

**Basic Design Study Report**

on

**The Model Rural Development Project**

in

**The People's Republic of Bangladesh**

**September 1991**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

GRF

CR(3)

91-95



No.

# Basic Design Study Report

on

## The Model Rural Development Project

in

## The People's Republic of Bangladesh

JICA LIBRARY



1094111(0)

23021

September 1991

JAPAN INTERNATIONAL COOPERATION AGENCY

GRF

CR(3)

91-95

国際協力事業団

23021

マイクロ  
フィルム作成

## PREFACE

In response to a request from the Government of the People's Republic of Bangladesh, the Government of Japan decided to conduct a basic design study on the Model Rural Development Project and entrusted the study to the Japan International Cooperation Agency (JICA).

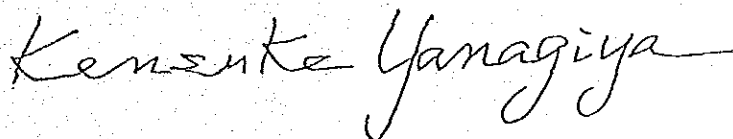
JICA sent to Bangladesh a study team headed by Mr. Masaru Sasaki, Senior Engineer, Bureau of Tokai Agricultural Administration, Ministry of Agriculture, Forestry and Fisheries, from November 17th, 1990 to February 28th, 1991.

The team held discussions with the officials concerned of the Government of Bangladesh, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Bangladesh in order to discuss a draft report, and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

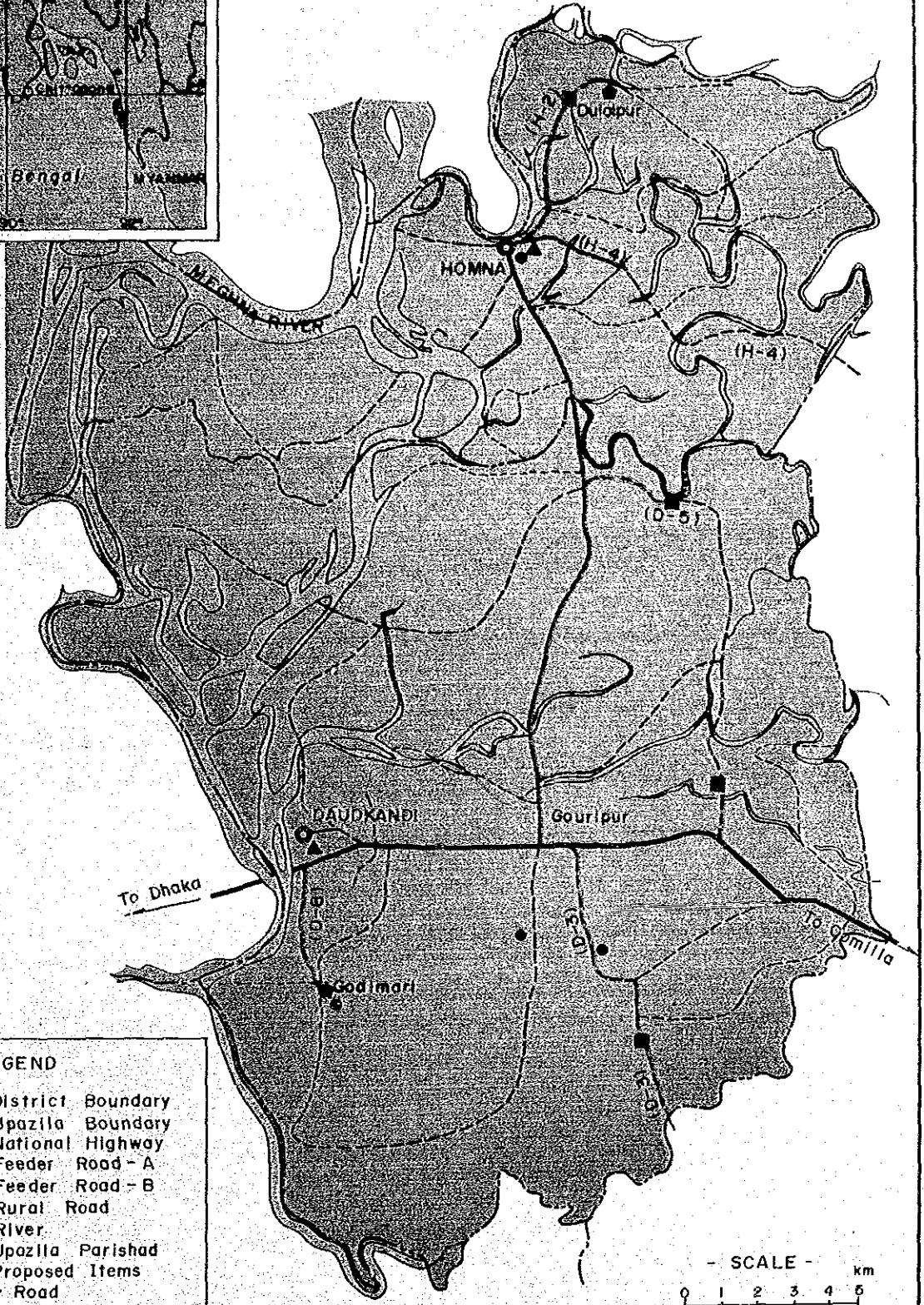
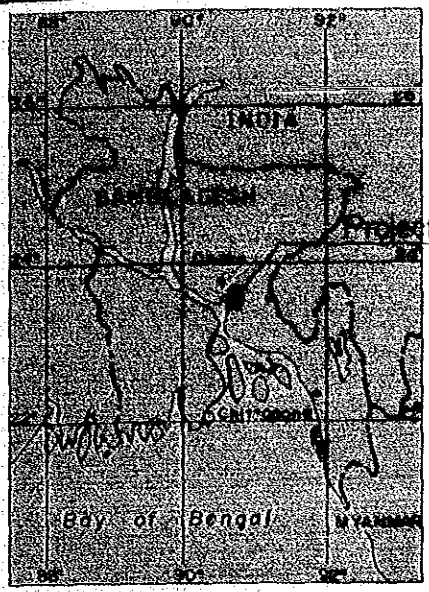
I wish to express my sincere appreciation to the officials concerned of the Government of the People's Republic of Bangladesh for their close cooperation extended to the teams.

September, 1991



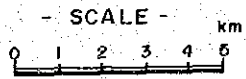
Kensuke Yanagiya  
President  
Japan International Cooperation Agency





**LEGEND**

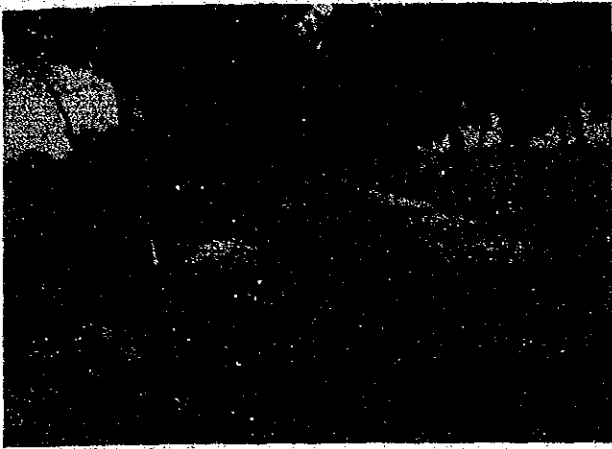
- District Boundary
- Upazila Boundary
- ===== National Highway
- ===== Feeder Road - A
- Feeder Road - B
- Rural Road
- ~~~~~ River
- Upazila Parishad
- Proposed Items
- Road
- Bridge
- Primary School
- ▲ UCCA Facilities
- ◆ Growth Center



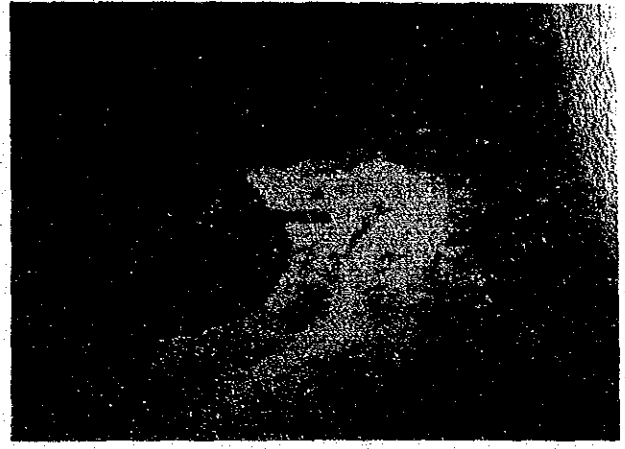
Location Map



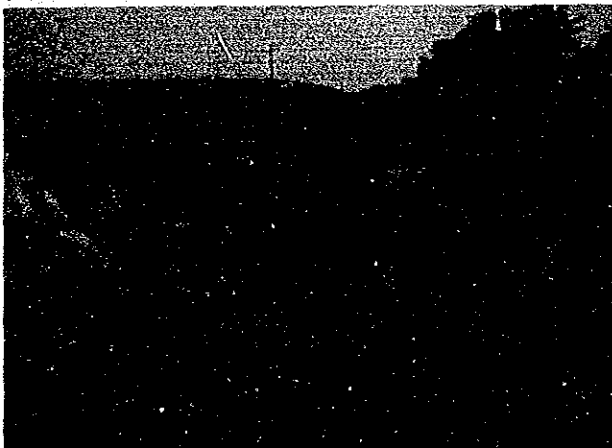




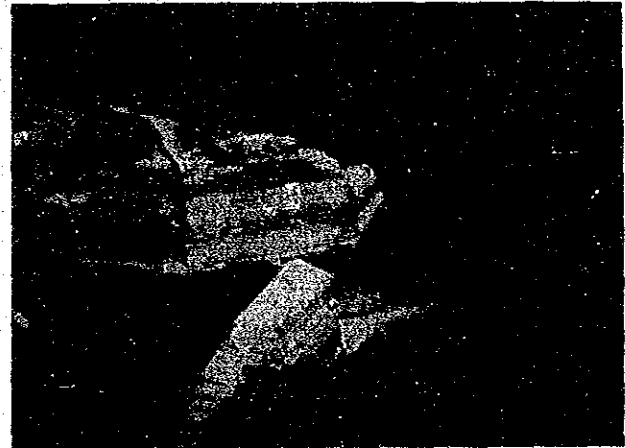
Feeder Road A with brick (HBB) pavement



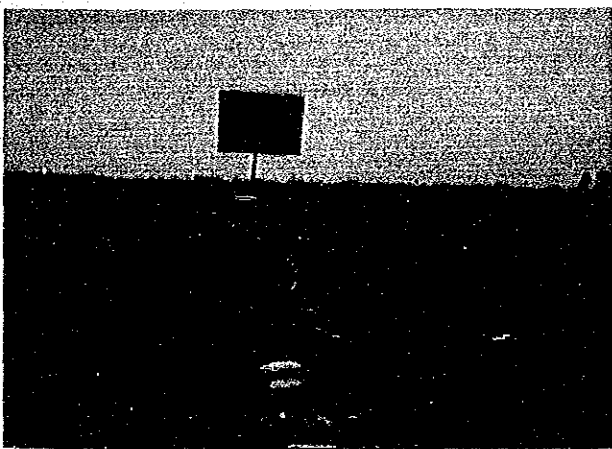
Feeder Road B eroded by water



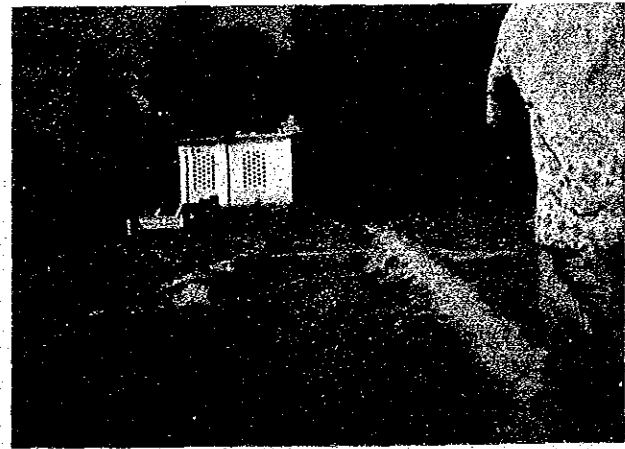
Wooden bridge (No. 1)



Collapsed bridge (No. 2)

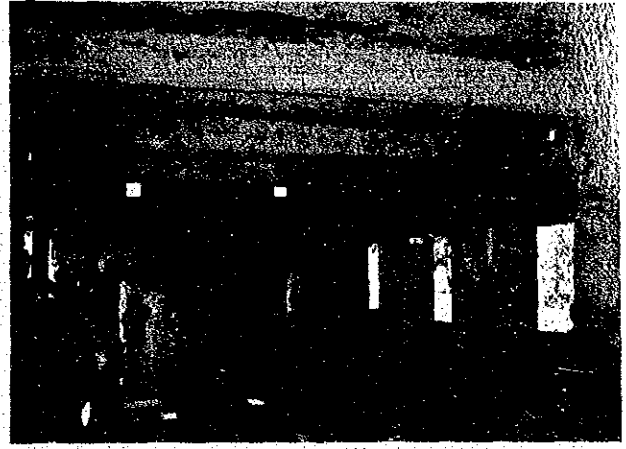
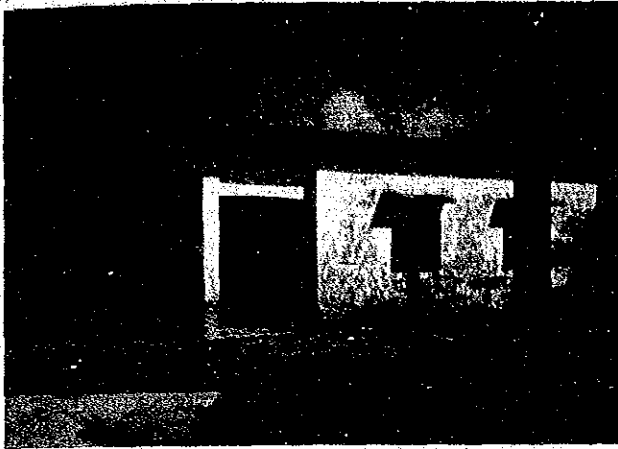


Irrigation canal



Pump station for buried pipeline





Primary school



Growth center



Training center



## SUMMARY

In July, 1990, in response to the request made by the Government of Bangladesh to the Government of Japan for grant aid on the Model Rural Development Project in the Daudkandi and Homna upazilas in the Comilla District, the Japan International Cooperation Agency (JICA) dispatched a preliminary study team, which confirmed the requested items. As a result, the Government of Japan decided to conduct a basic design study on a model rural development project for the Homna and Daudkandi upazilas. In accordance with this decision, JICA dispatched a basic design study team to Bangladesh from November 17th, 1990 to February 28th, 1991 (From December 8th, 1990 to January 18th, 1991, field work was suspended.) for field surveys, data collection and discussions with officials concerned in Bangladesh. Based on field work results, further studies were conducted in Japan. From July 1st to 12th in 1991 JICA dispatched a study team to Bangladesh for explanation and discussions on a draft report. Finally, this report has been compiled to present the project's background and the basic design for the project's facilities and equipment.

Bangladesh has 144,000 km<sup>2</sup> of land, of which most is composed of deltas formed by big international rivers. Approximately two thirds of the land area is submerged by floods every monsoon season. 112 million people inhabit this severe land with a high population density of 780 persons per km<sup>2</sup> (1990) and a high population growth rate of 2.3 %. Under these severe natural and social conditions, the people of Bangladesh have been facing poverty problems. 85 % of the population live in rural areas (1981), which especially suffer serious poverty problems. Therefore, rural development to alleviate poverty has been one of the most important issues in Bangladesh from a social and economical viewpoint since independence.

The following component programs of rural development were set up in the Third Five Year Plan (from 1985 to 1990) and are also given in draft of the Fourth Five Year Plan, which has yet to be decided officially.

- Physical infrastructural development; feeder roads, markets and electrification.
- Irrigated agricultural development, drainage and minor flood control; the most important item is irrigated agricultural development composed of minor irrigation schemes, provision of production inputs such as fertilizer and seeds and provision of credit to farmers.
- Production and employment programme for the rural poor; compulsory marketing components; training and other input supplies.

There are two core institutional organizations in the forefront for rural development, which were formed based on the past experiences in Bangladesh. One is a two tier system of cooperative societies composed of village level cooperatives (KSS) and their upazila level association (UCCA). The UCCA supports village level cooperatives for the administration and the monitoring of credit, training, etc. This system has been fostered to encourage rural people's self-reliant efforts to better their own lives.

The Bangladesh Rural Development Board (BRDB) is responsible for the administration of this cooperative system.

The other is a local government called upazila parishad, which is composed of a chairman directly elected by the upazila people, chairmen of union parishads (administrative units under the control of upazila parishad), a chairman of the UCCA, officers representing related agencies on rural development and local administration and other four designated members. This upazila parishad system was established in 1982 as a result of a power decentralization policy for effective and efficient rural development combining the rural people's self-governing and the coordinated activities of officers of agencies concerned in the National Government. As for upazila level public works such as roads, markets, canals, school houses, etc., the Local Government Engineering Bureau (LGEB) gives administrative and technical guidance to upazila parishads.

Both the BRDB and the LGEB belong to the Ministry of Local Government, Rural Development and Cooperatives.

In 1986, under the above-mentioned circumstances, the Government of Bangladesh requested the Government of Japan to undertake a study on model rural development. In response to this request, in 1988 and 1989, JICA conducted a study and formulated a master plan on the Model Rural Development Project for the Homna and Daudkandi upazilas in the Comilla District. The master plan aims to promote an integrated rural development, which is composed of the construction of rural infrastructures, encouragement of irrigated agriculture and strengthening of farmers' organizations and thus to contribute toward poverty alleviation and employment opportunity increase. The request for grant aid was made on the priority component selected from the master plan.

The JICA preliminary study team confirmed the following requested items through field works and discussions with agencies concerned in Bangladesh (the BRDB and the LGEB).

- ① The improvement of feeder and rural roads.
- ② The re-excavation of irrigation and drainage canals and the installation of buried pipelines.
- ③ The procurement of floating pumps and low-lift pumps together with the erection of storage houses for low-lift pumps.
- ④ The improvement of growth centers and hut markets.
- ⑤ The improvement of school houses.
- ⑥ The construction of godowns (one for food grain and one for fertilizer in each upazila).
- ⑦ The construction of training rooms for Upazila Central Cooperative Associations (UCCA).

The project area, the Homna and Daudkandi upazilas in the Comilla District, is located 50 km east of Dhaka. It is composed of 554 km<sup>2</sup> of flat lowlands extending along the Meghna river and its tributaries, which suffer from annual floods. The population is approximately 730 thousand with a



high density of 1,330 persons/km<sup>2</sup>. The major industry is agriculture with some cottage manufacturing industries and tertiary industry. Among the crops grown in the 43,000 ha cultivated area, rice is dominant and the other important crops are wheat, potato, jute and vegetables. Annual floods and the lack of irrigation facilities mainly constrain agricultural development in the Project area. In a few words, the project area is a typical Bangladesh example of a rural area which is suffered from severe poverty problems.

This Project is aimed at the realization of more remarkable and comprehensive impacts by intensively investing into integrated development in a relatively small project area, while most of the rural development projects in Bangladesh have usually been implemented rather extensively in wide project areas.

Among the requested components of rural infrastructural development is the improvement of roads which are important and basic measures to secure traffic, communication and transportation needed for economical and social development. Since roads in the Project area remain in serious condition with a lot of gaps, eroded embankments and damaged bridges, it is vital to improve selected important routes as to secure traffic even in the rainy season.

The improvement of markets, growth centers and hut markets, which play a key role for rural people to sell their products, to purchase commodities needed for their daily lives and to obtain employment opportunities, is considered to be a great deal more effective when planned to be connected with access road improvements.

Irrigation and drainage, is also an indispensable component to increase agricultural production in this Project area, where cropping areas and the introduction of improved seeds and technology are restricted in the rainy season due to the impact of annual floods. Such measures for irrigation as the re-excavation of canals and the installation of pumps will be able to a great deal enlarge cropping areas to increase agricultural production in the dry season, when improved technology can effectively be applied without inundation problems.

An irrigation system using floating pumps to take water into a canal needs much more investment and operational costs than a system intaking water by gravity. Accordingly, floating pumps are given less priority from their economical and operational disadvantages.

One of a UCCA's important activities is the training of members and employees of the UCCA and primary cooperative societies on cooperative activities, improved farming techniques, family welfare, vocational skills, etc. Training facilities are essential to promote the UCCAs' training activities for this Project. It will be instrumental for UCCAs to expand their activities to construct storage houses for the management of low-lift pumps for rental to cooperative members as well as godowns for food grain storage and fertilizer supply.

The rehabilitation of school houses is planned as to contribute to the national key policy to promote compulsory primary education as well as for the attached function of community centers. It is said that upgrading the educational level of rural people through the extension of primary education will bring about significant productivity increases in the long run, which will also encourage rural development.

The responsible agency for this Project will be the Ministry of Local Government, Rural Development and Cooperatives (MLGRDC) and the executing agencies will be the Local Government Engineering Bureau (LGEB) and the Bangladesh Rural Development Board (BRDB).

These two executing agencies are to be in charge of the following components respectively. And operation in the Project area will be carried out by upazila parishads and the UCCAs under the respective control of the LGEB and the BRDB.

LGEB-upazila parishads: Roads, growth centers, canals, pipelines and primary schools.

As for the feeder A road, the LGEB is responsible only for construction, and maintenance is to be executed by the Road and Highway Department (RHD).

BRDB-UCCA : Low-lift pumps and UCCA facilities.

Considering the appropriate scale of the Project to be implemented through the grant aid program, the installation of floating pumps, which is not a priority as previously mentioned has been excluded from the Project's components. The contents of each component have been planned taking into consideration the balanced composition of the Project.

For the feeder A road connecting the Homna headquarters with the national highway, the most important route other than the national highway in the Project area, pavement with the RHD standard is to be constructed to secure smooth traffic even in the rainy season. For the selected sections of feeder B road routes, D-3, D-5 and D-8 in Daudkandi and H-2 and H-4 in Homna, which are important as connectors of growth centers or neighboring upazilas with the national highway or the feeder A road, pavement with the LGEB standard and bridges are to be constructed. The planned pavement for the feeder B roads will be laid on the embankments, which will have been executed in advance by the Bangladeshi side through the "Growth Center Connecting Road Program", etc.

Two growth centers, the Dulalpur Bazar and the Goalhari Bazar, were selected to be improved in the Project, since the improvement of these two markets are considered to be the most urgent and effective, being that they are directly connected with the improvement of their access roads, routes H-2 and D-8. The market improvement is to include the construction of public market sheds and the improvement of pathways, drainage and sanitation.



Canals to be excavated have been selected taking into consideration the Bangladeshi priorities as well as technical and economical advantages. Excavation is planned to be conducted with manual labor so as to contribute to the increase of employment opportunities.

Low-lift pumps are needed to lift irrigation water from the canals to be excavated.

Buried pipelines are planned to be installed at two deep tube-well irrigation schemes, which are suitable to demonstrate a method to efficiently use water.

Four primary schools have been selected for construction to replace the existing superannuated school houses with less capacity than required, considering the Bangladeshi priorities, urgencies and construction access. School capacities have been determined based on the criterion that a section be of less than 50 pupils and classes be divided into two parts a day.

A training center for each UCCA is to be constructed, which will play a significant role for the promotion of training to improve farming and irrigation management in connection with canals to be excavated and pumps to be installed, to foster cooperative activities and to upgrade family welfare. The training for women's development is taken into consideration in the building plan and the training programs. The training center is planned to furnish lodging accommodations for instructors.

A storage house with a work shop to be used for the introduced pumps is planned for each UCCA.

As for godowns, only one for 200 tons of grain and one for 400 tons of fertilizer for the Homna UCCA are planned. No godown is planned for the Daudkandi UCCA, considering that there is no urgent need for additional storage capacity around the Daudkandi headquarters.

The contents of the planned facilities and equipment are given in the attached table. The implementation schedule is divided into three stages and the required periods for detailed design and construction are as follows.

	Detailed design	Construction
The first phase	3 months	11 months
The second phase	3.3 months	11 months
The third phase	3.3 months	11 months

The project cost to be born by the Government of Bangladesh is estimated as follows.

Project Cost > born by the Government of Bangladesh

(1) LGEB		Unit: 1,000 TK
1)	Construction cost;	1,567
	Site filling & access road for Jamalkandi Primary School	37
	Electricity introduction; Itakhola Primary School	1,530
2)	Pay for staff (4 persons) and employees (9 persons); 3 years	1,750
3)	Vehicles; 1,500 for 1 car, 150 for 3 moter-cycles	1,650
4)	Office expenditures; furniture, equipments, rent, stationary, printing, telephone, electricity, etc.	5,850
5)	Custom duty;	10,125
6)	Bank commission;	572
<hr/>		
	Total	21,514
(2) BRDB		
1)	Construction cost; Site filling & access road for Daudkandi UCCA	149
2)	Pay for staff (4 persons) and employees (18 persons); 8 years (Personnel expenditures for training, pump rental & marketing bussinesses are included in 5) & 8.)	8,616
3)	Vehicles; 2,000 for 2 Jeeps and 100 for 20 bicycles	2,100
4)	Office expenditures; furniture, equipments, rent, stationary, printing, telephone, electricity, etc.	5,750
5)	Traning; 1,100 / year x 6 years	6,600
6)	Custom duty;	16,634
7)	Bank commission;	85
<hr/>		
	Sub-total	39,934
8)	Profit from pump rental and marketing bussinesses; (175 + 460) / year x 6 years	3,175
<hr/>		
	Net total expenditures	36,759

This Model Rural Development Project is aimed at realizing a remarkable comprehensive impact by means of making intensive investment for integrated rural development in a relatively small project area. Besides, the Project area is a typical Bangladesh rural area, which suffers annual floods, and is located in the Comilla District to which a leading role has been given for rural development in Bangladesh. Accordingly, this Project is expected to present an appropriate model for rural development in Bangladesh.

This Project is expected to be remarkably fruitful as a rural development project according to the key policy of the Government of Bangladesh as well as to contribute a great deal to upgrading living standards of rural people including the poor. Therefore, it is judged to be appropriate that this Project will be executed as a grant aid project.

In order to successfully implement the Project, the Government of Bangladesh is requested to post the required personnel and to secure the necessary budget. Furthermore, it is needed that the Government of Bangladesh will fully conduct the planned operation and necessary maintenance for the facilities and equipment to be provided through the Project. In addition, it is recommended that JICA experts and JOCV members be dispatched to cooperate with the BRDB to support UCCA activities in connection with this Project. The combined implementation of the technical cooperation and this grant aid project, which is to improve only physical infrastructures due to its institutional nature, is considered to produce the most fruitful results for integrated rural development.



Project outline

Project Components	Quantity	Details	Executing Agency
Road; Feeder Road-A Feeder Road-B	9.33km 14.71km(D-8:6.48km, H-4:3.40km, H-2:4.83km)	Pavement Pavement	LGEB LGEB
Irrigation Facilities; Canal Re-excavation	8.7km(D:5.7km,H:3.0km)	Planned Irrigation Area (D:700ha, H:292ha)	LGEB
Buried Pipeline	2 sets	Connected with existing DTW schemes. Pipes(PVS, Bore 200mm)	LGEB
Road; Feeder Road-A Feeder Road-B	3.00km 7.89km(D-3:5.84km, H-2:2.05km)	Pavement Pavement	LGEB LGEB
Bridge	1 site(H-2,No.4)	L=62m,Sub.RC, Super.Steel	LGEB
Growth Centers	2 sites(Dulalpur, Goalmari)	Market sheds, pathway, drainage	LGEB
Irrigation Facilities; Canal Re-excavation	22.8km (D:21km,H:1.8km)	Planned Irrigation Area (D:1520ha, H:228ha)	LGEB
Low-loft Pumps	70 sets	Discharge 3.4m <sup>3</sup> /min, Bore 150mm Engine 10.5HP.	BRDB
UCCA Facilities; Training Center	2 sites(Daudkandi, Homna)	Training room, lodging accommodation, water supply, sanitation etc.	BRDB
Primary School Equipment;	1 school(Jamalkandi)	Room for classes, teachers, storage etc.	LGEB
For Primary School	1 set		LGEB
For UCCAs	1 set		BRDB
Road; Feeder Road-A Feeder Road-B	4.60km 9.39km(D-3:5.84km, D-5:3.55km)	Pavement Pavement	LGEB LGEB
Bridge	3 sites(D-3,5:No.1,2,3)	D-5(L=25.8m,12.9m,RC),D-3(L=5.3m,RC)	LGEB
Irrigation Facilities; Canal Re-excavation	32.1km(D:28.5km,H:3.6km)	Planned Irrigation Area, D:2208ha,H:560ha	LGEB
Low-lift Pump	72 sets		BRDB
Primary Schools Equipment	3 schools	Room for classes, teachers, storage etc.	LGEB
For Primary School	3 sets		LGEB

## CONTENTS

**PREFACE**  
**LOCATION MAP**  
**PHOTOGRAPHS**  
**SUMMARY**  
**ABBREVIATIONS**  
**GLOSSARY**

<b>CHAPTER 1 INTRODUCTION</b> .....	1
<b>CHAPTER 2 BACKGROUND OF THE PROJECT</b> .....	2
2-1 Background of the project.....	2
2-2 Outline of the Request .....	3
2-3 Outline of the Project Area .....	4
<b>CHAPTER 3 PROJECT OUTLINE</b> .....	5
3-1 Objective .....	5
3-2 Study and Examination on the Request.....	5
3-3 Project Description .....	7
3-3-1 Executing Agencies and Operational Structure .....	7
3-3-2 Activity plans.....	12
3-3-3 Outline of Facilities and Equipment .....	16
3-3-4 Operation and Maintenance Plan .....	20
3-4 Technical Cooperation.....	22
<b>CHAPTER 4 BASIC DESIGN</b> .....	23
4-1 Roads .....	23
4-1-1 General .....	23
4-1-2 Pavement Design .....	23
4-1-3 Bridge Design .....	29
4-2 Irrigation Facilities .....	39
4-2-1 Design Strategy .....	39
4-2-2 Design Criteria.....	45
4-2-3 Basic Design .....	46
4-3 Buildings .....	55
4-3-1 Basic Prerequisites.....	55
4-3-2 Basic Plan .....	61
4-3-2-1 Homna UCCA Facilities .....	61
4-3-2-2 Daudkandi UCCA Facilities .....	74
4-3-2-3 Primary Schools.....	75
4-3-2-4 Growth Centers .....	79
4-3-3 Planned Equipment .....	81
4-4 Construction Plan .....	85
4-5 Project Cost to be born by the Government of Bangladesh .....	89
<b>CHAPTER 5 PROJECT EVALUATION AND CONCLUSION</b> .....	90

**DRAWINGS**  
**ANNEX**



## ABBREVIATIONS

ADB	:	Asian Development Bank
BADC	:	Bangladesh Agriculture Development Corporation
BARD	:	Bangladesh Academy for Rural Development
BBS	:	Bangladesh Bureau of Statistics
BRDB	:	Bangladesh Rural Development Board
BS	:	Block Supervisor
BSS	:	Bhumiheen-bityaheen Samabaya Samity (A landless/assetless cooperative society)
BWDB	:	Bangladesh Water Development Board
B. Aus	:	Broadcast Aus
CARE	:	Cooperative for American Relief Everywhere (A non-governmental organization)
DAE	:	Department of Agriculture Extension
DTW	:	Deep Tube-well
FFP	:	Food for Work
HYV	:	High-yielding Variety
IRDP	:	Integrated Rural Development Program
JICA	:	Japan International Cooperation Agency
KSS	:	Krishak samabaya samity (A farmers' cooperative society)
LGEB	:	Local Government Engineering Bureau
LLP	:	Low-lift pump
LV	:	Local variety
MBSS	:	Mahila bhumiheen-bityaheen samabaya samity (A assetless women's Cooperative Society)
MOA	:	Ministry of Agriculture
MOE	:	Ministry of Education
MOF	:	Ministry of Food
MLGRDC	:	Ministry of Local Government, Rural Development and Cooperatives
RHD	:	Road and Highway Department
STW	:	Shallow tube-well
TCCA	:	A thana central cooperative association
TFYP	:	Third Five Year Plan
TK	:	Taka (Bangladeshi currency unit)
T. Aman	:	Transplanted Aman
UCCA	:	An upazila central cooperative association
UAO	:	Upazila Agriculture Officer
URDO	:	Upazila Rural Development Officer
WFP	:	World Food Program

## GLOSSARY

- Aman** : The main rice crop. Generally, broadcast Aman is sown in March—April and harvested in November—December. Transplanted Aman is transplanted in mid-July—early September and harvested in November—December.
- Aus** : The pre-monsoon rice, generally sown or transplanted in March—April and harvested in November—December.
- Boro** : The winter rice crop, generally transplanted in December—February and harvested in April—June.
- Kharif** : The monsoon season.
- Rabi** : The dry (winter) season.
- Taka** : The Bangladeshi currency unit (Japanese 1 Yen = 0.27Taka).
- Union parishad**: A lowest level local self-governing body under control of an upazila parishad.
- Upazila parishad**: A basic local government in Bangladesh.





