Government of the People's Republic of Bangladesh
Ministry of Water Resources

Bangladesh Water Development Board

# PROJECT COMPLETION REPORT : IMED 04/2003 (Revised)

# Updating Feasibility Study for Kurigram Irrigation Project (North & South Unit)

**November, 2022**

**Government of the People's Republic of Bangladesh**
**Ministry of Planning**
**Implementation Monitoring and Evaluation Division**

**PROJECT COMPLETION REPORT : IMED 04/2003 (Revised)**

## A. PROJECT DESCRIPTION :

| | | | |
|---|---|---|---|
| 01. | **Name of the Project** | : | Updating Feasibility Study for Kurigram Irrigation Project (North & South Unit). **(Project code- 224336600)** |
| 02. | **Administrative Ministry/Division** | : | Ministry of Water Resources (MoWR) |
| 03. | **Executing Agency** | : | Bangladesh Water Development Board (BWDB) |
| 04. | **Location of the Project** | : | Phulbari, Bhurungamari, Nageswari, Kurigram Sadar, Ulipur, Razarhat and Chilmari Upazillas of Kurigram District. Lalmonirhat Sadar upazilla of Lalmonirhat District and Gaibandha District. |

**05. Objective of the Project:**

The objectives for this study are as follows:

- To update the earlier feasibility study as per the changed hydrological features, morphological conditions and socio – economic situation to alleviate poverty and enhance livelihood condition of the poor people by boosting up agricultural production through surface water-based irrigation facilities.
- Aiming to river bank protection, flood control, drainage and irrigation water resources management for Dharla and Dudhkumar River basin area.
- To investigate the feasible option for irrigation practices using pumping technology rather than barrage as proposed earlier in Dharla river under this study.

**06. Estimated Cost :**

**(In lakh Taka)**

| | **Original** | **Latest Revised** |
|---|---|---|
| **(a) Total** | 498.60 | - |
| **(b) Taka** | 498.60 | - |
| **(c) Foreign Currency** | - | - |
| **(d) Project Aid** | - | - |
| **(e) RPA** | - | - |

| | | | | |
|---|---|---|---|---|
| **07.** | **Date of Approval** | : | **PCP/PFS** | **PP** |
| | **(a) Original** | : | 01/06/2021 | - |
| | **(b) Latest Revised** | : | - | - |
| | **(c) No Cost Time Extension** | : | - | - |

**08. Implementation Period :**

| | Date of Commencement | Date of Completion |
|---|---|---|
| (a) Original | July 2021 | September 2022 |
| (b) Latest Revised | - | - |
| (c) Actual | July 2021 | June 2022 |

**09. Financing Arrangement (Source-wise):**

**9.1 Status of Loan/Grant**

**a) Foreign Financing : *Not Applicable***

| Source (s) | Currency as per Agreement | Amount in US $ (Million) | Nature (Loan/Grant/ supplier's/ credit) | Date of Agreement | Date of Effective-ness | Date of Closing | |
|---|---|---|---|---|---|---|---|
| | | | | | | Original | Revised |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | | | | | | |

**b) GOB:**

**(In lakh Taka)**

| Total amount | Loan | Grant | Cash Foreign Exchange |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 498.60 | - | 498.60 | - |

**9.2 Utilization of Project Aid: *Not Applicable***

**(In million)**

| Source (s) | Total Amount | | Actual Expenditure | | Unutilized Amount | |
|---|---|---|---|---|---|---|
| | In US $ | In Local Currency | In US $ | In Local Currency | In US $ | In Local Currency |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | | | | | |

**9.3 Re-imbursible Project Aid (RPA): *Not Applicable***

**(In lakh Taka)**

| R P A Amount | | Amount Spent | Amount Claimed | Amount Re-imbursed | Remarks |
|---|---|---|---|---|---|
| As per PP | As per Agreement | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 |
| | | | | | |

## B. IMPLEMENTATION POSITION

**01. Implementation Period :**

| Implementation Period as per PP | | Actual Implementation period | Time Over-run (% of original implementation period) | Remarks |
|---|---|---|---|---|
| Original | Latest Revised | | | |
| 1 | 2 | 3 | 4 | 5 |
| July 2021- September 2022 (15 months) | - | July 2021- June 2022 (12 months) | (-20%) | The project was completed well before the implementation period. |

**02. Cost of the Project :**

**(In lakh Taka)**

| Description | Estimated Cost | | Actual expenditure | Cost over-run (% of original cost) | Remarks |
|---|---|---|---|---|---|
| | Original | Latest revised | | | |
| 1 | 2 | 3 | 4 | 5 | 6 |
| TOTAL | 498.60 | - | 486.37 | (-2.45%) | |
| TAKA | 498.60 | - | 486.37 | | |
| PA | - | - | - | | |

**03. Project Personnel:** Existing manpower of Directorate of Planning-2, BWDB were engaged with implementation of the project.

| Sanctioned strength as per PP | Manpower employed during execution | Status of the existing manpower | | | Manpower Employed | |
|---|---|---|---|---|---|---|
| | | Manpower requirement for O&M as per pp | Existing manpower for O & M | Others | | |
| 1 | 2 | 3 | 4 | 5 | Male | Female |
| Officer (s) | - | - | - | - | - | - |
| Staff(s) | - | - | - | - | - | - |
| Total : | - | - | | | - | - |

**04. Training of Project Personnel (Foreign/Local):** No provision of training under this project.

| Field of Training /Study tour/workshop/ Seminer etc. | Provision as per PP | | Actual | | Remarks |
|---|---|---|---|---|---|
| | Number of person | Man - months | Number of person | Man - months | |
| 1 | 2 | 3 | 4 | 5 | 6 |
| a. Foreign | - | - | - | - | - |
| b. Local | - | - | - | - | - |

**05. Component-wise Progress (As per latest approved PFS) :**

(In lakh Taka)

| Items of work (as per PFS) | Unit | Target (as per PFS) | | Actual Progress | | Reasons for deviation (±) |
|---|---|---|---|---|---|---|
| | | Physical | Financial | Physical (%) | Financial | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| **A. Revenue** | | | | | | |
| 1. Honorarium | LS | 100% | 2.00 | 100% | 2.00 | |
| 2. Entertainment expenses | LS | 100% | 1.00 | 0% | 0.00 | |
| 3. Domestic Travel Expenses (TA & DA) | LS | 100% | 1.50 | 97% | 1.46 | |
| 4. Petrol & Lubricant | LS | 100% | 0.25 | 0% | 0.00 | |
| 5. Printing & Binding | LS | 100% | 0.25 | 100% | 0.25 | |
| 6. Other Stationary | LS | 100% | 0.50 | 100% | 0.499 | |
| 7. Consultancy Expenditure-1 | LS | 100% | 383.69 | 100% | 375.00 | |
| 8. Consultancy Expenditure -2 | LS | 100% | 106.41 | 100% | 104.42 | |
| 9. Computers | LS | 100% | 0.50 | 100% | 0.499 | |
| 10. Machineries and Equipment | LS | 100% | 0.25 | 100% | 0.25 | |
| **Sub-total (Revenue):** | | | **496.35** | | **484.38** | |
| | | | | | | |
| **B. Capital** | | | | | | |
| 11. Computers & Accessories (1 no laptop and 2 nos. desktop computer) | Nos. | 3 | 2.25 | 3 | 1.99 | |
| **Sub-total (Capital):** | | **100%** | **2.25** | | 1.99 | |
| **Grand-Total** | | **100%** | **498.60** | **100%** | **486.37** | |

**06. Information regarding Project Director (s):**

| Name & Designation with pay Scale. | Full time | Part time | Responsible for more than one project | Date of | | Remarks |
|---|---|---|---|---|---|---|
| | | | | Joining | Transfer | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Bidyut Kumar Saha<br>Superintending Engineer<br>Directorate of Planning-2,<br>BWDB, Dhaka.<br>Grade-4; 50,000-71,200 | Yes | - | Yes | 21 June 2021 | Till date | - |

**07. Procurement of Transport (in Nos.):** ***Not Applicable***

| Type of transport | Number as per P.P. | Procured with date | Transferred to Transport Pool with date | Transferred to O & M with date | Condemned/ damaged with date | Remarks |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Jeep | - | - | - | - | - | |
| Pick-up | - | - | - | - | - | |

## 08. Procurement of Goods, Works and Consultancy Services:

08.1 Goods & Works of the Project costing above Tk. 200.00 lakh. and Consultancy above Tk. 100.00 lakh :

| Description of procurement (goods/works /consultancy) as per bid document | Tender/Bid/Proposal Cost (in lakh Taka) | | Tender/Bid/Proposal | | Date of completion of works/services and supply of goods | |
|---|---|---|---|---|---|---|
| | As per PFS | Contracted value | Invitation date | Contract signing/ L.C opening date | As per contract | Actual |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Consultancy Services for "Updating Feasibility Study for Kurigram Irrigation Project (North & South Unit)-Component-1". | 383.69 | 375.00 | 30.06.2021 | 21.09.2021 | 20.09.2022 | 30.06.2022 |
| Consultancy Services for "Updating Feasibility Study for Kurigram Irrigation Project (North & South Unit)-Component-2". | 106.41 | 104.42 | 23.11.2021 | 03.03.2022 | 20.09.2022 | 30.06.2022 |

## 8.2 Use of Project Consultant (s) (Foreign/Local):

| Name of the Field | Approved man month | | Actual man month utilised | Remarks |
|---|---|---|---|---|
| | As per PP | As per contract | | |
| 1 | 2 | 3 | 4 | 5 |
| a) Foreign : | - | - | - | |
| b) Local : | Component-1: 75 man month<br>Component-2: 14 man month | Component-1: 75 man month<br>Component-2: 14 man month | Component-1: 75 man month<br>Component-2: 14 man month | Component-1 was conducted by IWM and component-2 was conducted by CEGIS. |

## 09. Construction/Erection/Installation Tools & Equipment:

| Description of items | Quantity (as per PP) | Quantity procured with date | Transferred to O & M with date | Disposed off as per rule with date | Balance | Remarks |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1 no laptop and 2 nos. desktop computer | 3 Nos | 26.06.2022 | - | - | 3 Nos | Being used by Directorate of Planning-2, BWDB, Dhaka . |

## C. FINANCIAL AND PHYSICAL PROGRAMME :

**01. (a) Original and revised schedule as per PFS :**

**(In lakh Taka)**

| Financial Year | Financial provision & physical target as per original PP | | | | Financial provision & physical target as per latest revised PP | | | |
|---|---|---|---|---|---|---|---|---|
| | Total | Taka | P.A. | Physical % | Total | Taka | P.A. | Physical % |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 2021-22 | 498.00 | 498.00 | - | 100% | - | - | - | - |
| **Total** | **498.00** | **498.00** | - | **100%** | - | - | - | - |

**01. (b) Revised ADP allocation and progress :**

**(In lakh Taka)**

| Financial Year | Revised Allocation & target | | | | Taka releas e | Expenditure & physical progress | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | Taka | P.A. | Physical % | | Total | Taka | P.A. | Physical % |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2021-22 | 498.00 | 498.00 | - | 100% | 498.00 | 486.37 | 486.37 | - | 100% |
| **Total** | **498.00** | **498.00** | - | **100%** | **498.00** | **486.37** | **486.37** | - | **100%** |

## D. ACHIEVEMENT OF OBJECTIVES OF THE PROJECT:

| Objectives as per PP/PFS | Actual achievement | Reasons for shortfall, if any |
|---|---|---|
| **Technical Feasibility Study** | | |
| To update the earlier feasibility study as per the changed hydrological features, morphological conditions and socio – economic situation to alleviate poverty and enhance livelihood condition of the poor people by boosting up agricultural production through surface water-based irrigation facilities. | Completed.<br><br>Hyro-morphological analysis has been conducted under component-1 of the study and environmental & social impact aseeseement (ESIA) has been completed under component-2 of the project. The previous feasibility study has been updated in this study considering the changed field condition. | - |
| Aiming to river bank protection, flood control, drainage and irrigation water resources management for Dharla and Dudhkumar River basin area. | Completed.<br><br>Hydro-morphological analysis of Dharla and Dudhkumar river has been accomplished and measures regarding river bank protection, flood control, drainage and irrigation water resouces | - |

| Objectives as per PP/PFS | Actual achievement | Reasons for shortfall, if any |
|---|---|---|
| | management of these rivers has been suggested accordingly. The proposed interventions are suggested under Section-10 of the main report. | |
| To investigate the feasible option for irrigation practices using pumping technology rather than barrage as proposed earlier in Dharla river under this study. | Completed.<br><br>The study has proposed to construct one pumping station at Shiberkuti which is U/S of previously proposed barrage location to cover more irrigation area with a design discharge of 48.76 $m^3/s$ for Kurigram Irrigation Project South Unit. In Kurigram Irrigation Project North Unit, two pumping stations have been proposed among which one is for irrigation at Pateswari and another one is at Tangonmari for drainage (Section 10.1 of the main report). | - |

## E. BENEFIT ANALYSIS

**01. Annual Out-put:** ***Not Applicable*** **for the Study Project.**

| Items of out-put | Unit | Estimated quantity expected at full capacity | Actual quantity of out-put during the 1st year of operation at full capacity (or during, real production for newly completed project). |
|---|---|---|---|
| (a)<br><br>(b) | | | |

**02. Cost / Benefit:** ***Not Applicable*** **(It is not an investment project, hence** ***not applicable*****)**

| Item | Estimated | Actual |
|---|---|---|
| **(1) Benefit cost ratio of the project**<br>**(i) Financial**<br><br>**(ii) Economic**<br><br>**(2) Internal Rate of Return**<br>**(i) Financial**<br><br>**(ii) Economic** | | |

**03. Please give reasons for shortfall, if any, between the estimated and actual benefit:** ***Not Applicable***

## F. MONITORING AND AUDITING

**Monitoring: Nil.**

| Name & designation of the inspecting official | Date of Inspection | Identified Problems | Recommendations |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| a) Ministry / Agency: | - | - | - |
| b) IMED : | - | - | - |
| c) Others: | - | - | - |

**0.2. Auditing during and after Implementation:**

**2.1. Internal Audit:** Not conducted yet.

| Period of Audit | Date of submission of Audit Report | Major findings/ objections | Whether objections resolved or not. |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | | | |
| | | | |

**2.2. External Audit:** Not conducted yet.

| Audit period | Date of submission of Audit Report | Major findings/ objections | Whether objections resolved or not. |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | | | |
| | | | |

## G. DESCRIPTIVE REPORT

### 1. General Observations/Remarks of the Project on:

### 1.1 Background

Government of Bangladesh (GoB) has set a number of goals that both help to define a vision for and have an impact on the strategies related to major surface water irrigation schemes, these include:

(i) ensure sustained agricultural growth,
(ii) increase rural incomes,
(iii) improve food security,
(iv) expand irrigation and
(v) efficient and balanced utilization of land and water resources.

In this view, execution of FCDI projects will assist the country in achieving food security and reduction of poverty, which is one of the priorities of the government.

In the past, Bangladesh Water Development Board (BWDB) executed a number of FCDI projects. At present Government of Bangladesh (GoB) is taking into account in expanding the surface water management system to boost up agricultural production. As per instructions from Ministry of Water Resources (MoWR), BWDB has taken up initiatives to update the feasibility study of (i) Teesta Irrigation Project Phase II including undeveloped 20000 ha of Phase-I (TIP Phase-II), (ii) Kurigram Irrigation Project North Unit (KIPNU) and (iii) Kurigram Irrigation Project South Unit (KIPSU) before implementation. Feasibility studies of these projects were conducted about several years back.

Kurigram Irrigation Project North Unit covers major part of Phulbari Upazila and minor parts of Bhurungamari, Nageswari and Kurigram Sadar Upazila. The gross area of the project is about 42,800 hectares with a net cultivable area 23,869 hectare. The Dudkumar, the Brahmaputra and the Dharla are the three main perennial rivers that surround the project area and general hydrological characteristics of the area are influenced by them. The Dudkumar is a tributary of the Brahmaputra. Although the North Unit is protected from flood by embankment, frequent embankment failure and severe bank erosion of Dudhkumar and Dharla rivers which are adjacent to the north unit causes hardship to the people of the area.

Kurigram Irrigation Project South Unit covers the southwestern part of the Kurigram district comprising Kurigram Sadar, Ulipur, Razarhat & Chilmari Upazilas and part of Lalmonirhat Sadar Upazila of Lalmonirhat district. Very small area of the project belongs to Gaibandha district. The area is bounded by the international borderline with India in the north, the railway line leading to Lalmonirhat from Kaunia in the west, the Teesta River in the southwest and the Dharla & Brahmaputra rivers in the north & east. Gross area of the project bounded by the existing flood embankments is 59,400 ha and the net cultivable area is about 32,124 ha. Groundwater is being used for irrigation in both north unit and south unit of Kurigram Irrigation Project which is financial burden for rural poor people. Although, surface water irrigation is low-cost and increase the fertility of the soil, available surface water has remained unutilized in the project areas. Conjunctive use of surface water and groundwater irrigation may be justified.

A mathematical modelling study was conducted in 2005 for updating feasibility study of Kurigram Irrigation Project (North Unit and South Unit). That study provided necessary hydrological information and parameters in updating the completed feasibility study of the Kurigram Irrigation Project North Unit (KIP, NU) and Kurigram Irrigation Project South Unit (KIP, SU) using existing regional models duly updated and validated for the year 2002-03. Later on, a dedicated report on topographic survey and mapping was submitted in December, 2007. Afterwards detail irrigation planning was done in 2009 using mathematical modelling technique for both North unit and South unit of Kurigram Irrigation Project.

More than eleven years have passed since the last study. A lot of changes have taken place such as changes in physical setting and hydrological features, changes in morphological conditions, changes in socio-economic pattern, changes in land use and cropping pattern etc. which needs to be revaluated with the updated data. A baseline survey is necessary to get the

firsthand information about the socioeconomic conditions of the water users in order to devise a basis for planning, as well as defining directions and strategies. Also, in the Delta Plan 2100, a project titled *"Kurigram Irrigation Project"* has been kept in provision for the improvement of livelihood by providing food sufficiency through developed irrigation facilities for the poor people of the project area.

It is therefore felt essential to upgrade and update the earlier feasibility study using the recent hydrological data and considering the climate change condition in order to fulfil the need based requirements for the study area including total morphological demand of Dharla and Dudhkumar river.

## 1.2 Justification/Adequacy

***Linkage with Bangladesh Delta Plan (BDP), 2100***

Bangladesh Delta Plan 2100 has six goals among which the following goals are directly relevant with this study:

**Goal 2: Enhance Water Security and Efficiency of Water Usages**

This goal relates to water resources management especially during the dry season as well as water shortage during dry spells. The goal aims to ensure reliable and adequate provision of freshwater to support equitable and sustainable economic development, environmental sustainability and livelihood security. This includes: i) sufficient and timely provision of safe surface and groundwater for drinking, agriculture, fisheries, environment, navigation, industry etc.; and ii) controlling pollution, ensuring water quality and providing sanitation at acceptable levels in relation to defined standards as well as environmental, health, agricultural and industrial needs. Under this study, the water resources will be estimated and the quality of water will also be determined which is under linked with this goal.

**Goal 6: Achieve Optimal and Integrated Use of Land and Water Resources**

The primary quest of this goal is to ensure efficient integration and proper interaction between land and water use aspects. Establishment of connectivity of water courses and inducing integration between different modes of resources interactions are emphasized under this goal which will be supplemented under this study.

In the **Delta Plan 2100**, a project titled *"Kurigram Irrigation Project"* has been kept in provision for the improvement of livelihood by providing food sufficiency through developed irrigation facilities for the poor people of the project area.

***Linkage with Sustainable Development Goals (SDGs):***

The following SDG Goals are related to the proposed study:

- **Goal-2** indicates **"Zero Hunger"**. The target 2.1 of this goal marks "By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round".

The target 2.3 of this goal marks "By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment".

The target 2.4 of this goal marks "By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality".

***National Water Policy (NWPo):***

The Government of Bangladesh has approved **National Water Policy** in 1999 with the intention of guiding both public and private actions in the water sector for ensuring optimal development and management of water that benefits both individual and the society at large. The Policy aims to ensure progress towards fulfilling national goals of economic development, poverty alleviation, food security, public health and safety, decent standard of living for the people and protection of the natural environment.

In the **Section 4.7: Water and Agriculture** of National Water Policy states that *support of private development of groundwater irrigation for promoting agricultural growth will continue, alongside surface water development where feasible.*

But there will be a renewed focus towards increasing efficiency of water use in irrigation through various measures including drainage-water recycling, rotational irrigation, adoption of water conserving crop technology where feasible, and conjunctive use of groundwater and surface water.

*The proposed project is relevant with the policy of the Government as below:*

*a. Encourage and promote continued development of minor irrigation, where feasible, without affecting drinking water supplies*

*c. Improve efficiency of resource utilization through conjunctive use of all forms of surface water and groundwater for irrigation and urban water supply.*

***Seventh Five Year Plan (7th FYP)***

The objectives of the ***7th FYP*** have been formulated to materialize the vision of 2021 along with other international, regional and national priorities. According to this plan, all water sector programs/projects are pro-poor initiatives, be it an irrigation project or a river management project. The proposed projects are linked with the 7th FYP as follows:

- People's participation in conformity with IWRM principals.
- Conjunctive use of surface and groundwater for sustainable irrigation.
- Food security by achieving food grains self-sufficiency through ensuring year-round sustainable irrigation.
- Water conservation for irrigation and other uses.

- Climate change adoption and mitigation.
- Environmental protection.
- Studies and research on future water resources management.

### 1.3 Objectives

The objectives for this study are as follows:

- To update the earlier feasibility study as per the changed hydrological features, morphological conditions and socio – economic situation to alleviate poverty and enhance livelihood condition of the poor people by boosting up agricultural production through surface water-based irrigation facilities.
- Aiming of river bank protection, flood control, drainage and irrigation water resources management for Dharla and Dudhkumar River basin area.
- To investigate the feasible option for irrigation practices using pumping technology rather than barrage as proposed earlier in Dharla river under this study.

### 1.4 Project revision with reasons: Not Applicable

## 2. Rationale of the project in respect of Concept, Design, Location and Timing.

The North Unit of Kurigram Irrigation Projecct is protected from flood by embankment. But frequent embankment failure and severe bank erosion of Dudhkumar and Dharla rivers which are adjacent to the north unit causes hardship to the people of the area. Groundwater is being used for irrigation in the project area which is financial burden for rural poor people. Although, surface water irrigation is low-cost and increase the fertility of the soil, available surface water has remained unutilized in the North and South unit. Conjunctive use of surface water and groundwater irrigation may be justified. Drainage congestion is another problem in both the unit.

The feasibility study was conducted several years ago. Meanwhile landuse and cropping pattern changes took place in the study area. As well as several infrastructures along with embankment has been constructed in the project area. Internal khals/drainage channels have become badly silted up and lost serviceability up to the mark. So, updated cross-section survey is necessary to get the clear representation of the drainage system of the project area. The hydrological and morphological condition of the study area has also changed during this period. In the previous study climate changes option has not been considered. A baseline survey is necessary to get the firsthand information about the socio-economic conditions of the water users in order to devise a basis for planning, as well as defining directions and strategies.

It is therefore felt essential to upgrade and update the earlier feasibility studies using the recent hydrological data and considering the climate change condition in order to fulfil the requirements for appropriate representation of the present situation of the projects.

**3. Brief description on planning and financing of the project and its applicability.**

- **Project Identification**

In Kurigram Irrigation Project, the gross area of the project in north unit is about 42,800 hectares with a net cultivable area 23,869 hectare whereas in south unit gross area of the project bounded by the existing flood embankments is 59,400 ha with a net cultivable area 32,124 ha. Groundwater is being used for irrigation in both north and south unit which is financial burden for rural poor people. Although, surface water irrigation is low-cost and increase the fertility of the soil, available surface water has remained unutilized in the project areas. So, conjunctive use of surface water and groundwater irrigation may be justified.

More than eleven years have passed since the last study. A lot of changes have taken place such as changes in physical setting and hydrological features, changes in morphological conditions, changes in socio-economic pattern, changes in land use and cropping pattern etc. which needs to be revaluated with the updated data. A baseline survey is necessary to get the firsthand information about the socioeconomic conditions of the water users in order to devise a basis for planning, as well as defining directions and strategies. Also, in the Delta Plan 2100, a project titled *"Kurigram Irrigation Project"* has been kept in provision for the improvement of livelihood by providing food sufficiency through developed irrigation facilities for the poor people of the project area.

In view of the above, It is felt essential to upgrade and update the earlier feasibility study using the recent hydrological data and considering the climate change condition.

- **Project Preparation**

In view of the above, BWDB prepared a PFS to execute the feasibility study project.

**Appraisal:** The DPEC meeting was held on 12/04/2021.

- **Credit Negotiation-N/A**
- **Credit Agreement-N/A**
- **Credit Effectiveness-N/A**
- **Loan Disbursement-N/A**
- **Loan Conditionalities-N/A**
- **Project Approval:** The project was approved by honorable state minister, MoWR on 01/06/2021.
- **Others (if any).**

**4. <u>Analysis of the Post-Implementation situation and result of the project</u>:** *Not Applicable for this study project.*

**4.1 Whether the beneficiaries of the project have clear knowledge about the Target/ Objectives of the project.**

**4.2 Programme for use of created-facilities of the project**

**4.3 O & M programme of the project.**

**4.4 Impact of the project -**

**4.4.1 Direct**

**4.4.2 Indirect**

4.5 **Transfer of Technology and Institutional Building through the project**

4.6 **Employment generation through the project.**

4.7 **Possibility of Self employment**

4.8 **Possibility of women-employment opportunity**

4.9 **Women's participation in development**

4.10 **Probable Impact on Socio-Economic activity.**

4.11 **Impact on environment**

4.12 **Sustainability of the project**

4.13 **Contribution to poverty alleviation/reduction**

4.14 **Opinion of the public representatives, local elite, local administration, teachers, religious leaders, women's representatives etc.**

4.15 **Contribution of Micro-credit programmes and Comments on overlapping with any NGO activities.**

5. ***Problems encountered during Implementation (with duration & steps taken to remove those)***

| | | | |
|---|---|---|---|
| 5.1 | **Project Management** | 5.12 | **Project aid disbursement and re-imbursment** |
| 5.2 | **Project Director** | | |
| 5.3 | **Land Acquisition** | 5.13 | **Mission of the development partners.** |
| 5.4 | **Procurement** | 5.14 | **Time & Cost Over-run** |
| 5.5 | **Consultancy** | 5.15 | **Project Supervision/Inspection** |
| 5.6 | **Contractor** | 5.16 | **Delay in Decision** |
| 5.7 | **Manpower** | 5.17 | **Transport** |
| 5.8 | **law & Order** | 5.18 | **Training** |
| 5.9 | **Natural clamity** | 5.19 | **Approval** |
| 5.10 | **Project financing, allocation and release.** | 5.20 | **Others.** |
| 5.11 | **Design formulation/approval** | | |

**This is a consultancy service procurement project. No such problems were occurred.**

## 6. Remarks & Recommendations of the Project Director:

The study was approved by the Ministry of Water Resources (MoWR) vide memo number :42.00.0000.041.14.041.20-311, dated 01 June 2021. The project was accomplished on 30 June 2022 which is within the approved project period.

The objective of the feasibility study is to update the earlier feasibility study as per the changed hydrological features, morphological conditions and socio – economic situation to alleviate poverty and enhance livelihood condition of the poor people by boosting up agricultural production through surface water-based irrigation facilities. The study also aims to riverbank protection, flood control, drainage and irrigation water resources management for the Dharla and Dudhkumar River basin area. The feasible option for irrigation practices using pumping technology rather than barrage as proposed earlier in Dharla river have to be investigated under this study.

The study has been framed to attain its objectives through two components: Component-1 and Component-2. Under Component-1, deatailed hydromorphological analysis of the concerned area was done through mathematical modeling. Based on the outputs of the mathematical modeling, project interventions have been proposed. Under Component-2 of the project, detailed environmental and social impact assessment (ESIA) has been completed to analysis the impact of the project interventions on the environment and the society of the project area.

The study proposed 9.70 km and 9.10 bank protection work respectively for the left bank and right of Dudhkumar river. For the Dharla river, the study proposed 17.30 km and 16.85 km bank protection work respectively along the right bank and left bank. The study is proposed to construct one pumping station at Shiberkuti which is U/S of previously proposed barrage location to cover more irrigation area with a design discharge of 48.76 $m^3/s$ for Kurigram Irrigation Project South Unit (KIPSU). In Kurigram Irrigation Project North Unit (KIPNU), two pumping stations have been proposed among which one is for irrigation at Pateswari and another one is at Tangonmari for drainage. The capacity of irrigation pump is 36.52 $m^3/s$ whereas the capacity for drainage pump is 7.60 $m^3/s$. In the previous study a barrage on Dharla river was proposed to divert flow in South Kurigram. However, in this study barrage has been discarded due to higher costing, policy and transboundary issues. As suggested in the earlier feasibility report, two independent irrigation systems have been checked and modified for KIPNU and KIPSU system. The total length of all irrigation canals under the KIPNU is 289.3 km; out of which 45.41 km is main canal, 116.0 km is secondary canals and 127.9 km is tertiary canal. The KIPSU comprised of 351.9 km irrigation canals, of which 40.2 km is main canal and 116.3 km is secondary canals and 195.4 km is tertiary canal. It is anticipated that if the project is implemented as planned and suggested in this report, the requirement of post project CAD activities would be minimum and a net area of about 23,869 ha and 32,124 ha land could be brought under surface water irrigation for KIPNU and KIPSU respectively. This would result huge crop production to achieve food security of local people as well as of the nation. As a whole socio-economic condition of the local people would be greatly enhanced. It is also anticipated that the project will also generate a significant number of employment opportunities during implementation and post project condition. Furthermore production cost of agriculture commodities would be much lower compared to the present production cost mainly because of low cost of surface water irrigation.

Total investment cost of the project at financial price and economic prices are estimated as BDT 147924.63 lakh and BDT 152394.92 lakh respectively for both the north unit and south

unit. For north unit, the EIRR and FIRR has been calculated 12.84% and 9.93% respectively. For south unit, EIRR and FIRR has been calculated 16.16% and 12.79% respectively.

All the objetives have been achieved though accomplishment of design of proposed interventions, cost estimate and ESIA. It is anticipated that the project output would help in DPP preparation and implementation of the subsequent investment project.

**Date : .....** **Signature and seal of the Project Director**

9/22/22
বিদ্যুৎ কুমার সাহা
প্রকল্প পরিচালক
ও
তত্ত্বাবধায়ক প্রকৌশলী (পুর)
পরিকল্পনা-২ পরিদপ্তর
বাপাউবো, ঢাকা।

**7. Remarks/Comments of Agency Head**

The mission of BWDB is flood control under strategic planning, development of drainage and irrigation systems, prevention of river erosion, mitigation of salinity, land reclamation and management of food security, alleviation of poverty and management of water related disasters by addressing the adverse effects of climate change in line with integrated coastal management; increasing public engagement through active participation in integrated water resource management. The study is very much relevant with the mission of BWDB. It is expected that implementation of project based on the study outcomes would contribute in agricultural growth of the north western region of the country.

**Date : .....**

27.11.2022
(FAZLUR RASHID)
Director General
BWDB, Dhaka.
**Signature and Seal**

**8. Remarks/Comments of the officer in- charge of the Ministry/Division**

In Delta Plan-2100, a project titled "Kurigram Irrigation Project " has been kept in provision for the improvement of livelihood by providing food sufficiency through developed irrigation facilities for the poor people of the project area. A feasibility study which was conducted more than 11 years ago is updated with this study as the hydrological and morphological condition of the study area has changed during this period. The study focused on riverbank protection, flood control, drainage and irrigation water resources management for the Dharla and Dhudhkumar River basin area. The main study area is Kurigram District (Phulbari, Bhurungumari, Nageswari, Ulipur, Razarhat, Chilmari and Kurigram Sadar Upazila), part of

Lalmonirhat Sadar Upazila, Lalmonirhat District and a very small part of Gaibandha District. The Dudhkumar, Brahmaputra and the Dharla are the three main perennial rivers that surround the project area. Projects will be taken soon to address the recommendation of the PFS of river bank protection, construction of pumping stations, use of surface water etc.

**Date :**

**Signature and Seal**

Government of the People's Republic of Bangladesh
Ministry of Water Resources
Bangladesh Water Development Board

মূল্য তাহবীল নং- ২৭৪৮
তারিখ : ৩০/০৬/২০২২

Approved
30/06/2022
(FAZLUR RASHID)
Director General
BWDB, Dhaka.

# Final Report
# on
# Updating Feasibility Study for Kurigram Irrigation Project (North and South Unit)-Component-1

## Volume I: Main Report

Institute of Water Modelling

# EXECUTIVE SUMMARY

## E1. Introduction

Government of Bangladesh (GoB) is taking into account in expanding the surface water-based irrigation system to boost up agricultural production. At present groundwater is being used for irrigation in both north unit and south unit of Kurigram Irrigation Project, which is a financial burden for rural poor people. Although, surface water irrigation is of low-cost and increases the fertility of the soil, available surface water has remained unutilized in the project areas. A detail irrigation planning was made in 2009 using the mathematical modelling technique for both north unit and south unit of Kurigram Irrigation Project. More than eleven years have passed since the last study for this project. A lot of changes have taken place such as, changes in physical setting and hydrological features, changes in morphological conditions, changes in socio-economic pattern, changes in land use and cropping pattern etc., which needs to be reevaluated with the updated data. It is therefore felt essential to upgrade and update the earlier feasibility study using the recent hydrological data and considering the climate change condition in order to fulfil the need-based requirements for the study area including total morphological study of Dharla and Dudhkumar river.

## E2. Project Area

Kurigram Irrigation Project (North Unit) covers major parts of Phulbari Upazila and parts of Bhurungamari, Nageswari and Kurigram Sadar Upazila. The study area of the project is about 42,800 ha with a net cultivated area of 23,869 ha. The Dudhkumar, the Brahmaputra and the Dharla are the three main perennial rivers that surround the project area and general hydrological characteristics of the area are influenced by them. The Dudhkumar is a tributary of the Brahmaputra. The north unit is protected from flood by embankment. The frequent embankment failure and severe bank erosion of Dudhkumar and Dharla rivers causes hardship to the people.

Kurigram Irrigation Project (South Unit) covers the southwestern part of the Kurigram district comprising Kurigram Sadar, Ulipur, Razarhat and Chilmari Upazila and part of Lalmonirhat Sadar Upazila of Lalmonirhat district. Very small area of the project belongs to Gaibandha district. The area is bounded by the international borderline with India in the north, the railway line leading to Lalmonirhat from Kaunia in the west, the Teesta River in the southwest and the Dharla & Brahmaputra rivers in the north & east. Study area of the project bounded by the existing flood embankments is 59,400 ha and the net cultivated area is about 32,124 ha.

## E3. Objectives of the Study

The objective of the project is to update the earlier feasibility study as per the changed hydrological features, morphological conditions and socio - economic situation to alleviate

poverty and enhance livelihood condition of the poor people by boosting up agricultural production through surface water-based irrigation facilities.

### E4. Scope of Works

The activities that have been undertaken to achieve the stated objectives can broadly be categorized under the following major groups:

- Identification of present situation of the existing irrigation and drainage system.
- Data collection, quality checking and processing.
- Development, calibration and validation of Hydrological Model, Hydrodynamic Model, Basin Model, 2D - Hydro-morphological model and 3D-Groundwater flow model and its application.
- Detail design and cost estimates of proposed interventions.
- Assessment of benefit-cost ratio.
- Development of Kurigram Irrigation Information System (KIIS).

### E4. Data collection

Available hydro-meteorological data has been collected from secondary sources. Primary data such as water level, discharge, cross – sections of rivers, sedimentation concentration and bed material samples has been collected under this study to fill up the data gaps as well as for the model development. The discharge varies from 66.3 to 2520 $m^3/s$ for Dharla River and 55.7 to 2242 $m^3/s$ for Dudhkumar River for the duration of August 2021 to February 2022. The sediment concentration of Dudhkumar River varies from 7 to 1416 mg/l with an average value of 226 mg/l and for Dharla river it varies from 12 to 2561 mg/l with an average value of 233 mg/l for the duration of August 2021 to February 2022.

### E5. Water Requirements

Irrigation water requirement for project area has been computed for future cropping pattern as suggested in another component of the study conducted by CEGIS. Considering the various losses such as conveyance loss, field application loss, absorption loss etc. the estimated irrigation duty is found to be 726 ha/m3 and 749 ha/m3 for KIPNU and KIPSU respectively. The peak diversion requirement is computed to be 36.52m3/sec and 48.76m3/sec for KIPNU and KIPSU respectively.

### E6. Selection of Pump House Locations

In the previous study a barrage on Dharla river near Sinai Union, few kilometres upstream of Kurigram town was proposed. Present study it has been decided to construct a pump house instead of Barrage on Dharla river. Considering the present field condition, morphological change in the river as well as available flow in the river and increase the irrigable area, the pump location has been selected at Shiberkuthi. To select the pump location at Siberkuthi for Dharla river priority is given to cover maximum area for irrigation. Besides, river morphology, planform changes, historical satellite images, bank-

lines shifting, surveyed data, suggestions from BWDB official and IWM study team has also taken into consideration. The proposed pump location also avoids the conflict of transboundary issues with the neighboring country. In the previous study, the Tangonmari pump has been proposed as for dual purposes such as drainage and irrigation but under this study only the pump at Tangonmari has been proposed for drainage only.

**E7. Water Availability**

- Assessment of surface water availability for various return periods has been made by frequency analysis based on 10-day average low flows of 30 years through application of mathematical model. From the analysis it is found that the dry period low flow at Pateswari is found to be 75.6$m^3$/s, 55.7$m^3$/s and 39.5$m^3$/s for 2yr, 5yr and 10yr return period respectively. Model simulation reveals that flow at Shiberkuthi location is found to be 93.3$m^3$/s, 66.3$m^3$/s, and 48.4$m^3$/s for 2yr, 5yr and 10yr return period respectively.
- From the comparison of total demand for the Pateswari and Shiberkuthi system with availability it can be concluded that sufficient water is available to meet the irrigation requirement after leaving 30% flow for in-stream requirement and environmental flow.

**E8. Irrigation Layout Plan**

- As suggested in the earlier Feasibility Report two independent irrigation systems have been checked and modified for KIPNU and KIPSU system. The total length of all irrigation canals under the KIPNU is 289.3 km; out of which 45.40 km is main canal, 116.0 km is secondary canals and 127.9 km is tertiary canal. There are three main canals under the Pateswari system; Pateswari Main Canal (PMC), Nageswari Main Canal (NMC) and Phulbari Main Canal (FMC). The KIPSU comprised of 351.9 km irrigation canals, of which 40.2 km is main canal and 116.3 km is secondary canals and 195.4 km is tertiary canal.

- From the command area delineation for KIPNU, it is found that a study area of around 42,800 ha having net cultivable area of about 23,879 ha could be brought under surface water irrigation. For KIPSU, it is found to be around 59,400 ha having net cultivable area of about 32,124 ha. Rest of the area has been excluded from surface water irrigation coverage either due to higher elevation or non-feasibility of providing irrigation canals due to presence of physical barriers such as roads, railways, water bodies etc.; the left-out area could be irrigated by groundwater.

**E9. Mathematical Model Development**

The study is carried out by using the technique of mathematical modeling for integrated assessment of the river basin. The project models have been developed by physically based basin, hydrologic and hydrodynamic, morphological and groundwater modelling system

like MIKE BASIN, MIKE 11, MIKE 21 and MIKE SHE to simulate the main hydrologic and hydraulic processes; runoff from rainfall, flow, velocity, water levels in river/irrigation canal, river bank erosion, sediment transport and groundwater flow system.

Analyzing the model simulated morphological results, historical satellite images, surveyed bank-line during 2021 and others relevant information, it has found that both the Dharla and Dudhkumar river naturally very dynamic and flashy river. The morphological changes like bank erosion, river bed degradation, siltation, formation of char lands and frequent tendency to create loop cut is very common phenomenon for both of river.

**E10. Proposed Interventions**

Salient features of the proposed irrigation plan for KIPNU are given below.

| | |
|---|---|
| Study area | : 42,800 ha |
| Irrigable area by SW (Total) | : 21,075 ha |
| Major crops | : Rice (HYV Boro, Aus, HYV Aman, LT Aman), Wheat, Potato, Jute, Mustard, Vegetable etc. |
| Source of surface water | : Dudhkumar river |
| Flow availability (80% dependable) | : 75.6 $m^3/s$ at Pateswari |
| Proposed mode of water diversion | : Pump House at Pateswari |
| Peak diversion requirement | : 36.52 $m^3/s$ (Pateswari) |
| Main canal | : 45.4 km (Pateswari) |
| Secondary canal | : 116.0 km (Pateswari) |
| Tertiary canal | : 127.9 km (Pateswari system) |
| Cross-Regulator /Check Structures | : 31 nos (7 on Main, 15 on Secondary & 9 on Tertiary canals) |
| Off-take Regulator | : 68 nos, (13-on secondary and 55- on tertiary canals) |
| Number of Turnouts | : 492 nos |
| Escape | : 4 nos Major Canals |
| Bridges | : 16 nos |
| Foot Bridges/culverts (small size) | : 347 nos |

Salient features of the proposed irrigation plan for KIPSU are as follows:

| | |
|---|---|
| Study area | : 59,000 ha |
| Net Cultivable area by SW (Total) | : 32,124 ha |
| Major crops | : Rice (HYV Boro, HYV Aus, HYV Aman, LT Aman), Wheat, Potato, Jute, Mustard, Vegetable etc. |
| Source of surface water | : Dharla river |

| | |
|---|---|
| Proposed mode of water diversion | : Pump on Dharla river at Shiberkuthi, 7 km d/s of Indian boarder |
| Peak diversion requirement | : 48.76 $m^3/s$ |
| Flow availability at pump location | : 93.3 $m^3/s$ (minimum) with 80% dependability during rabi / boro season |
| Main canal | : 40.17 km (1 no) |
| Secondary canal | : 116.30 km (19 nos) |
| Tertiary canal | : 195.45 km (77 nos) |
| Cross-Regulator / Check Structures | : 67 nos (7 on Main, 20 on Secondary and 40 on Tertiary Canals) |
| Off-take Regulator | : 97 nos. (19 nos. on Secondary and 77 nos. on Tertiary Canals) |
| Number of Turnouts | : 550 nos |
| Escape | : 5 nos (3 nos on Main Canal and 2 nos on secondary canal) |
| Bridges | : 18 nos |
| Foot Bridges/culverts (small size) | : 270 nos |

## E11. River bank Protection Work of Dharla and Dudhkumar River

It has been found that the bank line shifting and bank erosion of Dharla river is very significant. At the proposed pump location of Siberkuthi on right bank within 1km reach (upstream and downstream) more than 125m of bank erosion has been found during high flood and average flood event simulation. Considering the planform characteristics of Dharla, at the proposed pump location both banks should be protected through RTW works to make the channel stable and guide the flow near the intake point. The erosion prone and vulnerable locations along the Dharla river on both banks have been identified through historical satellite images, surveyed bank-line and model study analysis.

For both the proposed pump house at Siberkuthi for Dharla and at Pateswari for Dudhkumar river, river training works such as bank protection should be provided. About 17.30 Km on right bank and 16.85 Km on left bank protection works has been recommended to minimize bank erosion for Dharla river, making stable bank and confining flow for certain reach of river to maintain water availability at the proposed pump house. Also, about 9.10 Km on right bank and 9.70 Km on left bank protection works has been recommended to minimize bank erosion for Dudhkumar river. In total 34.15 km. bank protection work has been proposed for Dharla river whereas 18.8 km. bank protection work is proposed for Dudhkumar river.

## E12. Impact on Groundwater

The upazila wise recharge varies from 436mm to 886mm. The maximum recharge occurs in Nageswari upazila whereas the minimum recharge occurs in Kurigram sadar upazila. The recharge is mainly depends on rainfall and irrigation return flow. The study reveals that upazila wise recharge varies from 436 mm to 885 mm and average irrigation return flow in dry period varies from 21% to 27%. Average minimum return flow 15% found in the month of January and average maximum return flow 30% found in the month of February. It reveals from the study that, groundwater level will rise by about 2.5 m to 3.0 m compared to the existing groundwater level if irrigation is provided by surface water.

## E13.Cost Estimate and Economic Analysis

The cost for the proposed interventions with pump houses, irrigation canal and allied structures and construction of embankment has been estimated as BDT 159758.60 lakh for North Unit and BDT 164586.50 lakh for South Unit. The salient feature of project implementation plan along with the cost has been presented in the following tables:

**Project Summary Financial Investment Cost (North Unit) Lakh taka**

| Economic Code | Economic Sub-code wise Item Description | Unit | Quantity | Total Cost* |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| **(a) Revenue Component** | | | | |
| | Project Implementation Support Cost | Item | 1 | 915.61 |
| | Detailed deign, Supervision and Monitoring Consultant | Item | 1 | 2000.00 |
| | Sub-total Revenue Component of (a) = | | | **2915.61** |
| **(b) Capital Component** | | | | |
| | Construction of Pateswari Pump house | Item | 1 | 10761.30 |
| | Construction of Transmission Line | Item | 1 | 5700.00 |
| | Construction of Approach Road | Item | 1 | 4452.45 |
| | Construction of Tangonmari Pump House | Item | 1 | 3374.38 |
| | Construction of Division Office Building | no | 1 | 190.00 |
| | Construction of Sub Station | no | 2 | 3020.62 |

| Economic Code | Economic Sub-code wise Item Description | Unit | Quantity | Total Cost* |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| | Construction of Road Bridge | Item | 1 | 1784.62 |
| | Construction of embankment | Item | 1 | 51516.00 |
| | Construction of Main Canal | Item | 8 | 12424.02 |
| | Construction of Road Bridge | Item | 5 | 3457.50 |
| | Construction of Syphon | Item | 10 | 4682.24 |
| | Construction of Secondary and Tertiary Canal | Item | 5 | 7893.74 |
| | Construction of Regulator | Item | 10 | 14606.36 |
| | Construction of Foot Over Bridge | Item | 7 | 1752.16 |
| | Construction of Escape | Item | 1 | 598.86 |
| | Construction of Turnouts | Item | 5 | 933.80 |
| | Land Acquisition | Item | 1 | 16767.98 |
| | 4WD Jeep | no | 2 | 180.00 |
| | Motor cycle | no | 2 | 3.00 |
| | Speed boats | no | 1 | 10.00 |
| | Environmental and Social Management Plan | Item | 1 | 144.00 |
| | Environmental and Social Monitoring Plan | Item | 1 | 56.00 |
| | O &M during construction | Item | 1 | 700.00 |
| **Sub-total Capital Component of (b)** | | | | **145009.02** |
| **Sub-total (a+b)** | | | | **147924.63** |

**Project Summary Financial Investment Cost (South Unit) Lakh taka**

| Economic Code | Economic Sub-code wise Item Description | Unit | Quantity | Total Cost* |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| **(a) Revenue Component** | | | | |
| | Project Implementation Support Cost | Item | 1 | 915.61 |
| | Detailed deign, Supervision and Monitoring Consultant | Item | 1 | 2000.00 |
| **Sub-total Revenue Component of (a)** | | | | **2915.61** |
| **(b) Capital Component** | | | | |
| | Cost of Shiber Kuti Pump House | Item | 1 | 11837.43 |
| | Cost of Irrigation Canals | Item | 1 | 39550.00 |
| | Construction of Drainage Regulator | Item | 1 | 3373.44 |
| | Construction of Drainage Syphon | Item | 1 | 3187.50 |
| | Construction of Flood Control Activities | Item | 1 | 25939.86 |
| | Construction of Road Bridge on Irrigation System | no | 1 | 1929.30 |
| | Construction of Foot Bridge on Irrigation System | no | 2 | 369.70 |
| | Construction of Box Culvert on Irrigation System | Item | 1 | 2781.60 |
| | Construction of Turn-out on Irrigation System | Item | 1 | 375.17 |
| | Construction of Cross Regulator on Irrigation System | Item | 8 | 6044.78 |
| | Construction of Head/Offtake Regulator on irrigation System | Item | 5 | 7509.75 |
| | Construction of Escape of Irrigation System | Item | 10 | 560.00 |
| | Construction of Embankment | Item | 1 | 32724.00 |
| | Land Acquisition | Item | 1 | 12203.78 |
| | 4WD Jeep | no | 2 | 180.00 |
| | Motor cycle | no | 2 | 3.00 |
| | Speed boats | no | 1 | 10.00 |
| | Environmental and Social Management Plan | Item | 1 | 144.00 |
| | Environmental and Social Monitoring Plan | Item | 1 | 56.00 |

| Economic Code | Economic Sub-code wise Item Description | Unit | Quantity | Total Cost* |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| | O &M during construction | Item | 1 | 700.00 |
| **Sub-total Capital Component of (b)** | | | | **149479.31** |
| **Sub-total (a+b)** | | | | **152394.92** |

The Internal Rate of Return (IRR) has been calculated as 12.84% for economic whereas for financial it is 9.93% for North Unit. For south unit, the Internal Rate of Return (IRR) has been calculated as 19.31% and 15.54% for economic and financial respectively. In case of combined calculation for both the north unit and south unit, the Internal Rate of Return (IRR) has been calculated as 16.16% for economic whereas for financial it is 12.79%.

## RECOMMENDATIONS

- Irrigation networks have been updated considering the present field condition, morphological changed situation and demand of local stakeholders for both North and South Unit. It is recommended for implementation as per updated networks.

- Two independent separate canal layout systems were developed during the last study (2009) namely Pateswari Canal System and Tangonmari Canal System for North Unit. However, in the present study, entire irrigation system of North Unit could be irrigated by Pateswari pump house due to change of river morphology and field situation at the Tangonmari location. As such Irrigation pump at Pateswari and only drainage pump at Tangonmari have been suggested for implementation.

- It has been decided in consultation with BWDB, MoWR and local stakeholders to construct a pump house instead of Barrage on Dharla river at Shiberkuthi (U/S of Barrage location suggested by previous study) considering the present field condition, morphological change in the river and to increase the irrigable area. In view of above considerations, a pump house is recommended at Shiberkuthi for implementation.

- The provision of regular monitoring survey for river bathymetry (bed level) as well as intake canal have to be maintained. Therefore, regular maintenance dredging/excavation activity based on survey report of river bed level is recommended to ensure the water availability for pumping from the Dharla and Dudhkumar River. The length and design of dredge channel would be determined by field survey report.

- It is quite likely that during implementation there might have some change in canal alignment which may have knock on effect on the structure location and size. To address the changed situation, support of planning and modelling might be necessary.

- At the present situation the proposed loop cut considering technical as well as land acquisition and resettlement issue is not feasible. But during establishment of whole river, the opportunities of loop cut may be explored with the changed hydrological and social situation.

- The proposed embankment construction length for Dharla left bank is about 5.6km and for right bank is about 10.10km, whereas for Dudhkumar river it is recommended about 15.9km on right bank.

- During and after implementation, monitoring of suggested parameters is necessary to assess the performance of the system and device necessary remedial measures.

- The Kurigram Interactive Information System (KIIS) developed under the study should be properly used and should be updated time to time. Accordingly, the manpower should be trained.

- The analysis of the interventions and impact is that project is technically feasible, economically viable, socially acceptable and environmental-friendly.

স্মারক তারিখী নং:-২৭৪৮
তারিখ: ৩০/০৮/2022

Approved

30/08/2022

(FAZLUR RASHID
Director General
BWDB, Dhaka.

# Final Report

## on

## ESIA study for "Updating Feasibility Study for Kurigram Irrigation Project (North and South Unit)"-Component-2

# Executive Summary

Bangladesh is basically an agrarian country. The major input in this sector inter-alia is irrigation, which currently heavily depends on groundwater. But the resource is under threat of mining in many parts of the country. In this context, the Government of Bangladesh following the national water policy, has given thrust to maximize the use of surface water as well as conjunctive use of surface and groundwater, wherever possible. To that end, BWDB has taken initiative to use the water of Dharla and Dudhkumar rivers for irrigation in Kurigram Irrigation Project North Unit (KIPNU) and (iii) Kurigram Irrigation Project South Unit (KIPSU). Accordingly, BWDB has planned to update the previously conducted feasibility studies of those projects before implementation, as a lot of changes have taken place in terms of land use, population dynamics, river hydrology, morphology, etc. The feasibility studies of those projects were conducted several years back.

Kurigram Irrigation Project North Unit covers a major part of Phulbari Upazila and minor parts of Bhurungamari, Nageswari, and Kurigram Sadar Upazila. The gross area of the project is about 41,440 ha with a net cultivable area of 27,775 ha. Kurigram Irrigation Project South Unit covers the southwestern part of the Kurigram district comprising Kurigram Sadar, Ulipur, Razarhat & Chilmari Upazilas, and part of Lalmonirhat Sadar Upazila of Lalmonirhat district. The Gross area of the project is bounded by the existing flood embankments and the area is 58,300 ha and the net cultivated area is about 37,782 ha.

This project will help to eradicate extreme poverty and substantially increase water-use efficiency as well as water productivity envisaged in Bangladesh Delta Plan-2100. Moreover, the project will also help to increase the resilience of agricultural production systems as well as the diversification of agricultural output and livelihoods.

This study project is aimed to provide ways and means for yearlong surface water irrigation facilities to the farmers by the construction of pump houses, regulators, check structures, escapes, excavation of irrigation canals and drainage channels, etc.; and will sort out the drainage congestion problem in the low-lying areas by the construction of drainage channels and cross drainage structures. However, a reasonable quantum of natural flow will also be maintained in the Dharla and Dudhkumar rivers to meet the ecological requirement. Thus, this project will put significance by restoring agricultural production and Command Area Development. The Updating feasibility study team (IWM) suggested a number of interventions namely: Construction and Installation of irrigation Pump house at Pateawari on the Dudhkumar River in the North Unit and another Pump house at Shiberkuthi on the Dharla river in the South Unit, Construction and installation of a Drainage Pump house at Tangonmari in the North Unit, Construction of Irrigation Canal systems (North Unit Irrigation canal system- 289.30 Km, South Unit Irrigation system- 351.91 Km); Construction of Water Control Structures and other structures- 958 nos. in North Unit; 1007 nos. in South Unit, River Bank Protective works on both banks of Dharla and Dudhkumar rivers: Dharla River- 34.15 Km and Dudhkumar – 18.80 Km., Dredging of Intake channels for two Irrigation Pump Houses for a length of 500 m each with 70 m width, Dredging of Dharla river-54.60 Km and Dudhkumar river-39.60 Km and Rehabilitation and construction of embankment for North Unit is 96.20 Km and for South Unit is 114 Km.

The proposed project is consistent with significant national and international plans, policies, and programs (PPP). All of these PPPs were consulted throughout the feasibility study development. The PPP consultation found that the implementation of a pump house for irrigation supply to improve crop production, ecological enhancement, and lessen drainage congestion are the most important conclusions. Relevant Bangladesh Legislation i.e. Environment Conservation Rules- 1997, Bangladesh Water Act- 2013, The National Agriculture Policy (NAP) 2013, Irrigation Act, 1876 (Act No. III of 1876), Bangladesh Irrigation Water Rate Ordinance, 1983 (Ordinance No. XXXI of 1983). National Environment Management Action Plan 1995 and different relevant international legal obligations among the PPPs have also been consulted.