management - production - marketing?
- h. Assist the business and marketing component to survey the market possibilities for eco-produced shrimps to the Netherlands

#### **The water management - agricultural production value chain**

- a. Assist in setting-up a GIS database that serves as a good support tool not only for the specific technical designs and zonal land use planning but also as a tool to be used in the participatory land use planning sessions that entail the whole chain of water management improvement, increased agricultural production and marketing (see also section 6.2.2);
- b. Assist in the inventory and analysis of the water management system and assist in the formulation of different scenario's through a participatory approach (input: participatory needs assessment);
- c. Discuss support base for voluntary exchange of lease or land use rights (if indeed needed). Reasoning: if you improve the water management system to increase agricultural production one should also be willing to look into the issue of scattered distribution of plots and the possibilities to increase efficiency in use of inputs;

- d. Assist in the development of scenario's and discuss choice 2nd crop and 3rd crop in relation to business opportunities and water management system;
- e. Assist in participatory land use planning meetings and safeguard relationships through the management of (potential) conflicts in areas with shrimp, fish and rice.

Remark: Learn from Martina session (occurs disagreement between farmers and landless? Probably yes)

### **6.2.2 GIS implementation, analyses and maintenance**

- a. Investigate the existing and required GIS (project Bleu Gold, CEGIS, Union Parishad, Upazila offices, LGED, BWBD)
- b. Formulate decision paper on development of GIS
- c. Formulate implementation strategy
- d. formulate a sustainable incorporation concept in the existing government structure and systems
- e. Assist on the implementation, application and incorporation

### **6.3 STRATEGIC ADVICE**

By cooperation on operational and tactical activities, a trustfull working relation is built between DWA/DLG, the project team and EKN. When this relation has matured, the project team and/or EKN can define TOR for short (or longer) term missions by strategic policy advisors from DWA/DLG. This will be set up on demand driven basis from Bangladesh. In that stage it can also be investigated whether establishment of partnership relation with for example specific Dutch water authorities can be achieved.

## ANNEX: PEOPLE MET

*Mr Delawer Hossain Mozumder*  
Executive engineer  
Local Government Engineering Department Khulna

Mr A.F.M. Munibur Rahman  
Superintending engineer  
LGED

**BRAC centre**  
75 Mohakhali  
Dhaka 1212  
Mr Andrew Jenkins

**Office Blue Gold Program:**  
*Mr Dirk Smits, teamleader*

*Mr Alamgir Chowdhury*  
Deputy teamleader

*Mr Mofazzal Ahmed*  
Deputy component leader Water resources management

*Mr Karel T'Jonck*  
BMB mott MacDonald

*Mr Mahmudur Rahman Aveek*  
Quantity Survey Engineer - GIS

### **Bangladesh Water Development Board**

*Mr Kabil Hossain*  
(Blue Gold Program)  
O&M Division II

*Mr Braza Mohan Nath*  
Superintending engineer  
Design circle-5

*Mr Majibur Rahman*  
Executive engineer  
Khulna O&M Division

*Mr Deboprotim Howlader*  
Sub-divisional engineer  
Khulna O&M Division-1

Mr Abdul Salam Khan  
Mechanical engineering XEN  
ME Division Khulna

Mr Abal Kashem  
Dep. Director  
Regional Accounting Centre  
BWDB Khulna

**Embassy of the Kingdom of the Netherlands**

Mr Carel de Groot  
First secretary, Water Section

Mr A.T.M Khaleduzzaman  
Senior advisor Integrated water resources management

Mr Laurent Umans  
First secretary, Food security

Ms Arman Akbary Khan  
Advisor food security

**Bandudeltas BDP 2100  
Bangladesh Delta Plan 2100**

*Mr Jaap de Heer*  
Teamleader

*Mr Giasuddin Choudhury*  
Deputy teamleader

*Char Development and Settlement IV*  
Mr Jan van der Wal  
Teamleader

*Coastal Climate Resilient Infrastructure Project*

Mr Mosiur Rahman Joarder

LGED Khulna

*Urban Dredging Project*

Taco de Vries

Teamleader