

### 3.1.5 Management, operation and maintenance

#### (1) Water resources development

##### 1) Re-excavation of irrigation canals

Re-excavation of irrigation canals should be managed by Upazila Parishad through the system such as Food for Work (FFW) because Upazila Parishad can easily manage the land acquisition problem. After the re-excavation, once three years or four years of proper maintenance must be carried out to keep the sufficient capacity. The maintenance work should be practiced in the winter season by landless farmers who will be employed by beneficial farmers or cooperatives under the guidance of Upazila Parishad.

Required man-power for the proper maintenance of irrigation canals are supposed that 360,000 man-day per year in Daudkandi and 180,000 man-day per year in Homna Upazila.

##### 2) Floating Pumps

Floating pumps will be supplied to BADC (Bangladesh Agricultural Development Cooperation) and BADC will have the responsibility for management, operation and maintenance of the pumps. Practically, a sub-assistant engineer and mechanics in each Upazila will take care in cooperation with Upazila Parishad.

As for the existing floating pumps, BADC has no regulation for the collection of water charge because the operation was just started in 1988 and operation system is not established yet. The management, operation and maintenance system of floating pumps in the Study Area should follow the BADC system which will be established in near future.

#### (2) On-farm irrigation plan

##### 1) Supply of LLP

LLP will be supplied to "Agricultural Modernization Center (AMC)" which will be managed by UCCA in cooperation with Upazila Parishad. Each LLP will be

rented to farmers or cooperatives by AMC and maintenance or repair will be done in AMC in cooperation with BADC mechanics.

2) Construction of buried pipeline system

Construction of buried pipeline systems should be managed by Upazila Parishad through the system such as FFW because of easy land arrangement. Landless farmers can work for the construction. Operation and maintenance should be carried out by beneficial farmers or cooperatives.

3) Improvement of irrigation procedure

AMC will give instructions to farmers or cooperatives in irrigation procedure for the proper expansion of irrigation area.

### 3.1.6 Supporting system

Irrigation development plan should be supported by agencies such as Bangladesh Agricultural Research Institute (BARI), Bangladesh Rice Research Institute (BRRI), Bangladesh Water Development Board (BWDB), Bangladesh Agricultural Development Cooperation (BADC), Bangladesh Rural Development Board (BRDB) and Local Government Engineering Bureau (LGEB) for the execution of proper development.

## 3.2 Drainage and Minor Flood Control Plan

### 3.2.1 Objectives

There are two objectives for the improvement of drainage in the Study Area. One is the drainage of rainfall in the Study Area. Peak of rainfall is in June and July when Aus, Jute and Summer crops are harvested. As the water logging by rainfall disturbs the harvest works, the rainfall water must be drained as soon as possible to make the field dry.

Another objective is to lower the flood water level in the Study Area. The peak of flood water level is August and September. The flood water level is lowered according to the decrease of water level in Meghna river. However, if the drainage capacities of canals or tributaries are not enough, it takes long time to drain out the flood water and the water level in the Study Area is kept at high level. This high water level disturbs the harvest of Aman and planting of winter crops.

### 3.2.2 Development plan

There are two major projects near the Study Area which are mentioned in Annex A section 5.1.4. Existing Development Plan. One is Gumti Phase I Sub-Project (Gumti-South Project) and the other is Gumti Phase II Sub-Project. As the main objectives of these projects are flood control and drainage, the plan of flood control and drainage in these projects should have priority over this Project. Therefore, only the improvement of drainage canals which will not be covered by the major projects were considered in this study.

There are some drainage canals and tributaries which were silted up and have not enough capacity. These canals or tributaries should be re-excavate to keep proper capacity and depth for drainage as follows:

#### Homna Upazila

Priority No.	Name of Drainage Canal	Excavation Depth (m)	Width (m)	Length (km)
1	Srenadi	1.0	4.6	2.4
2	Homna Opachar	1.0	4.6	2.4
3	Shanpur	1.0	3.0	1.6
4	Kashipur	1.0	4.6	1.6
5	Kalipur	1.0	3.0	2.4
6	Chanderchar	1.0	3.0	3.2
7	Ghangatia	1.0	3.0	1.6
Total Length				15.2

### 3.2.3 Management, operation and maintenance

Re-excavation of drainage canals or tributaries should be managed by Upazila Parishad through the system such as Food for Work (FFW) to avoid the land acquisition problem the same as the re-excavation of irrigation canals. After the re-excavation, once three years of proper maintenance must be carried out to keep the sufficient capacity. The maintenance work should be practiced in the winter season by landless farmers who will be employed by beneficial farmers or Upazila Parishad.

### 3.3 Feeders and Rural Roads

#### (1) General

The road network in the Project Area consists of the national highway (NHW) Dhaka-Chittagong passed through the middle part of Daudkandi as the backbone connecting to Feeders A, B and rural roads in this region.

Regarding these feeders and rural roads, since bridges and culverts are insufficient and significantly damaged by recent floods, the communication-situation has been very inconvenient, affecting the economic life of local people.

These feeders and rural roads, therefore, are subjected to improvement for strengthening the road network in the area.

#### (2) Development plan

##### 1) Basic plan

##### a. Feeders A

The communication between the Project Area and Dhaka Metropolitan is made by the national highway passing over the Meghna River by 2 places of ferry-boat in which one place has a bridge under construction while another is subject to another bridge in the near future.

With the completion of these bridges, the communication-convenience between the Project Area and Dhaka Metropolitan will be realized within one-hour.

The Project Area, therefore, will be substantial for development conditions which inquire the improvement of Feeder A.

Under these improved conditions, the transportation of fresh foodstuffs, especially fresh legumes, to Dhaka Metropolitan will be totally supported accordingly.

The boat transportation has been frequently used for paddy, wheat, fertilizers, etc. which have proper adaptability to storage and transportation will be maintained.

This means boat transportation will not be changed to road transportation, but both types will be used upon its specific merits accordingly.

b. Feeder B and rural roads

Regarding the distribution network in Upazila, the road system connecting to Growth Centers and neighbour Upazilas which affects largely the economic life of inhabitants will be subjected to improvement.

Besides typical roads connecting union parishads with Upazila parishads important rural roads connecting to Growth Centers, Hat Markets, facilities related to inhabitants' daily life will be made up to rural roads (RI) for improvement.

2) Road improvement and low-income class

By irrigation development, the improvement of roads will support communication convenience for labour force needed by the cultivation of vegetables, industrial crops of higher value added and, therefore, generate employment in the Study Area.

From the improvement of Feeder A and rural roads, transportation and related businesses (bicycles, rickshaws, carriages, etc.) will be expanded. Labour force from landless low-income people will be absorbed accordingly.

Other related job opportunities are construction materials, construction works and O.M of these structures.

3) Road network and sectional structure

The road network subjected to improvement is shown in Figure 3.3.1.

Concerning the sectional structure of each type, basic standards on main items such as road width, pavement width should be basically followed. Besides, other items are listed up in Table 3.3.1.

4) Flood damage prevention

- a. First, the surface of Feeder A should be made up for higher than the highest flood level in 1988 (6.34 m PWD at Daudkandi - Gumti).

Other feeders and rural roads subjected to improvement will be made up to bridge level (6.00 m PWD for average figure)

- b. In order to protect roads structures, vegetation is basically considered.

The selection of vegetation shall be referred to have fuel materials and feeds for animals.

The clay coverage will be made on places with sandy structure.

- c. Planting trees along roads for supplying fuel materials.

d. Sectional Structure

Category	Road Width (m)	Pavement (m)	Road Side	Slope
F.A.	7.32	3.66	1.83	1:2.0
F.B.	7.32	3.66	1.83	1:2.0
R	4.88	3.05	0.91	1:2.0

5) Road improvement plan

The plan of road improvement in the Study Area is shown as follows:

Category	Daudkandi			Homna			Total		
	Q'ty (unit)	Distance (km)	Bridge (place)	Q'ty (unit)	Distance (km)	Bridge (place)	Q'ty (unit)	Distance (km)	Bridge (place)
Feeder A	1	13.3	3	1	5.0	-	1*	18.3	3
Feeder B	10	106.7	61 (Ferry: 1)	3	33.1	20 (Ferry: 1)	13	139.8	81 (Ferry: 2)
Rural Road	6	34.7	22	6	48.0	37	12	82.7	59
Total	17	154.7	86 (Ferry: 1)	10	86.1	57 (Ferry: 1)	26	240.8	143 (Ferry: 2)

Note: \* Feeder A includes only 1 road passing through both Upazila of Daudkandi and Homna. Details of road plan are shown in Table 3.3.2. Road network is shown in Fig. 3.3.1.

6) O.M organization

The O.M of Feeder A will be carried out by Roads & Highways Department (RHD) as up to now.

However, the O.M of Feeders B and rural roads will be carried out by Upazila Parishad. Concerning the management of road trees, vegetation on both road sides, maintenance of road surfaces and structures, the utilization of labour force from low-income class landless people of BSS and MBSS should be considered accordingly. This is also considered as a program of employment-generation.

The organization of O.M. in each Upazila will be as follows:

Maintenance Technician : 2 persons  
Maintenance Labour : 1 person per km  
Patrol Car : 1 unit

b. Employment generation

From this O.M. Organization, the program of employment generation is as follows:

		Maintenance Expert	Maintenance Labour	Rural Car
Daudkandi	2 x 25 days x 12 = 500 man/day			1 unit
Feeder B	(106.7 km)	106.7 x 25 x 12 =	32,010 man/day	
Rural Road	(34.7 km)	34.7 x 25 x 12 =	10,410 man/day	
Ferry	(1 place)	6 x 25 x 12 =	1,800 man/day	
Sub-total		44,620 man/day		
Homna	2 x 25 days x 12 = 600 man/day			1 unit
Feeder B	(33.1 m)	33.1 x 25 x 12 =	9,930 man/day	
Rural Road	(48.0 km)	48 x 25 x 12 =	14,400 man/day	
Ferry	(1 place)	6 x 25 x 12 =	1,800 man/day	
Sub-total		26,730 man/day		
Total		71,350 man/day		2 units

### 3.4 Distribution Facilities

#### (1) Growth centers

##### 1) General

Growth Centers play an important role in the area development by its distribution of goods and materials.

By the implementation of MRDPP, the production volume in agriculture will be increased to 1.5 times. And the present population of 634,000 will be increased to 913,000 or approx. 1.5 times also (See Tables 3.4.1, and 3.4.2).

From this background the volume for distribution and people utilizing growth centers will be augmented accordingly.

The improvement of functions of growth centers, therefore, is considered basically necessary.

- a) The center should be improved for a stable supply of daily necessities to the inhabitants even in the flood season.



b) Creation of employment opportunities

Based on the present situation of Growth Centers main points of the development plan is to improve and to strengthen economic and distribution functions in supplying daily goods and production materials to local inhabitants.

For this purpose, the expansion and improvement of facilities such as Hat Markets and storages will be carried out.

2) Development plan

- a) Construction of a 2-floor building for installing shops of rice, fish, meat, vegetables, clothes, and daily goods. Installation of livestock place(s) and a slaughter house as annexed.
- b) In order to strengthen storage capacities of foodstuffs and produces, storages are subjected to expansion. A new storage in Homna (200 T) will be constructed.
- c) Improvement of inside passages, drains, water supply, toilets and electric system.
- d) Growth Centers subjected to the improvement program are as follows:

Daudkandi		Homna	
No. 1	Daudkandi	No. 1	Homna
No. 2	Goripur	No. 2	Dualpur
No. 3	Eliotgonji	No. 3	Marikulpur
No. 4	Batakandi		
No. 5	Goalmari		
Total	5 places		3 places

Table 3.4.3 shows existing condition and Table 3.4.4 shows improvement plan of each Growth Center.

3) Maintenance system

The centers will be managed by the Bazaar Committee headed by Upazila Chairman as it is.

After completion of the improvement works, necessary personnel will be required to operate and maintain the facilities. Following personnel will be exclusively required.

Management personnel : Three (3) persons for each center

Labour : Twenty (20) persons for each center

4) Employment generation

Daudkandi:

25 persons x 25 days x 12 months x 5 places = 34,500 man-days

Homna:

23 persons x 25 days x 12 months x 3 places = 20,700 man-days

45 persons x 25 days x 12 months x 1 place = 13,500 man-days

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Total 68,700 man-days

(2) Hat Market

1) General

Hat Markets play a role in distribution of foodstuffs, materials for agricultural production and also a place for agricultural production and also a place for information exchange.

Their improvement is also considered very necessary.

2) Development plan

Main development is in new construction of shops for rice, fish, meat, vegetables, clothes, etc. Improvements of inside passages, drains, water supply and toilets are also considered.(see Table 3.4.5)

Hat Markets subjected to improvement are as follows:

	Type A	Type B	Total
Daudkandi	13 places	14 places	27 places
Homna	-	7 places	7 places
Total	13 places	21 places	34 places

Note: Type A or B is categorized by area size.

Type A : 2-floor RC building (18.3 x 12.2 m) for selling rice, fish and vegetables

Type B : 2-floor RC building (27.45 x 18.3 m) for selling rice, fish, vegetables and clothes

### 3) Maintenance system

Management of Hat Markets will be carried out by Bazaar Committee of Upazila Parishad as up to now. Maintenance will be carried out as follows:

2 managerial people and 3 maintenance peoples per market

### 4) Employment generation

Daudkandi:

5 persons x 25 days x 12 months x 27 places = 40,500 man-days

Homna:

5 persons x 25 days x 12 months x 7 places = 1,500 man-days

Total 51,000 man-days

## (3) Storages

### 1) General

The present situation of insufficient storage capacity should be improved by new construction of following storages.

- Sharing the storage capacity Growth Centers
- Securing the volume of foodstuffs for local inhabitants for 1 month.  
Construction of community-center with storage will be carried out.

## 2) Development plan

Place	Unit	Capacity	Purpose
Daudkandi:			
1. Goripur Bazaar	1	50 t	Foodstuff
2. Daudkandi Bazaar	4	250 t	Foodstuff
3. Eliotgoonji Bazaar	1	250 t	Foodstuff
4. Batakandi Bazaar	1	250 t	Foodstuff
5. Goalmali Bazaar	1	250 t	Foodstuff
6. 14 Unions	14	200 t	Multipurpose
7. 8 Unions	8	100 t	Multipurpose
Total	27	5,100 t	
Homna:			
1. 5 Unions	5	200 t	Multipurpose
2. 5 Unions	5	100 t	Multipurpose
Total	10	1,500 t	
Grand Total	37	6,600 t	

### Design of godown.

500T Type = 100' x 40' x 18' = 72000 cubicfeet

$72000 / 500 = 144$  : One Measurement ton = 144 cubicfeet

then 200 ton = 28800 cubicfeet

100 ton = 14400 cubicfeet

Height = 10 feet width 40 feet

200 T Type = 72' x 40' x 10' = 28800 cubicfeet

(21.95m x 12.19m x 3.05m )

100 T Type = 36' x 40' x 10' = 14400 cubicfeet

(10.97m x 12.19m x 3.05m)

250 T Type = 90' x 40' x 10' = 36,000 cubicfeet

(27.43m x 12.19m x 3.05m)

## 3) Maintenance system

The management of godowns in Growth Centers will be carried out by Bazaar Committee as up to now.

With the set up of the community center combined with godown at each union, UCCA will manage this management.

Persons for maintenance are as follows:

Item	Capacity (MT)	No.	Managerial Performs	Labour Persons
Storage	100	1	1	7
Storage	200	1	2	10
Storage	250	1	2	20
Storage	500	1	2	30

#### 4) Employment generation

Daudkandi:

$$[(32 \text{ persons} + 22) \times 4 + 12 \text{ persons} \times 14 + 8 \text{ persons} \times 8] \times 25 \times 12$$

$$= 105,600 \text{ man-days}$$

Homna:

$$[(12 \text{ persons} \times 5 + 8 \text{ persons} \times 5) \times 25 \times 12]$$

$$= 30,000 \text{ man-days}$$

### 3.5 Others

#### (1) Electrification

Upon the electrification plan for the region, both Upazila except the west side of Caratina river (15% of the total area) will be connected to electrification by June 1992.

Under this plan the electrification of irrigation facilities, Growth Centers and water supply facilities will be carried out accordingly.

#### (2) Improvement of high school and colleges

In the Study Area, there are about 50 high schools and colleges contributing to the high education of the region.

These facilities are reportedly lacked of education materials.

Schools subjected to this program are follows:

<u>Daudkandi</u>	<u>Homna</u>	<u>Total</u>
19	12	31

The management of these facilities is carried out by Upazila Parishad at the construction-phase and by each school management committee after the completion of construction.

(3) Drinking water

1) General

It has been reported that most diseases in the Study Area are caused by drinking water.

The improvement in drinking water, therefore, is very necessary.

2) Development plan

Devices for drinking water consisting of a hand pump and a filter will be set up as follows:

Daudkandi	:	476 places
Homna	:	200 places

3) Maintenance system

Union Parishad will carry out the maintenance.

Maintenance fee will be collected from users.

(4) Improvement of high schools and colleges

It was founded that almost high schools in the Study Area needs to improved of their buildings, teaching materials and drinking water supply.

Following numbers of high school and college will be taken up.

<u>Upazila</u>	<u>High School (Place)</u>	<u>College (place)</u>
Daudkandi	17	2
Homna	12	-
Total	29	2

Contents of plan are as follows:

1. 5 classrooms (82.5 m<sup>2</sup> x 5 rooms) and one staff room (82.5 m<sup>2</sup>) will be newly constructed.
2. One set of TV-Camera will be supplied as a teaching material.
3. Drinking water supply facility (Deep tube well) will be installed.

Management system

Upazila parishad would be in charge of construction. After completion the school would take its management by itself.

#### 4. Employment Generation Program

##### 4.1 Potential Labour Forces

###### (1) Definition of employment

Definitions and concepts of employment shall follow to "the Report on Labour Force Survey 1984-85 by BBS" as follows:

###### 1) Potential labour forces

Potential labour forces consist of following:

- a) 10-years of age and over, who may be presently employed or unemployed.
- b) Civilian labour force: Non-civilian labour force, members of armed forces on active shall be excluded.

###### 2) Non-potential labour forces

Following items shall be excluded by potential labour force.

- a) Full-time housewives
- b) Students living under institutional arrangement
- c) Persons working less than 15 hours per week without pay in the family farm or enterprise and not looking for employment (from 13th ILO convention)
- d) Disabled and retired persons
- e) Income recipients and beggars

In Bangladesh, compulsory education is not fixed and also employment regulations or acts are not clear. Therefore, from 10-years old after graduating primary school shall be counted as labour forces.

###### 3) Employed persons

Persons of age 10 years and above, who are either:

- a) working one or more hours for pay or profit, or working 15 hours or more per week without pay in a family farm or enterprise.



- b) not working but who has a job or business from which they are absent temporarily.
- 4) Unemployed persons

Persons 10 years of age and over involuntarily out of gainful employment, but either:

- a) have been actively looking for employment in the past two months, or
- b) are willing to work but not looking for work because of being temporarily ill or believing no work is available.

## (2) Proposed population in the Study Area

For estimating the potential labour forces, following basic figures were assumed.

### 1) Total population

Item	APIR	Daudkandi	Homna	Total
1981	-	414,860	199,103	613,963
1988	2.6	497,000	238,000	735,000
1999	2.0	617,000	296,000	923,000

Annual population increase rates (APIR) were assumed to be 2.6% from 1981 to 1988 and 2.0% from 1988 to 1999 based on Upazila information and TFYP.

### 2) Male and female

The ratio of male and female out of total population shall be the same in 1981 and in 1999.

### 3) Age group structure

From the success of family planning, the ratio of 0-9 years age group shall be decreased as follows:

	(Unit: %)		
	1981	1999	Difference
Daudkandi	35.1	27.9	-7.2
Homna	34.7	27.5	-7.2

Annual decreasing ratio was assumed to be 0.4 percents based on Labour Force Survey 1984/85.

4) Housewives

The ratio of housewives such as married and widow was assumed to be the same of that in 1981. Delay marriage shall decrease the ratio, but the family system shall replaced from big size to small size.

5) Other economically inactives

Other economically inactivate persons such as students, floatings, retired (more than 65 years) and disabled, etc. shall be increased due to increased population. Annual increasing ratio were assumed to be 0.3% based on LFS 1984/85 and percentages of each item are as follows:

(Unit: %)				
Upazila	Item	1981	1999	Note
Daudkandi	Students	5.8	8.9	(57.4)
	>65 years	3.7	5.7	(36.6)
	Floating	0.6	0.9	(5.9)
	Total	10.1	15.5	
Homna	Students	4.3	7.1	(51.1)
	>65 years	3.9	6.4	(46.4)
	Floating	.2	0.3	(2.4)
	Total	8.4	13.8	

## 4.2 Present Income Situation

From the sample survey carried out by the study team following figures were obtained: (see Table 4.2.1)

Item	<u>Daudkandi</u>		<u>Honnā</u>		<u>Total/Average</u>	
	Nos.	%	Nos.	%	Nos.	%
1. No. of family	220	(100)	101	(100)	321	(100)
2. Main income source						
Agriculture	157	(71)	63	(62)	220	(69)
Daily labour	39	(18)	19	(19)	58	(18)
Service and business	9	(4)	7	(7)	16	(5)
Fishery	6	(3)	5	(5)	11	(3)
Cottage industry	5	(2)	5	(5)	10	(3)
Others	4	(2)	2	(2)	6	(2)
3. Average income (Tk./capita/year)						
Agriculture	6,482		4,546		5,514	
Daily labour	1,586		1,854		1,720	
Fishery	10,012		7,167		8,590	
4. Income of landless						
No. of samples	18		18		36	
Income (Tk./capita/year)	2,096		2,679		2,388	
Consumption (Tk./capita/year)	2,464		2,844		2,654	
Family member	6.4		6.1		6.3	

From the above, landless are engaged as daily labour and so much depressed compared with farm households and fishery household.

Figure 4.2.1 shows the trend of monthly incomes of landless household.

It is founded that the trend of monthly incomes of landless household in flooding season (from Aug. to Oct.) is considerably decreased due to non-chance of daily labour work of both agriculture and construction

## 4.3 Employment Generation Program

### (1) General

The generation of employment which is a main objective of the MRDPP, apart from 2 other objectives of production improvement and income-generation, is considered as a crucial problem to be solved properly.

First, there are 2 persistent factors actually effecting the basic solution of this problem in the Study Area which are the high population with a density of more than 1,000 people per sq.km and a high population growth of average 2.6 percents per annum.

From this socio-economic background, the situation of employment in the Study Area, therefore, has been faced with 2 aspects, the under employment and the unemployment, as occurred in the whole country up to now.

In the Study-Area, the present population density is more than 1,000 people per sq.km. This inquires following alternative considerations.

- 1) Reducing the population for a typical density of normal rural area to be obtained.
- 2) Transforming the Study Area into a city area with a major portion of manufacturing and business and a minor portion of agriculture.
- 3) Combining 1) and 2) for a gradual improvement.

As alternatives 1) and 2) are not able to be realized immediately due to existing socio-economic conditions, the alternative 3) of combining 1) and 2) for gradually changing the employment situation in the Study Area by reducing the rural population while increasing the volume of economic activities in manufacturing and business is considered accordingly.

## (2) Basic concepts for employment generation program

From the background mentioned above, directives for the employment generation would be basically considered as follows:

- 1) In maintaining a present population density of more than 1,000 people per sq.km in the Study Area, business and manufacturing sectors should be developed at full scale for sharing a higher portion toward economic activities of city areas.
- 2) Agriculture as per its basic industry in the region should be developed for absorbing more labour force for higher productivity and higher value added in production by introducing high technology in agriculture.
- 3) The under employment situation shown by the household-employment should be solved by replenishing more jobs-at-home as much as possible.

(3) Directives for employment generation program

The employment generation program, therefore, will have 2 parts as follows:

- 1) Part 1 : Expanding present aspects related to agriculture, the basic industry, such as cultivation, fishery and livestock.
- 2) Part 2 : Developing aspects related to manufacturing and business such as rural industries and business.

Concerning the Part 1, the expansion of irrigated areas and the introduction of crops with higher value added in agriculture will expectably absorb more labour force. The application of intensive fishery and livestock development will solve the unemployment situation and, at the same time, offer more job opportunities.

For the Part 2, a development plan in rural industries and business supported by UCCA and Upazila Parishad will be carried out promptly. This plan requires an adequate fund for activating related business activities.

This plan will have 2 periods.

- 1) First Five-year Period (1990-1994)
  - a. Funding existing rural industries with soft credits, for the targets of double production and double labor-force absorption.
  - b. Increasing self-reliant employment for landless people by rural/cottage technical training and funding assistance.
- 2) Second Five-year Period (1995-1999)
  - a. Acquiring foreign assistance(s) for studying the establishment of new rural industrial factories for selecting priority projects for implementation.
  - b. Setting up the capital procurement schedule for establishing factories of these priority projects. These capitals would be financed by soft-loans from foreign sources.

- c. Setting up a central complex of utilities (Generator, Boiler, Industrial Water, Waste-Treatment, Distribution Marketing Center, etc.) as basic facilities for industrial development and facilities of source priority projects at each Upazila.

(4) Basic facts for employment plan

Assuming a population growth of average 2.0 percents per annum to be projected for this MRDPP following figures would be obtained.

1) Population

Year	Daudkandi	Homna	Total
1981	414,860	199,103	613,963
1999	617,000	296,000	913,000
Increase (person)	202,140	96,897	299,037

2) Increase in potential labour force

Supporting one-third of the increased population will be potential labour force.

Item	Daudkandi	Homna	Total
Increased portion (person)	67,380	32,299	99,679
(man-days)	16,845,000	8,074,000	24,919,50

3) Present unemployment

Item	Daudkandi	Homna	Total
Unemployment (person)	57,653	24,417	82,070
(man-days)	14,413,250	6,104,250	20,517,500

4) Total figures for employment plan

Item	Daudkandi	Homna	Total
Total (person)	125,033	56,716	181,749
(man-days)	31,258,250	14,179,000	45,437,250

(5) Employment generation plan

As mentioned in the Main Report, the problems of employment generation should be solved at 2 levels, national and regional, in which the national level should execute proper basic measures for supporting the whole program.

Concerning the national level, there are various main tasks related to this problem in which the population control for balancing the Crude Birth Rate (CBR) with the Crude Death Rate (CDR), the investment approach for generating national industries and business, and specific national programs for absorbing young people in large scale are basically considered.

In the Study Area, the employment generation plan will have 2 main following purposes.

- 1) Solving the under employment situation by replenishing works-at-home
- 2) Creating new job-opportunities for the unemployed people

(6) Effects of employment generation program

- 1) Effects on under employment situation

The household basis livestock development under the promotion of UCCA in corporation with Upazila Livestock Office will be the main part for replenishing works-at-home for the household employment considered as the source of under employment.

Besides, inland fishery and cottage industries which are subjected to be developed by the MRDPP will also effect side-jobs for the household employment.

Also, along with the convenience of communications made by the MRDPP, distribution of produces will partly contribute to solve the under employment situation.

- 2) Effects on employment creation

Until the completion of MRDPP implementation, the creation of new job opportunities would be approximately 20 million mandays (or 80,000 persons) for long-term employment and 27 million manday for short-term employment.

Item	1988			1999			Increment
	D	H	Total	D	H	Total	
1 Population ( 1,000 persons)	497	738	735	617	296	913	178
2 Total labor force ( 1,000 persons)	163	83	246	202	103	305	59
3 Total labor force (1,000 man.day)	40,750 (100)	20,750 (100)	61,500 (100)	50,500 (100)	25,750 (100)	76,250 (100)	14,750
4 Employment (1,000 man.day)							
4\ Long Term Employment							
(1) Production sector							
1) Agriculture	9,351	3,807	13,158	12,729	6,230	18,959	5,801
2) Inland fishery	1,314	492	1,806	6,160	2,193	8,353	6,547
3) Livestock	-	-	-	103	56	159	159
4) Rural industry	1,231	3,511	4,742	2,650	5,050	7,700	2,958
5) Cottage industry	3,295	2,086	5,381	4,193	2,517	6,710	1,329
Sub total	15,191	9,896	25,087	25,835	15,946	41,781	16,694
(2) O & M of infrastructures							
Sub total	-	-	-	404	206	610	610
(3) UCCA related works							
1) Godown cum ricemill	-	-	-	1,572	745	2,317	2,317
2) Inland fishery center	-	-	-	118	38	156	156
Sub total	-	-	-	1,690	783	2,473	2,473
Total	15,191 (37)	9,896 (48)	25,087 (41)	27,929 (55)	16,935 (66)	44,864 (59)	19,777
4\ Temporary Employment							
(1) Irrigation	-	-	-	988	152	1,140	1,140
(2) Road	-	-	-	1,848	1,002	2,850	2,850
(3) Fish pond	-	-	-	18,503	4,332	22,835	22,835
(4) Others	-	-	-	241	102	343	343
Total	-	-	-	21,580	5,588	27,168	27,168

Note () indicates percentage to the total labor force

D: Daudkandi H: Homna

#### (7) National programs in employment generation

As the MRDPP cannot solve the employment generation for the newly made labour force from the population growth in the Study-Area, this problem should be solved at national level with specific programs which would be measures towards a population control target in order to obtain a solution in this respect.





## ***TABLES***



Table 2.1.1 Land Use Plan

Land Use	Daudkandi		Homna		(Unit: ha) Total	
	1988	1999	1988	1999	1988	1999
<b>Basic Factor</b>						
Population (x1000)	497.0	617.0	238.0	296.0	735.0	913.0
Household (x1000)	81.5	112.2	41.8	53.8	123.3	166.0
Persons/Household	6.1	5.5	5.7	5.5	6.0	5.5
<b>Area</b>						
1. Total area	37,555		17,871		55,426	
2. Water body	4,900		1,600		6,500	
3. Agricultural land	28,839	28,200	14,415	14,000	43,254	42,200
4. Fish pond	741	741	312	312	1,053	
5. Infrastructure	751	939	357	447	1,108	1,386
6. Homestead	2,324	2,775	1,187	1,512	3,511	4,287

Note: 1) Agricultural Land

1988 Average area between 1985/86 ~ 87/88

1999 Estimated

2) Infrastructure

1988 2% of the total area computed from the map

1999 2.5% of the total area

3) Homestead

Dwelling, institutions, business, and industries are included.

The area was computed based on the following estimation.

$0.0243 \text{ (ha)} \times \text{Households} + \text{Institutions (School etc.)}$

4) The area of water body and fish ponds are supposed not to be changed

Table 2.1.2 Target Yield and Production in Daudkandi

Crops	Present			Target		
	Area (ha)	Yield (t/ha)	Production (t)	Area (ha)	Yield (t/ha)	Production (t)
Rice						
Aus						
HYV	100	2.21	221	3,260	3.0	9,780
LV	3,560	0.76	2,706	-	-	-
T&A	3,660	0.80	2,927	3,260	3.0	9,780
T. Aman						
HYV	150	2.54	381	1,080	3.5	3,780
LV	650	1.22	793	-	-	-
T&A	800	1.47	1,174	1,080	3.5	3,780
B. Aman						
LV	18,340	1.12	20,541	17,000	2.2	37,400
Boro						
HYV	7,880	3.53	27,816	12,850	5.0	64,250
LV	670	1.88	1,260	-	-	-
T&A	8,550	3.40	29,076	12,850	5.0	64,250
(Sub-total)	(31,350)	(1.71)	(53,718)	(34,190)	(3.4)	(115,210)
Rabi Crops						
HYV						
Wheat						
Irri.	1,620	2.26	3,661	6,650	2.5	16,625
Non-Irri.	6,820	1.76	12,003	-	-	-
T&A	8,440	1.85	15,664	6,650	2.5	16,625
Oilseed (Mustard)						
HYV	60	1.13	68	1,660	1.2	1,992
LV	1,780	0.58	1,032	-	-	-
T&A	1,840	0.60	1,100	1,660	1.2	1,992
Potato						
HYV	3,930	17.22	67,675	3,800	20.0	76,000
LV	60	5.23	314	-	-	-
T&A	3,990	17.04	67,989	3,800	20.0	76,000
Winter Vegetables	1,270	11.46	14,581	2,160	12.0	25,920
Pulses	620	0.68	442	1,080	1.0	1,080
(Sub-total)	(16,160)			(15,350)		
Kharief Crops						
Jute						
Oil	10	2.07	21	1,620	2.2	3,564
Cap	1,520	2.03	3,085	-	-	-
T&A	1,530	2.03	3,106	1,620	2.2	3,564
Oilseed (Sesame)	620	0.92	570	1,450	1.0	1,450
Pulses	-	-	-	540	1.0	540
Summer Vegetable	580	23.20	13,455	2,160	19.0	41,040
Chilli	1,410	1.31	1,847	2,170	1.5	3,255
(Sub-total)	(4,140)			(7,940)		
Total	51,650			57,480		
(Crop Intensity)	(179%)			(204%)		

Table 2.1.3 Target Yield and Production in Homna

Crops	Present			Target		
	Area (ha)	Yield (t/ha)	Production (t)	Area (ha)	Yield (t/ha)	Production (t)
Aus						
HYV	-	-	-	1,210	3.0	3,630
LV	1,770	1.31	2,319	-	-	-
T&A	1,770	1.31	2,319	1,210	3.0	3,630
T. Aman						
HYV	-	-	-	580	3.5	2,030
LV	-	-	-	-	-	-
T&A	-	-	-	580	3.5	2,030
B. Aman						
LV	10,340	1.27	13,132	7,620	2.5	19,050
Boro						
HYV	2,590	3.14	8,133	5,280	4.8	25,344
LV	200	1.07	214	-	-	-
T&A	2,790	2.99	8,347	5,280	4.8	25,344
(Sub-total)	(14,900)	(1.59)	(23,798)	(14,690)	(3.5)	(50,054)
Wheat						
Irr.	-	-	-	3,030	2.5	7,575
Non-Irr.	3,780	1.78	6,728	-	-	-
T&A	3,780	1.78	6,728	3,030	2.5	7,575
Oilseed (Mustard)						
HYV	-	-	-	1,170	1.1	1,287
LV	880	0.60	528	-	-	-
T&A	880	0.60	528	1,170	1.1	1,287
Potato						
HYV	70	13.03	912	1,980	16.0	31,680
LV	40	6.39	256	-	-	-
T&A	110	10.62	1,168	1,980	16.0	31,680
Winter Vegetables	990	10.80	10,692	1,560	12.0	18,720
Pulses	-	-	-	590	1.0	590
(Sub-total)	(5,760)			(8,330)		
Jute						
Oil	20	1.62	32	1,360	2.0	2,720
Cap	970	1.34	1,300	-	-	-
T&A	990	1.34	1,332	1,360	2.0	2,720
Oilseed (Sesame)	210	1.07	225	620	1.1	682
Pulses	-	-	-	390	1.0	390
Summer Vegetable	110	9.86	1,085	1,560	17.0	26,520
Chilli	730	1.12	818	1,240	1.3	1,612
(Sub-total)	(2,040)			(5,170)		
Total	22,700			28,190		
(Crop Intensity)	(157%)			(201%)		

Table 2.1.4 Amount of Fertilizer and Seed Rate

	Present (kg/ha)			Proposed (kg/ha)			
	Urea	TSP	MP	Urea	TSP	MP	Seed Rate
Aus	120	90	55	175	130	77	30
T. Aman	135	100	65	190	140	90	30
B. Aman	20	-	-	90	50	-	75
Boro	175	130	70	240	170	90	30
Wheat	105	95	42	130	125	60	150
Potato	320	220	320	385	260	385	1,800
Oilseed	95	95	50	135	135	65	10
Pulses	-	50	20	35	125	50	25
Chilli	75	150	50	95	194	65	30
Jute	105	25	45	150	37	65	10
Vegetables	310	110	110	405	140	140	-

Note: TSP Triple Super Phosphate  
MP Muriate of Potash

Table 2.1.5 (1/2) Present Labour Requirement by Crop and Activity

	LP	PL	BC	Fe 1	TPL	Fe 2	We	PC	C/C	THR	S/W	R/S	I	Total
B. Aus (LV)	10	15	3	1	-	-	75	-	45	12	7	-	-	168
T. Aus (LV)	10	20	-	3	62	2	62	5	50	20	10	-	-	244
B. Aman (LV)	10	15	3	1	-	-	40	-	45	17	8	-	-	139
Boro (HYV)	10	20	-	3	62	3	75	7	55	30	12	-	14	291
Jute	10	20	3	3	-	-	75	3	37	-	16	45	-	212
Wheat	10	15	3	3	-	1	25	-	30	25	12	-	-	124
Pulses	10	10	3	1	-	-	-	-	20	12	5	-	-	61
Oilseed	10	10	3	3	-	-	20	-	20	12	5	-	-	83
Chilli	10	15	3	3	-	2	42	5	70	-	25	-	30	203
Potato	15	20	70	5	-	5	75	5	50	-	-	-	25	270
Vegetables	15	25	70	5	-	5	75	5	55	-	-	-	30	285

Note: LP: Land preparation  
 PL: Ploughing  
 BC: Broadcasting  
 Fe 1: Fertilizer 1st  
 TPL: Transplanting  
 Fe 2: Fertilizer 2nd  
 PC: Pesticide  
 C/C: Cutting/Carrying  
 THR: Threshing  
 S/W: Sundrying/Winnowing  
 R/S: Retting/Stripping  
 I: Irrigation



Table 2.1.5 (2/2) Proposed Labour Requirement by Crop and Activity

	LP	PL	BC	Fe 1	TPL	Fe 2	We	PC	C/C	THR	S/W	R/S	I	Total
T. Aus (HYV)	10	20	-	3	62	3	62	5	50	20	10	-	8	253
T. Aman (HYV)	10	20	-	3	62	3	65	7	55	30	12	-	8	275
B. Aman (LV)	10	15	3	2	-	-	45	-	50	20	10	-	-	155
Boro (HYV)	10	20	-	3	62	5	75	10	62	43	14	-	16	320
Jute	10	20	3	3	-	1	75	5	40	-	17	50	-	224
Wheat	10	15	3	3	-	2	30	5	40	37	12	-	12	169
Pulses	10	10	3	3	-	-	-	3	25	14	5	-	10	83
Oilseed	10	10	3	3	-	2	25	5	25	14	5	-	10	112
Chilli	10	15	3	3	-	3	50	7	75	-	25	-	30	221
Potato	15	20	75	6	-	6	75	7	60	-	-	-	25	289
Vegetables	15	25	75	6	-	6	75	7	65	-	-	-	30	304

Note: Abbreviation are same as Table B.1.5(1).

Table 2.1.6 Total Target Area and Production by Crop in the Study Area

	Area (ha)			Production (t)		
	Present (A)	Target (B)	B/A MP	Present (C)	Target (D)	D/C
Aus	5,430	4,470	0.81	5,246	13,410	2.56
T. Aman	800	1,660	2.07	1,174	5,810	4.95
B. Aman	28,680	24,620	0.86	33,673	56,450	1.68
Boro	11,340	18,130	1.60	37,423	89,584	2.39
Rice-Total	46,250	48,880	1.05	77,516	165,254	2.13
Wheat	12,220	9,680	0.79	22,392	24,200	1.08
Oilseed	3,550	4,900	1.38	2,423	5,411	2.23
Potato	4,040	5,780	1.43	69,157	107,680	1.56
Pulses	620	2,600	4.19	433	2,600	6.16
Vegetables	2,950	7,440	2.52	39,813	112,200	2.82
Jute	2,520	2,980	1.18	4,438	6,284	1.41
Chilli	2,140	3,410	1.59	2,665	4,862	1.83

Table 3.1.1 Proposed Cultivated Area (from proposed cropping pattern)

Crop	Daudkandi				Homna				Total	Irrigation
	F1	F2	F3	Sub-total	F1	F2	F3	Sub-total		
Boro	-	8,700	4,150	12,850	-	3,720	1,560	5,280	18,130	Full
T.Aus	1,080	2,175	-	3,255	585	620	-	1,205	4,460	Full
T.Aman	1,080	-	-	1,080	585	-	-	585	1,665	Supplemental
B.Aman	-	8,700	8,300	17,000	-	3,720	3,900	7,620	24,620	Rainfed
W.Vegetable	2,160	-	-	2,160	1,560	-	-	1,560	3,720	Full
S.Vegetable	2,160	-	-	2,160	1,560	-	-	1,560	3,720	Full
Potato	1,620	2,175	-	3,795	1,365	620	-	1,985	5,780	Supplemental
Wheat	540	3,625	2,490	6,655	390	1,860	1,170	3,420	10,075	Supplemental
Chilli	-	2,175	-	2,175	-	1,240	-	1,240	3,415	Supplemental
Sesame	-	1,450	-	1,450	-	620	-	620	2,070	Supplemental
Mustard	-	-	1,660	1,660	-	-	1,170	1,170	2,830	Supplemental
Jute	1,620	-	-	1,620	1,365	-	-	1,365	2,985	Rainfed
Pulses	1,620	-	-	1,620	975	-	-	975	2,595	Rainfed
Total	11,880	29,000	16,600	57,480	8,385	12,400	7,800	28,585	86,065	
Net Area	5,400	14,500	4,150	24,050	3,900	6,200	3,900	14,000	38,050	
Crop Intensity	220 %	200 %	200 %	204 %	215 %	200 %	200 %	204 %	204 %	

Full Irrigation Area : 31,695 ha (26,310 ha in net)

Supplemental Irrigation Area : 24,107 ha (17,515 ha in net)

Rainfed Area : 30,100 ha

Table 3.1.2 Recommendation of Irrigation for Field Crops

Crop	Recomendation
Wheat	: Two irrigation, one at crown root initiation and another either at maximum tillering or booting stage are economically feasible for wheat production.
Potato	: For maximizing potato production two irrigation should be chosen one at stolonization and another at bulking stage. By introducing mulching in potato cultivation two irrigation could be minimized.
Mustard (Oilseed)	: One irrigation at preflowering and another either at flowering or pod filling stage are beneficial for HYV Mustard whereas single irrigation at preflowering stage is sufficient for LYV Mustard.
Maize	: Silking and tasseling stages are more sensitive to irrigatin for maize production.
Cauliflower	: Soil moisture tension should be kept up to 0.45 bar for cauliflower cultivation.
Cabbage	: Irrigation should be chosen when the soil moisture tension rises between 0.40-0.50 bar.
Tomato	: Allowable soil moisture depletion should be around 40% for maximizing tomato production.
Onion	: Favorable yield could be achieved if the soil moisture ranges between 0.40-0.60 bar.

Source: Bangladesh Agricultural Research Institute (BARI)

Table 3.1.3 Water Requirements of Boro

Item	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
1. Crop Coefficient (Kc)		1.10	1.10	1.25	1.25	1.00			
2. Potential Evapo-transpiration (ET <sub>o</sub> ) (mm/day)	3.2	2.6	2.7	3.8	4.8	4.1	5.7	4.4	4.4
3. Consumptive Use = (1) x (2) x 30 (mm)		89	92	133	186	123			
4. Percolation (mm)		31	31	28	31	30			
5. Effective Rainfall (mm/day)	0	0	0	0	18	100	120	230	370
6. Water Deficit = (3) + (4) - (5) (mm)		120	123	161	199	53			
7. Crop Intensity to Total Area		0.75	1	1	1	0.75			
8. Land Preparation Requirements (mm)	100								
9. Net Water Requirements = (6) x (7) + (8) (mm)	100	90	123	161	199	40			
10. Gross Water Requirements = (9) x 1/0.65 (mm)	154	138	189	248	306	61			
" (mm/day)	5.1	4.5	6.1	8.8	9.9	2.0			
" (l/s/ha/16hr)	0.89	0.77	1.06	1.54	1.71	0.35			

Table 3.1.4 Water Requirements of T.Aus

Item	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
2. Potential Evapo- transpiration (ET <sub>o</sub> ) (mm/day)	3.2	2.6	2.7	3.8	4.8	4.1	5.7	4.4	4.4
3. Consumptive Use = (1) x (2) x 30 (mm)						0	0	0	0
4. Percolation (mm)						90	93	90	93
5. Effective Rainfall (mm/day)	0	0	0	0	18	100	120	230	370
6. Water Deficit = (3) + (4) - (5) (mm)						(10)	(27)	(140)	0
7. Crop Intensity to Total Area						0.75	1	1	0.25
8. Land Preparation Requirements (mm)					100				
9. Net Water Requirements = (6) x (7) + (8) (mm)					100	-8	-27	-140	0
10. Gross Water Requirements = (9) x 1/0.65 (mm)					154	-12	-42	-215	0
" (mm/day)					5.0	-0.4	-1.3	-7.2	0.0
" (l/s/ha/16hr)					0.86	-0.1	-0.2	-1.25	0

Table 3.1.5 Water Requirements of T.Aman

Item	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
1. Crop Coefficient (Kc)			1.10	1.10	1.10	0.95			
2. Potential Evapo-transpiration (ETo) (mm/day)	3.2	2.6	2.7	3.8	4.8	4.1	5.7	4.4	4.4
3. Consumptive Use = (1) x (2) x 30 (mm)			92	125	164	117			
4. Percolation (mm)			0	0	32	30			
5. Effective Rainfall (mm/day)	230	370	250	120	60	0	0	0	0
6. Water Deficit = (3) + (4) - (5) (mm)			0	5	136	147			
7. Crop Intensity to Total Area			0.75	1	1	0.75			
8. Land Preparation Requirements (mm)		0							
9. Net Water Requirements = (6) x (7) + (8) (mm)		0	0	5	136	110			
10. Gross Water Requirements = (9) x 1/0.65 (mm)		0	0	8	209	169			
" (mm/day)		0.0	0.0	0.3	6.7	5.6			
" (l/s/ha/16hr)		0	0	0.04	1.17	0.98			

Table 3.1.6 Water Requirements of Winter Vegetable

Item	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
1. Crop Coefficient (Kc)	0.55	0.80	1.10	1.10					
2. Potential Evapo- transpiration (ET <sub>o</sub> ) (mm/day)	3.2	2.6	2.7	3.8	4.8	4.1	5.7	4.4	4.4
3. Consumptive Use = (1) x (2) x 30 (mm)	55	64	92	117					
4. Effective Rainfall (mm/day)	0	0	0	0	18	100	120	230	370
5. Water Deficit = (3) - (4) (mm)	55	64	92	117					
6. Crop Intensity to Total Area	0.75	1	1	0.75					
7. Net Water Requirements = (5) x (6) (mm)	41	64	92	88					
8. Gross Water Requirements = (7) x 1/0.70 (mm)	58	92	132	125					
" (mm/day)	1.9	3.1	4.4	4.2					
" (l/s/ha/12hr)	0.45	0.69	0.98	1.04					



Table 3.1.7 Water Requirements of Summer Vegetable

Item	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
1. Crop Coefficient (Kc)					0.55	0.80	1.10	1.10	
2. Potential Evapo- transpiration (ET <sub>o</sub> ) (mm/day)	3.2	2.6	2.7	3.8	4.8	4.1	5.7	4.4	4.4
3. Consumptive Use = (1) x (2) x 30 (mm)					82	98	194	145	
4. Effective Rainfall (mm/day)	0	0	0	0	18	100	120	230	370
5. Water Deficit = (3) - (4) (mm)					64	0	74	0	
6. Crop Intensity to Total Area					0.75	1	1	0.75	
7. Net Water Requirements = (5) x (6) (mm)					48	0	74	0	
8. Gross Water Requirements = (7) x 1/0.70 (mm)					68	0	106	0	
" (mm/day)					2.2	0.0	3.4	0.0	
" (l/s/ha/12hr)					0.53	0	0.79	0	

Table 3.1.8 Water Requirements of Potato

Item	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
1. Crop Coefficient (Kc)	0.55	0.91	1.15	1.07					
2. Potential Evapo- transpiration (ETo) (mm/day)	3.2	2.6	2.7	3.8	4.8	4.1	5.7	4.4	4.4
3. Consumptive Use = (1) x (2) x 30 (mm)	53	73	96	114					
4. Effective Rainfall (mm/day)	0	0	0	0	18	100	120	230	370
5. Water Deficit = (3) - (4) (mm)	53	73	96	114					
6. Crop Intensity to Total Area	0.75	1	1	0.75					
7. Net Water Requirements = (5) x (6) (mm)	40	73	96	85					
	Total = 294								

Table 3.1.9 Water Requirements of Wheat

Item	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
1. Crop Coefficient (Kc)	0.48	1.04	1.15	0.79					
2. Potential Evapo- transpiration (ET <sub>p</sub> ) (mm/day)	3.2	2.6	2.7	3.8	4.8	4.1	5.7	4.4	4.4
3. Consumptive Use = (1) x (2) x 30 (mm)	46	84	96	84					
4. Effective Rainfall (mm/day)	0	0	0	0	18	100	120	230	370
5. Water Deficit = (3) - (4) (mm)	46	84	96	84					
6. Crop Intensity to Total Area	0.75	1	1	0.75					
7. Net Water Requirements = (5) x (6) (mm)	35	84	96	63					
	Total = 278								

Table 3.1.10 Water Requirements of Oilseed (Mustard)

Item	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
1. Crop Coefficient (Kc)	0.55	0.93	1.10	0.85					
2. Potential Evapo- transpiration (ETo) (mm/day)	3.2	2.6	2.7	3.8	4.8	4.1	5.7	4.4	4.4
3. Consumptive Use = (1) x (2) x 30 (mm)	53	75	92	90					
4. Effective Rainfall (mm/day)	0	0	0	0	18	100	120	230	370
5. Water Deficit = (3) - (4) (mm)	53	75	92	90					
6. Crop Intensity to Total Area	0.5	1	1	0.75					
7. Net Water Requirements = (5) x (6) (mm)	26	75	92	68					
	Total = 261								

Table 3.1.11 Water Requirements of Oilseed (Sesame)

Item	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
1. Crop Coefficient (Kc)					0.65	1.10	1.08	0.65	
2. Potential Evapo- transpiration (E <sub>to</sub> ) (mm/day)	3.2	2.6	2.7	3.8	4.8	4.1	5.7	4.4	4.4
3. Consumptive Use = (1) x (2) x 30 (mm)					97	135	191	86	
4. Effective Rainfall (mm/day)	0	0	0	0	18	100	120	230	370
5. Water Deficit = (3) - (4) (mm)					79	0	71	0	
6. Crop Intensity to Total Area					0.75	1	1	0.5	
7. Net Water Requirements = (5) x (6) (mm)					59	0	71	0	
						Total = 130			

Table 3.1.12 Water Requirements of Chilli

Item	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
1. Crop Coefficient (Kc)					0.35	0.85	0.85	0.75	
2. Potential Evapo- transpiration (ET <sub>o</sub> ) (mm/day)	3.2	2.6	2.7	3.8	4.8	4.1	5.7	4.4	4.4
3. Consumptive Use = (1) x (2) x 30 (mm)					52	105	150	99	
4. Effective Rainfall (mm/day)	0	0	0	0	18	100	120	230	370
5. Water Deficit = (3) - (4) (mm)					34	5	30	0	
6. Crop Intensity to Total Area					0.75	1	1	0.5	
7. Net Water Requirements = (5) x (6) (mm)					26	5	30	0	
						Total = 61			

Table 3.1.13 Additional Irrigation Water Requirement for Miscellaneous Crops

Item	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Potato						
1. Additional Water Requirement (mm)	74		74			
2. Gross Water Requirement						
= (1) x 1/0.50 (mm)	148		148			
" (l/s/ha/12hr)	1.14		1.11			
Wheat						
1. Additional Water Requirement (mm)	70		70			
2. Gross Water Requirement						
= (1) x 1/0.50 (mm)	140		140			
" (l/s/ha/12hr)	1.08		1.05			
Oilseed (Mustard)						
1. Additional Water Requirement (mm)			65	65		
2. Gross Water Requirement						
= (1) x 1/0.50 (mm)			130	130		
" (l/s/ha/12hr)			0.97	1.07		
Oilseed (Sesame)						
1. Additional Water Requirement (mm)					59	
2. Gross Water Requirement						
= (1) x 1/0.50 (mm)					118	
" (l/s/ha/12hr)					0.88	
Chilli						
1. Additional Water Requirement (mm)					31	
2. Gross Water Requirement						
= (1) x 1/0.50 (mm)					62	
" (l/s/ha/12hr)					0.46	

Table 3.3.1 Road Classification and Geometric Standards of Road in Bangladesh

Classification	Definition	Crest Width	Payment Width	Shoulder Width on Either Side
<b>I. Arterial Road System</b>				
<b>1. National Highways</b>				
	Highway connecting a region with the national capital			
	Category - A	40' - 0"	22' - 0"	9' - 0"
	Category - B	40' - 0"	18' - 0"	11' - 0"
<b>2. Regional Highways</b>				
	Highway connection different regions with each other not connected by National Highways.			
	Category - A	36' - 0"	18' - 0"	9' - 0"
	Category - B	36' - 0"	12' - 0"	12' - 0"
<b>3. District Roads</b>				
	Roads connecting Sub-divisional Head Quarters with district Head Quarters and with each other within the district.	36' - 0"	12' - 0"	9' - 0"
<b>II. Feeder Road System</b>				
<b>4. Feeder Roads</b>				
	Roads connecting Upazila HQ and other Growth Centres with the arterial road system.	24' - 0"	12' - 0"	6' - 0"
<b>III. Rural Road System</b>				
<b>5. Category R1 (Upazila Roads)</b>				
	Roads connecting Union HQs/local markets with the Upazila HQ or road system.	16' - 0"	10' - 0"	3' - 0"
<b>6. Category R2 (Union Roads)</b>				
	Roads connecting villages and farms to local markets/Union HQ.	12' - 0"	-	0
<b>7. Category R3 (Village Roads)</b>				
	Roads within a village	8' - 0"	-	

Source: Bangladesh Planning Commission January, 1984.



Table 3.3.2 (1/2) Road Improvement Plan

Upazila Daudkandi

Sl No.	Name of Road	Grade	Length km	No of Bridges & Culverts	Remarks
1.	Gouripur Batakandi	F.A 1	5.00	3	Paving & including Bridges & Culverts
2.	Gouripur Ashmania	F.B 2	8.00	6	-do-
3.	Gouripur Kachua	-do-	12.00	4	-do-
4.	Pannai-Sree Rayer Char	-do-	16.00	8	-do-
5.	Batakandi Raipur	-do-	14.50	7	-do-
6.	Batakandi Kalir	-do-	6.50	4	-do-
7.	Shahadnipur Goalmari	-do-	13.00	2	-do-
8.	Daudkandi Goalmari	-do-	6.50	5	-do-
9.	Elliotgonj Mohamimadpur	-do-	6.00	10	-do-
10.	Elliotgonj Barakota	-do-	7.00	5	-do-
11.	Elliotgonj Pachpukuria	F.B 2	5.00	4	-do-
12.	Goalmari Mollakandi	-do-	6.50	3	-do-
13.	Shanud Ruhulanin	-do-	3.00	1	-do-
14.	Hassanpur Collage Hassanpur	-do-	4.00	1	-do-
15.	Daudkandi Mohanpur	-do-	7.00	4	-do-
16.	Goalmari Sreerayerchar	-do-	8.00	6	-do-
17.	Batakandi Ranpur Launch Ghat	-do-	13.00	10	-do-
18.	Gouripur Lalpur	-do-	4.00	3	-do-
Total			145.00	86	

Source : Upazila Information Nov. 1988 1 F.A = Feeder Road A

2 F.B = Feeder Road B

Table 3.3.2 (2/2) Road Improvement Plan

Upazila Homna

Sl No.	Name of Road	Grade	Length km	No of Bridges & Culverts	Remarks
1.	Homna Gouripur	F.A 1	6.00		Paved & including Bridges & Culverts
2.	Homna Daulatpur	F.B 2	6.70		-do-
3.	Homna maniderchar	-do-	9.00		-do-
4.	Sreemoddi Ragunathpur	-do-	16.00		-do-
5.	Ghagutia Baluakandi	-do-	13.00		-do-
6.	Bagmara Sovarampur	-do-	10.00		-do-
7.	Operchar Manipur	-do-	6.80		-do-
8.	Operchar Mahishmari	-do-	6.50		-do-
9.	Chandanpur Manikchar	-do-	4.00		-do-
10.	Doulatpur Ramkrishnapur	-do-	3.50		-do-
Total			81.50		

Source : Upaila Information Nov. 1988 1 F.A = Feeder Road A

2 F.B = Feeder Road B

Table 3.4.1 Estimated Population in 1988

No	Code	Name of Union	Area (Ha)	Population			Density (Persons/sq km)
				Total	Male	Female	
Daudkandi							
1.	193604	Balarampur North	1,084	18,847	9,463	9,384	1,739
2.	193608	Balarampur South	1,149	16,573	8,103	8,470	1,442
3.	193612	Barakanda	3,475	20,987	10,576	10,411	604
4.	193617	Bitikandi	2,287	32,549	15,738	16,811	1,423
5.	193621	Daudkandi North	1,542	19,734	9,764	9,970	1,280
6.	193625	Daudkandi South	1,824	26,053	14,251	11,802	1,428
7.	193630	Elliotgonji North	1,415	16,035	8,120	7,915	1,133
8.	193634	Elliotgonji South	1,396	18,464	9,517	8,947	1,323
9.	193638	Goalmari	1,959	32,565	16,088	16,477	1,662
10.	193643	Gobindapur	1,448	30,375	14,965	15,410	2,098
11.	193647	Gouripur East	1,365	17,292	8,757	8,535	1,267
12.	193651	Gouripur West	964	20,178	10,579	9,599	2,093
13.	193656	Jagathpur North	1,063	14,434	6,896	7,538	1,358
14.	193660	Jagathpur South	1,407	19,576	9,723	9,853	1,391
15.	193664	Maruka	3,001	32,998	16,434	16,564	1,100
16.	193669	Mazdpur	2,022	27,208	13,452	13,756	1,346
17.	193673	Mohammedpur	2,762	32,714	16,067	16,647	1,184
18.	193677	Narayenda	2,042	28,894	14,490	14,404	1,415
19.	193682	Panchgachia East	1,454	20,050	10,043	10,007	1,379
20.	193686	Panchgachia West	1,717	14,921	7,350	7,571	869
21.	193690	Sundalpur East	1,688	16,748	8,491	8,257	992
22.	193694	Sundalpur West	491	19,321	9,731	9,590	3,935
		Daudkandi Total	37,555	496,516	248,598	247,918	1,322
Homna							
1.	195409	Bhasania	1,904	30,033	15,147	14,886	1,577
2.	195419	Chandanpur	3,199	24,209	12,348	11,861	757
3.	195428	Chanderchar East	1,610	25,114	13,005	12,109	1,560
4.	195438	Chanderchar West	1,181	22,162	11,284	10,878	1,877
5.	195447	Ghagutia East	1,138	22,809	11,681	11,128	2,004
6.	195457	Ghagutia West	1,300	21,931	11,026	10,905	1,687
7.	195466	Homna North	1,718	18,515	9,429	9,086	1,078
8.	195476	Homna South	1,163	15,379	7,449	7,930	1,322
9.	195485	Nilakhi	2,414	31,986	16,140	15,846	1,325
10.	195495	Radha Nagar	2,244	26,153	12,983	13,170	1,165
		Homna Total	17,871	238,291	120,492	117,799	1,333
Total			55,426	734,807	369,090	365,717	1,326

Table 3.4.2 Estimated Population in 1999

No	Code	Name of Union	Area (Ha)	Population			Density (Persons/sq km)
				Total	Male	Female	
Daudkandi							
1.	193604	Balarampur North	1,084	23,434	11,766	11,668	2,162
2.	193608	Balarampur South	1,149	20,606	10,075	10,531	1,793
3.	193612	Barakanda	3,475	26,095	13,150	12,945	751
4.	193617	Bitikandi	2,287	40,470	19,568	20,902	1,770
5.	193621	Daudkandi North	1,542	24,536	12,140	12,396	1,591
6.	193625	Daudkandi South	1,824	32,393	17,719	14,674	1,776
7.	193630	Elliotgonji North	1,415	19,937	10,096	9,841	1,409
8.	193634	Elliotgonji South	1,396	22,957	11,833	11,124	1,644
9.	193638	Goalmari	1,959	40,490	20,003	20,487	2,067
10.	193643	Gobindapur	1,448	37,767	18,607	19,160	2,608
11.	193647	Gouripur East	1,365	21,500	10,888	10,612	1,575
12.	193651	Gouripur West	964	25,089	13,154	11,935	2,603
13.	193656	Jagathpur North	1,063	17,947	8,574	9,373	1,688
14.	193660	Jagathpur South	1,407	24,340	12,089	12,251	1,730
15.	193664	Maruka	3,001	41,029	20,434	20,595	1,367
16.	193669	Mazdpur	2,022	33,830	16,726	17,104	1,673
17.	193673	Mohammedpur	2,762	40,675	19,977	20,698	1,473
18.	193677	Narayenda	2,042	35,926	18,016	17,910	1,759
19.	193682	Panchgachia East	1,454	24,929	12,487	12,442	1,715
20.	193686	Panchgachia West	1,717	18,553	9,139	9,414	1,081
21.	193690	Sundalpur East	1,688	20,824	10,557	10,267	1,234
22.	193694	Sundalpur West	491	24,023	12,099	11,924	4,893
Daudkandi Total			37,555	617,350	309,097	308,253	1,644
Homna							
1.	195409	Bhasania	1,904	37,342	18,833	18,509	1,961
2.	195419	Chandanpur	3,199	30,101	15,353	14,748	941
3.	195428	Chanderchar East	1,610	31,226	16,170	15,056	1,940
4.	195438	Chanderchar West	1,181	27,555	14,030	13,525	2,333
5.	195447	Ghagutia East	1,138	28,360	14,524	13,836	2,492
6.	195457	Ghagutia West	1,300	27,268	13,709	13,559	2,098
7.	195466	Homna North	1,718	23,021	11,724	11,297	1,340
8.	195476	Homna South	1,163	19,122	9,262	9,860	1,644
9.	195485	Nilakhi	2,414	39,771	20,068	19,703	1,648
10.	195495	Radha Nagar	2,244	32,518	16,143	16,375	1,449
Homna Total			17,871	296,284	149,816	146,468	1,658
Total			55,426	913,634	458,913	454,721	1,648

Table 3.4.3 Existing Condition of Growth Center

Item		Daudkandi					Homna		
		Daud-kandi	Gouripur	Elliotganj	Batakandi	Goalmari	Homna	Daulatpur	Manik char
Area	(ha)	2.01	2.32	2.01	1.27	0.24	2.86	1.21	2.22
Market day in a week		2	1	2	1	2	2	2	
Rice shed	sq.m	134	208	167	100				
Fish shed	sq.m	89	130	70	104	89	111	100	111
Meat shed	sq.m	30	-	-	56		42	22	9
Vegitable shed	sq.m	67	100	145	78				
Cloth shed	sq.m	-	232	93			111	111	
Godown	Nos	2	2	1	1	1			
Hand Tube well	Nos	2	4	12	2	1	1	1	1
Latim	Nos	1	2	2	1		3	2	2
Electricity									
Post Office	Nos	1	1	1	1				
Banks	Nos	4	3	1	1				
Veterinary Hospital			1						
Dispensary			1						
Garbage pit			4				1	1	1
Rice mill	Nos	2	1		1				
Number of									
Buyers & Sellers	(1000)	15	20	25	15	8	25-30	15-20	8-10
Gross sales per annum (TK 10**7)		25	25	40	26	0.02	0.4	0.2	0.15
Cattle market	sq.m			74	5574				
Telephone	No			1					
Telegram					1				
Mosque					1				
Slaugh fer shed	sq.m						33	33	

Table 3.4.4 Improvement Plan of Growth Centers

Upazila Daudkandi

Items	Sl. No.1 Daudkandi Bazar	Sl. No.2 Gouripur Bazar	Sl. No.3 Elliotgoni Bazar	Sl. No.4 Batakandi Bazar	Sl. No.5 Goalmari Bazar
Shed for Fish	18.3m x 12.2m=223.26sq.m two story	18.3m x 12.2m=223.26sq.m two story	18.3m x 12.2m=223.26sq.m two story	18.3m x 12.2m=223.26sq.m two story	
Shed for Meat	1 Unit	1 Unit	1 Unit	1 Unit	
Shed for Vegetable	do	do	do	do	30.5m x 6.1m=186.05sq.m R.C two story 1 Unit
Shed for Rice	1 Unit	1 Unit	1 Unit	1 Unit	
Shed for Cloth		15.25m x 9.15m=139.54sq.m R.C two story, 1 No	15.25m x 9.15m=139.54sq.m R.C two story, 1 No	15.25m x 9.15m=139.54sq.m R.C two story, 1 No	11.00m x 5.5m=60.5sq.m R.C one floor
Slaughter House	1 unit with 1 hand pump	1 unit with 1 hand pump	1 unit with 1 hand pump	1 unit with 1 hand pump	1 unit with 1 hand pump
Shed for Cow		24.4m x 4.6m=112.24sq.m 1 Unit R.C Tin Roof	24.4m x 4.6m=112.24sq.m 1 Unit R.C Tin Roof	24.4m x 4.6m=112.24sq.m 1 Unit R.C Tin Roof	24.4m x 4.6m=112.24sq.m 1 Unit R.C Tin Roof
Internal Road	18.3m x 5m=9.150sq.m Concret pavement(20cm)	9.15m x 7m=6.405sq.m Concret pavement(20cm)	1.525m x 7m=10.675sq.m Concret pavement(20cm)	1.220m x 7m=8.540sq.m Concret pavement(20cm)	9.15m x 7m=6.405sq.m Concret pavement(20cm)
Internal Drain	1,525 m	1,068 m	1,830 m	1,220 m	1,068 m
Water Supply	1 Deep Tubewell Depth 120m 44" Pipe 500m	1 Deep Tubewell Depth Depth(400)120m 44" Pipe Length 500m	1 Deep Tubewell Depth 44" Pipe 500m	1 Deep Tubewell Depth 44" Pipe 500m	10 Unit of hand tubewell 30m Depth
Latrine	10 units with 3 seats	10 units with 3 seats	10 units with 3 seats	10 units with 3 seats	10 units with 3 seats
Godown	(Food)250MT 1 Unit 18.6m x 10m x 5.5m = 1,023cub.m R.C 1 Unit	(Food)500MT 30.5m x 12.2m x 5.5m = 2,046.55cub.m R.C 1 Unit	(Food)250MT 1 Unit 18.6m x 10m x 5.5m = 1,023cub.m R.C 1 Unit	(Food)250MT 1 Unit 18.6m x 10m x 5.5m = 1,023cub.m R.C 1 Unit	(Food)250MT 1 Unit 18.6m x 10m x 5.5m = 1,023cub.m R.C 1 Unit
Electricity	Lighting 500 m	Lighting 500 m	Lighting 500 m	Lighting 500 m	
Garbage Pit	10 Units	10 Units	10 Units	10 Units	10 Units

Upazila Homna

Items	Sl. No.1 Homna Bazar	Sl. No.2 Manikchar Bazar	Sl. No.3 Dulapur Bazar
Shed for Fish	18.3m x 12.2m=223.26sq.m two story	18.3m x 12.2m=223.26sq.m two story	18.3m x 12.2m=223.26sq.m two story
Shed for Meat	1 Unit	1 Unit	1 Unit
Shed for Vegetable	do	do	do
Shed for Rice	1 Unit	1 Unit	1 Unit
Shed for Cloth	15.25m x 9.15m=139.54sq.m R.C two story	15.25m x 9.15m=139.54sq.m R.C one floor	15.25m x 9.15m=139.54sq.m R.C two story, 1 unit
Slaughter House	1 unit with 1 hand Tubewell	1 unit with 1 hand Tubewell	1 unit with 1 hand tubewell
Shed for Cow	24.4m x 4.6m=112.24sq.m 1 Unit R.C Tin Roof	24.4m x 4.6m=112.24sq.m 1 Unit R.C Tin Roof	24.4m x 4.6m=112.24sq.m 1 Unit R.C Tin Roof
Internal Road	500m x 7m=3,500sq.m Concret pavement	500m x 7m=3,500sq.m Concret pavement	500m x 7m=3,500sq.m Concret pavement Bridge L=24m W=6.8m 1 No
Internal Drain	1,000 m	1,000 m	1,000 m
Water Supply	1 Deep Tubewell D=60m with water pipe 500m, 1 unit.	1 Deep Tubewell D=60m with water pipe 500m, 1 unit Length 500m	1 Deep Tubewell D=60m with water pipe 500m, 1 unit
Latrine	3 seats x 2 units	2 seats x 2 units	3 seats x 2 units
Godown	Cold Storage 200MT 20m x 15m x 2.8m = 840cub.m		
Electricity	Lighting 500 m		Lighting 500 m
Garbage Pit	8 Units	4 Units	8 Units
Cold Storage	1 (200 t)		

Table 3.4.5 Improvement of Hat Market

## Upazila Daudkandi

Sl. No.	Name of Market	Improvement Facilities					Garbage Pit
		Sales Shed	Internal Road (m)	Internal Drain (m)	Water Supply	Latrin	
1.	Rampur Bazar	Type B	1,000	700	3 Units	3 Units	3 Units
2.	Khirachalk Bazar	- do-	1,000	700	- do-	- do-	- do-
3.	Baidddihanath Pur Bazar	- do-	1,000	700	- do-	- do-	- do-
4.	Scennagar Bazar	- do-	1,000	700	- do-	- do-	- do-
5.	Mohammedpur Bazar	- do-	1,000	700	- do-	- do-	- do-
6.	Gobinda Pur Bazar	Type A	500	500	2 Units	2 Units	2 Units
7.	Uzirakandi Bazar	- do-	500	500	- do-	- do-	- do-
8.	Kalir Bazar	Type B	1,000	700	3 Units	3 Units	3 Units
9.	Karakandi Bazar	Type A	1,000	700	2 Units	2 Units	2 Units
10.	Machimpur Bazar	Type B	1,000	700	3 Units	3 Units	3 Units
11.	Daskandi Bazar	Type A	500	500	2 Units	2 Units	2 Units
12.	Ashmania Bazar	Type B	1,000	700	3 Units	3 Units	3 Units
13.	Lalpur Bazar	Type A	500	500	2 Units	2 Units	2 Units
14.	Hasnabad Bazar	- do-	500	500	- do-	- do-	- do-
15.	Sree Raiyerchar Bazar	Type A	500	500	2 Units	2 Units	2 Units
16.	Paler Bazar	Type B	1,000	700	3 Units	3 Units	3 Units
17.	Kawadi Bazar	Type A	500	500	2 Units	2 Units	2 Units
18.	Naiyer Bazar	Type B	1,000	700	3 Units	3 Units	3 Units
19.	Barkota Bazar	- do-	1,000	700	- do-	- do-	- do-
20.	Sundalpur Bazar	- do-	1,000	700	- do-	- do-	- do-
21.	Raypur Bazar	- do-	1,000	700	- do-	- do-	- do-
22.	Shahidnagar Bazar	Type A	500	500	2 Units	2 Units	2 Units
23.	Jagathpur Bazar	- do-	1,000	700	- do-	- do-	- do-
24.	Hat Khola Bazar	- do-	1,000	700	- do-	- do-	- do-
25.	kalasona Bazar	- do-	1,000	700	- do-	- do-	- do-
26.	Mohammed pur Bazar	- do-	1,000	700	- do-	- do-	- do-
27.	Juranpur Bazar	Type B	1,000	700	3 Units	3 Units	3 Units

## Upazila Homna

Sl. No.	Name of Market	Improvement Facilities					Garbage Pit
		Sales Shed	Internal Road (m)	Internal Drain (m)	Water Supply	Latrin	
1.	Chandanpur Bazar	Type A	500	500	2 Units	2 Units	2 Units
2.	Taker Bazar	- do-	500	500	- do-	- do-	- do-
3.	Taltali Bazar	- do-	500	500	- do-	- do-	- do-
4.	Ramkrishnapur Bazar	- do-	500	500	- do-	- do-	- do-
5.	Chatpur Bazar	- do-	500	500	- do-	- do-	- do-
6.	Kashi Pur Bazar	- do-	500	500	- do-	- do-	- do-
7.	Miras Bazar	- do-	500	500	- do-	- do-	- do-

- Note Type A : One unit consists of shed for fish, meat, rice and vegetables, and two story structure 18.3m x 12.2m
- Type B : One unit consists of shed for fish, meat, rice and vegetables, and cloth two story structure 27.45m x 18.3m
- Type C : One unit of water supply facility consists of hand tube-well (30m depth suction pipe)
- Latrine pit : One unit of latrine consists of three chambers

Table 3.4.6 (1/2) Improvement Plan of High Schools and College

Daudkandi Upazila

Sl. No.	Name of High School	Contents
1.	Daudkandi Model High School under Daudkandi(S) U.P.	Construction of school buildings( class room 82.5 m2 x 5 rooms,staff room 82.5 m2 ) Drinking water supply
2.	Gouripur Subal Aftab High School Gouripur(W), U.P.	-do-
3.	Daudkandi Begum Amena Sultan Girls High School under Daudkandi(South),U.P.	-do-
4.	Barapara Girl's High School under Sundalpur(E), U.P.	-do-
5.	Hatkholra High School under Mohammadpur U.P.	-do-
6.	Barkota High School under Mohammadpur U.P.	-do-
7.	Kawadi High School under Panchigachia(E) U.P.	-do-
8.	Mollakandi Lal Maih High School under Goalmari U.P.	-do-
9.	Jamalkandi Osmania High School under Goalmari U.P.	-do-
10.	Goalmari Hazrat Abdul Qadir Jalani(R:) High School under Goalmari U.P.	-do-
11.	Chasai High School under Maruka Union Parishad.	-do-
12.	Daulat Hossain High School under Gobindapur Union Parishad.	-do-
13.	Jagatpur Sadhana High School under Jagatpur (S) U.P.	-do-
14.	Gazipur High School under Balarampur (N) U.P.	-do-
15.	Mozidpur High School under Mozidpur Union Parishad.	-do-
16.	Baherchar Fazlul Hoque High School under Daudkandi (N.) Union Parishad	-do-
17.	Machimpur R.R. Institute under Bhitikandi Union Parishad	-do-
18.	Juranpur Karimunnessa Girl's High School under Goalmari Union Parishad	-do-
19.	Akbar Ali Khan Technical & Commerce College	-do-



Table 3.4.6 (2/2) Improvement Plan of High Schools and College

Homna Upazila

Sl. No.	Name of High School	Contents
1.	Government High School	Construction of school buildings( class room 82.5 m2 x 5 rooms,staff room 82.5 m2 ) Drinking water supply
2.	Homna Kabilddin Girl's High School	-do-
3.	Mathabangha High School	-do-
4.	Manikerchar High School	-do-
5.	Chandanpur High School	-do-
6.	Dalalpur High School	-do-
7.	Daulatpur High School	-do-
8.	Baher Kalmina High School	-do-
9.	Kalagchia High School	-do-
10.	Ramkrishnapur High School	-do-
11.	Ramkrishnapur Girl's High School	-do-
12.	Kashipur High School	-do-

Table 4.2.1 Results of Income Survey

## Homna

No.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.	3,100	2,800	3,100	1,800	1,860	1,800	1,200			3,000	3,000	3,100
2.	1,705	1,960	1,860	1,500	2,170	1,800	1,705	1,800		900	1,950	2,170
3.	930	840	930	900	930	900	930			930	900	930
4.	2,000	1,500	2,000	1,800	1,200	1,200	1,200	1,800	1,500	1,200	2,000	1,400
5.	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
6.	2,000	2,200	2,180	2,000	1,200	2,000	1,200	2,180	1,175		2,200	2,000
7.	2,500	1,500	1,800	2,200	2,000	2,000	2,500	2,500	1,600	1,400	2,000	2,000
8.	600	1,200	1,600	2,000	1,500	2,000	1,500	500	300	400	400	800
9.	2,000	2,000	2,500	2,000	3,000	2,500	3,000	2,000	3,000	2,500	3,000	2,500
10.	950	860	960	850	900	850	800	950	850	900	850	950
11.	800	800	700	600	800	800	600	800	700	800	800	600
12.	980	1,000	875	700	875	600	1,120	800		1,250	1,000	800
13.	1,500	1,400	1,500	1,250	500	1,800	1,250	400	600	1,250	1,500	1,500
14.	750	1,000	1,000	880	800	800	600	400	400	800	1,000	1,000
15.	875	800	875	880	400	800	1,000	300	600	1,000	1,000	1,100
16.	500	480	500	500	520	840	750	810	720	780	750	540
17.	500	500	540	480	520	560	480	300	360	400	480	540
18.	500	480	500	480	500	480	750	750	750	750	750	500
Total	25,190	24,320	26,420	23,820	22,675	24,730	23,585	19,290	15,555	21,260	26,580	25,430
Average	1,399.4	1,351.1	1,467.8	1,323.3	1,259.7	1,373.9	1,310.3	1,205.6	1,111.1	1,250.6	1,476.7	1,412.8

## Daudkandi

No.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.	750	400	450	450	400	400	700	400		400	750	750
2.	1,150	1,100	1,000	1,000	950	500	500	500	500	500	1,050	1,100
3.	600	520	650	700	800	600	600	650	700	1,050	1,050	750
4.	1,200	650	1,400	625	600	650	550			350	1,200	1,000
5.	750	560	600	750	700	750	750	700	750	600	700	750
6.	1,000	840	450	450	560	560	1,560	1,200	200	450	1,400	1,500
7.	1,250	1,400	1,500	1,300	1,200	900	850	650	600	750	850	1,000
8.	1,250	750	750	850	950	750	800		500	800	600	1,100
9.	6,500	6,000	4,500	1,000	2,500	3,000	2,500			1,000	2,000	3,000
10.	1,050	910	1,050	1,050	1,050	1,050	1,350	1,350	1,350	1,050	1,050	1,050
11.	800	700	875	875	350	800	1,000	1,100	1,200	700	250	750
12.	500	600	750	750	950	1,000	750	800	800	800	1,000	1,000
13.	1,200	1,400	1,500	1,200	1,600	660	300		400	650	840	1,120
14.	600	500	500	500	550	400	300	250	300	550	550	600
15.	350	400	480	500	500	350	250	300	250	300	300	550
16.	650	550	600	700	700	950	1,000	800	850	1,100	900	550
17.	1,250	1,250	700	600	600	650	750	600	1,200	1,250	1,300	1,300
18.	700	750	800	600	550	450	750	810	550	500	650	700
Total	21,550	19,280	18,555	13,900	15,510	14,420	15,260	10,110	10,150	12,800	16,440	18,570
Average	1,197.2	1,071.1	1,030.8	772.2	861.7	801.1	847.8	722.1	676.7	711.1	913.3	1,031.7



## ***FIGURES***



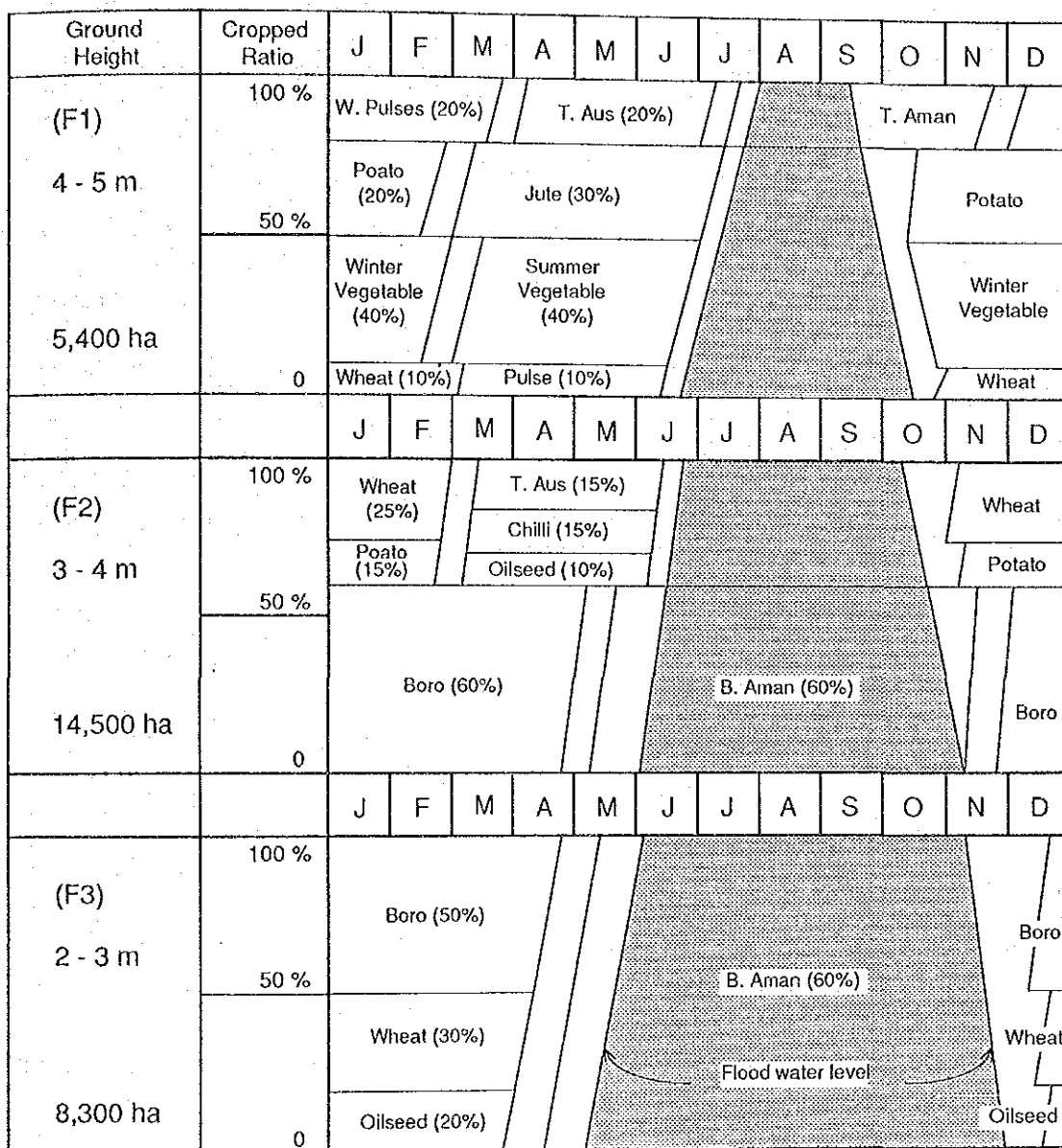


Fig. 2.1.1

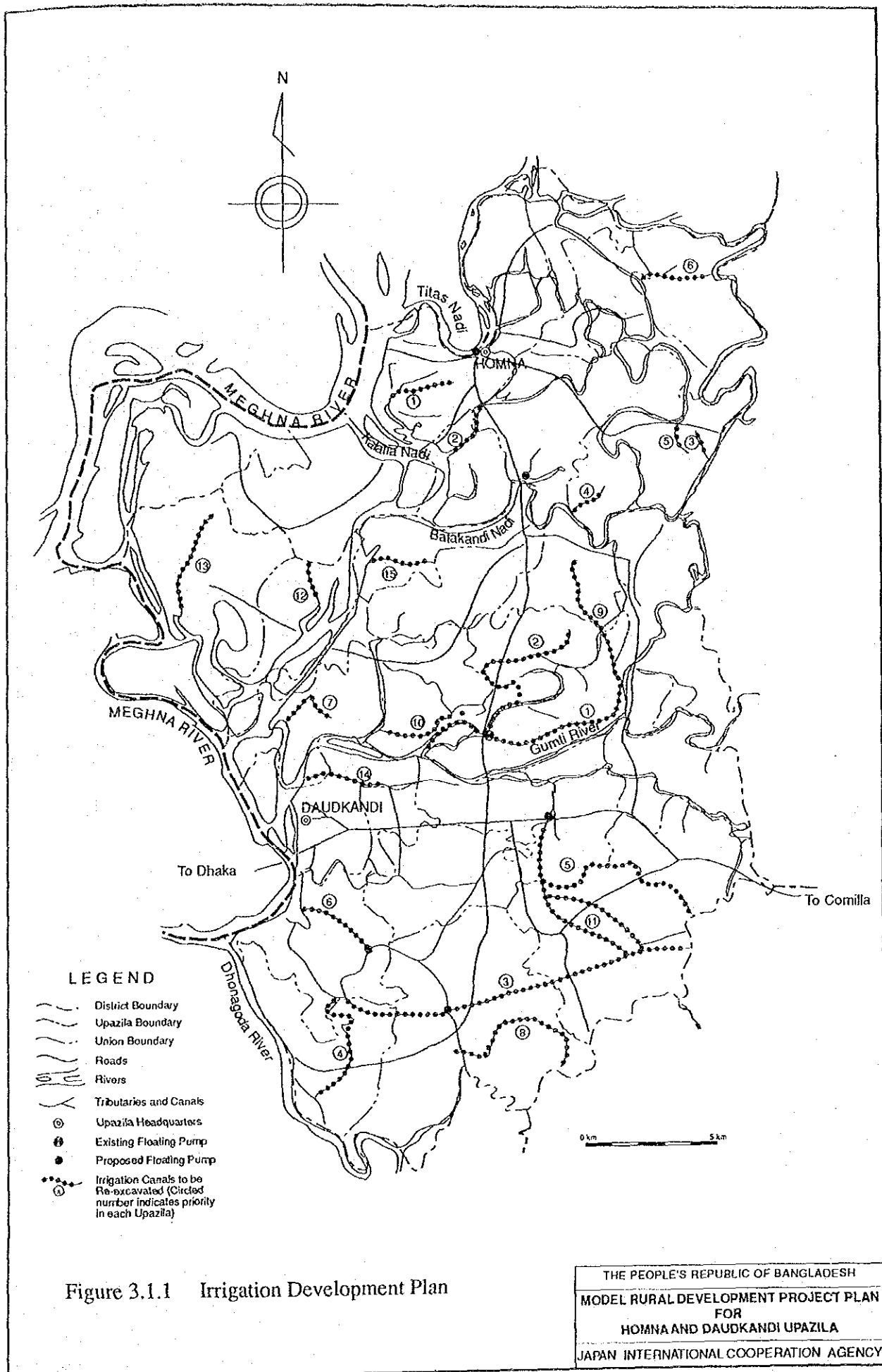
Proposed Cropping Pattern in  
Daudkandi

THE PEOPLE'S REPUBLIC OF BANGLADESH  
MODEL RURAL DEVELOPMENT PROJECT PLAN  
FOR  
HOMNA AND DAUDKANDI UPAZILA  
JAPAN INTERNATIONAL COOPERATION AGENCY

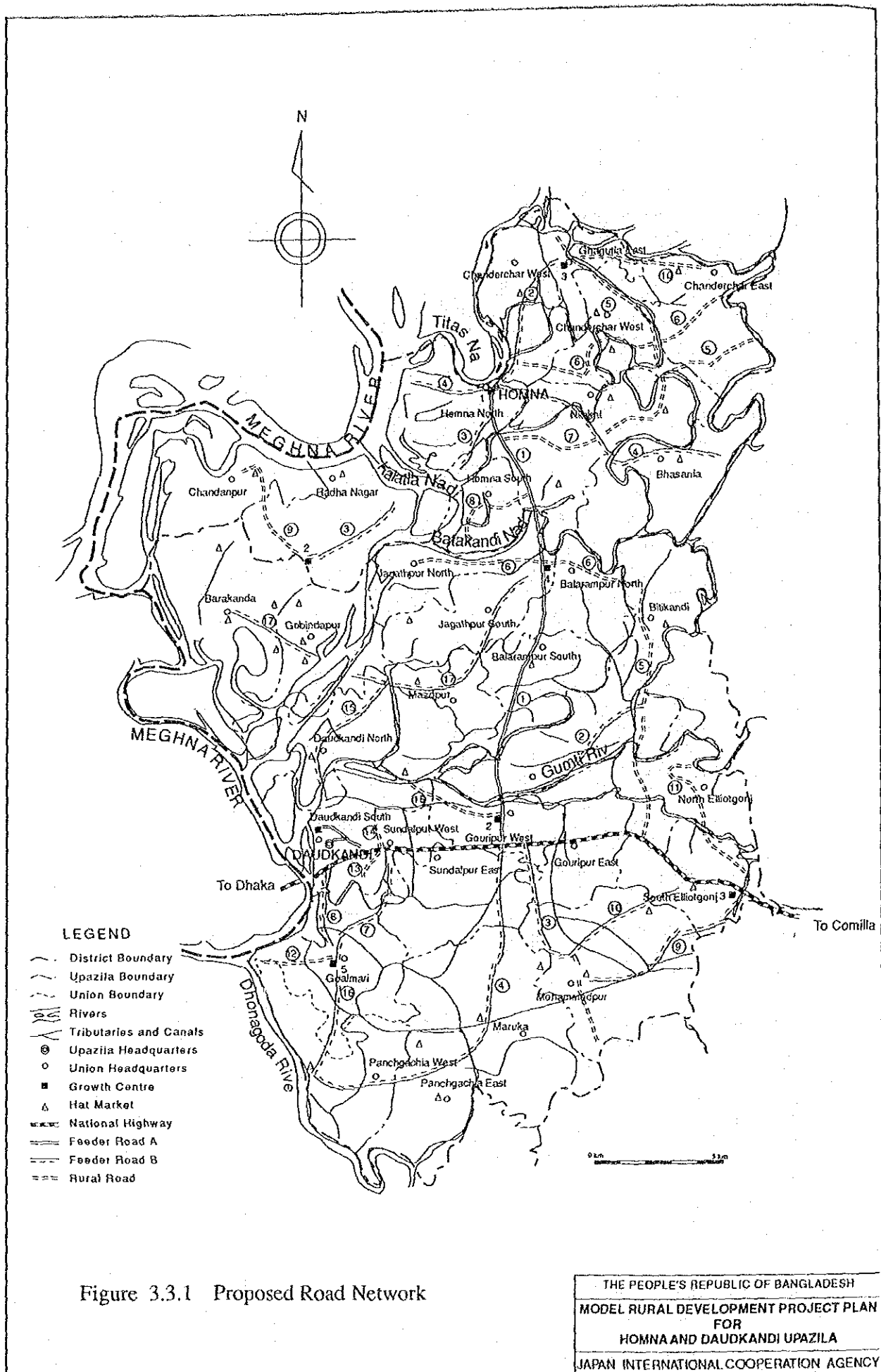
Ground Height	Cropped Ratio	J	F	M	A	M	J	J	A	S	O	N	D
(F1)	100 %	W. Pulses (15%)			T. Aus (15%)					T. Aman (15%)		Pulses	
4 - 5 m	50 %	Potato (35%)			Jute (35%)							Potato	
3,900 ha	0	Winter Vegetable (40%)			Summer Vegetable (40%)							Winter Vegetable	
		Wheat			Pulses (10%)							Wheat	
		J	F	M	A	M	J	J	A	S	O	N	D
(F2)	100 %	Wheat (30%)			T. Aus (10%)							Wheat (30%)	
3 - 4 m	50 %	Potato (10%)			Oilseed (10%)							Potato (10%)	
6,200 ha	0	Boro (60%)										Boro	
		J	F	M	A	M	J	J	A	S	O	N	D
(F3)	100 %	Boro (40%)										Boro	
2 - 3 m	50 %	Wheat (30%)										Wheat	
3,900 ha	0	Oilseed (20%)										Oilseed	

Fig. 2.1.2 Proposed Cropping Pattern in Daudkandi

THE PEOPLE'S REPUBLIC OF BANGLADESH  
 MODEL RURAL DEVELOPMENT PROJECT PLAN  
 FOR  
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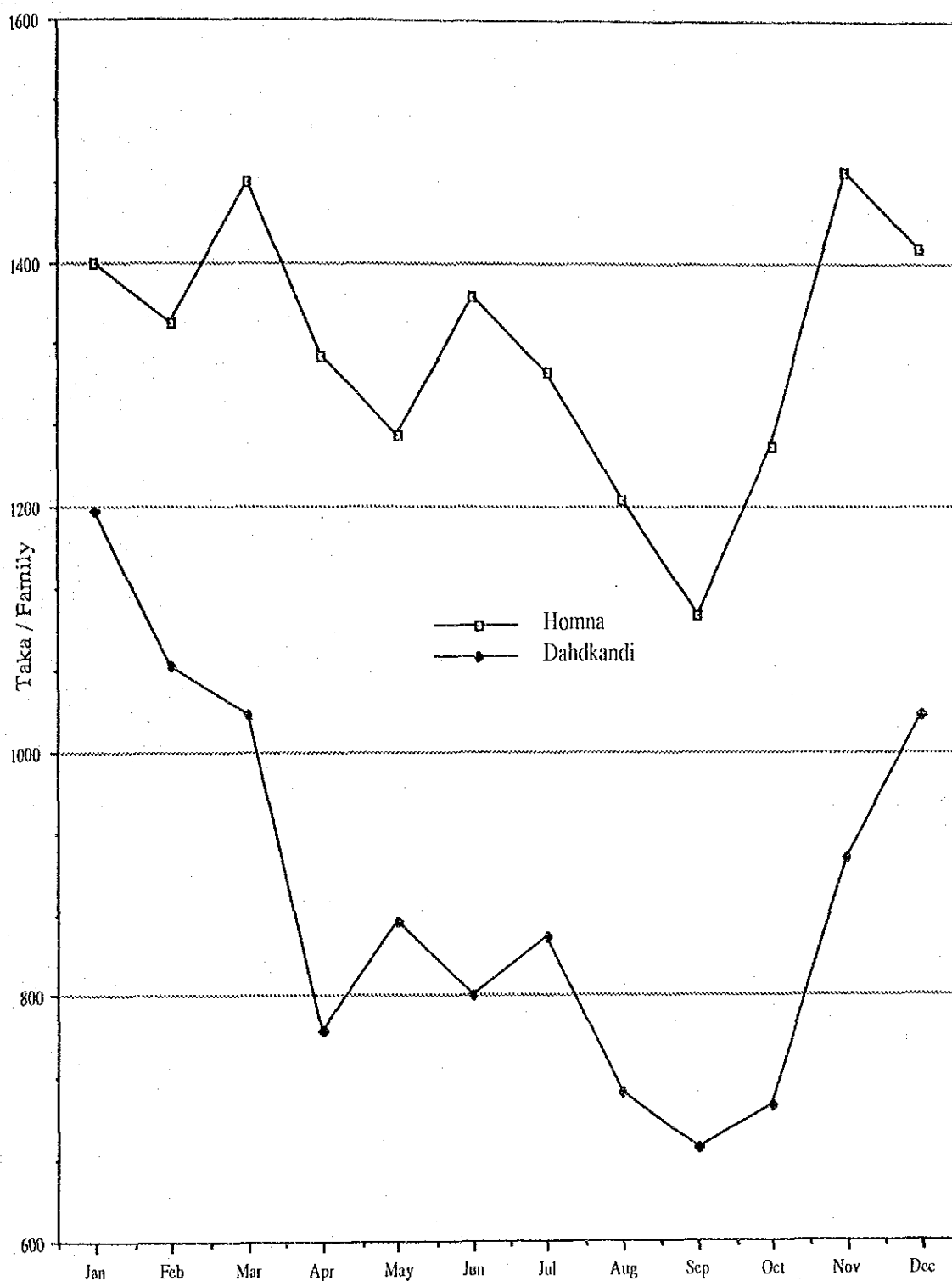


Figure 4.2.1 Trend of Monthly Incomes per Landless Household

THE PEOPLE'S REPUBLIC OF BANGLADESH  
 MODEL RURAL DEVELOPMENT PROJECT PLAN  
 FOR  
 HOMNA AND DAUDKANDI UPAZILA  
 JAPAN INTERNATIONAL COOPERATION AGENCY



*ANNEX C*  
*CONSTRUCTION PLAN AND COST ESTIMATES*



## ANNEX C

### CONSTRUCTION PLAN AND COST ESTIMATE

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Figure 1.1.1	Provisional Project Implementation Schedule
Figure 1.2.1	Provisional Construction Schedule for Priority Project
Figure 2.1.1	Image Sketch of Structures,Buildings and Facilities

## 1. Construction Plan

### 1.1 MRDP

Construction works of the Model Rural Development Project (MRDP) consist of various kind of works such as building works, road works, canal works, desilting works, etc. Construction item of this MRDP are shown below:

Item	Unit	Total		
		Daudkandi	Homna	Total
1. UCCA				
1.1 UCCA Building	place	1	1	2
1.2 AMC	place	1	1	2
1.3 Inland Fish Centre	place	1	1	2
1.4 Community Centre with godown and rice mill	place	97	46	143
2. Infrastructure Development				
2.1 Irrigation				
2.1.1 Re-excavation of Irrigation Canal	km	125	18	143
2.1.2 Re-excavation of Drainage Canal	km	0	15	15
2.1.3 Buried Pipeline	place	40	29	69
2.2 Road				
2.2.1 Feeder A				
1) Road Body	km	13	5	18
2) Bridge	Nos.	3	0	3
2.2.2 Feeder B				
1) Road Body	km	107	33	140
2) Bridge	Nos.	61	20	81
2.2.3 Rural Road				
1) Road Body	km	35	48	83
2) Bridge	Nos.	22	38	60
2.3 Growth Centre	place	5	3	8
2.4 Hat Market	place	27	7	34
2.5 Fish Pond	place	3,000	1,500	4,500
3. Others				
3.1 High School	place	19	12	31
3.2 Drinking Water Supply	place	476	200	676

In accordance with the general concept of the MRDPP, structures and facilities should be as much as possible of moderate size and conventional manners in consideration of the use of local materials, the availability of skilled labour, labour intensive construction works and simplicity in operation and maintenance.

#### Mode of earthwork

All earthwork will be carried out by man-power force in principle. Following tools or equipments would be introduced on the earthworks of the Project.



### Earthworks

### Proposed Tools or Equipment

Excavation

plow or shovel

Hauling

man-power

bamboo-basket

wheel barrow

Spreading

man-power

Compacting

hand tamper

roller

vibration-roller

### Workable days

Civil works, especially earthworks are mostly affected by rainfall and also flood water level in the Project area. As shown in Figures 1.4 and 1.5 in Annex A, flood water cover the project area during rainy season i.e. from May to October. And about 87% of annual fall concentrate in that rainy season. From this climatological feature, workable days of civil works are estimated at 150 days (6 months x 25 day/month).

### Construction method

Major civil works such as culvert, bridge and road works and major buildings will be constructed on the contract basis. A principle of one structure one contractor will be applied to the Project.

The construction works are divided into three major works, i.e. earthworks, concrete works, and building works as mentioned below:

#### (1) Earthworks

Major earthworks have to be executed during the period from the end of October to the end of April to secure effective performance and proper quality control. Major earthworks consist of the construction of roads, rehabilitation of fish pond and re-excavation of irrigation and drainage canals. The excavated soil will be placed on nearby road sites or conveyed to the spoil-bank.

## (2) Concrete works

Main concrete works comprise construction of the bridge/culvert and pipe for buried pipeline. Concrete for bridge/culvert works is prepared in site by portable concrete mixer and concrete pipe is prepared by small concrete plant.

## (3) Building works

The building works comprise construction of UCCA office, AMC office, Community Centre, etc. The building works can be executed during the rainy season period but not flooded period.

The superstructure is composed of reinforced concrete columns forming a rigid frame and of iron roof trusses. The walls will be constructed with brick masonry except UCCA's and AMC offices. These offices will be constructed with RCC wall.

## Project Implementation

MRDPP will be implemented by a stagewise development method considering the economic and social condition. It is recommended that the 10-year development plan for this MRDPP will be divided into three stages. Project components which have most important and urgency will be completed in the first stage of 1990 to 1993. Second stage has also three years from 1994 to 1996 and during this period sanitary and drinking water project will be completed. Third stage, three years plan will complete whole MRDPP works by 1999. Figure 1.1.1 shows the provisional implementation schedule of MRDPP and Table 1.1.1 shows project works of each stage.

### 1.2 Priority Projects

As mentioned above, construction of the MRDPP is divided into three stages. The project components of first stage are so selected to implement in early stage as Priority Projects.

The construction of the priority project would last from 1991 to 1990, assuming that the foreign fund necessary for the project would be concluded within the Fiscal year of 1990/91, and that the mobilization of contractor would be made within wet season of 1991.

Time required for completion of the priority project works covering road & canal earthwork, bridge & culvert works and building works, is estimated at two dry seasons, starting from the dry season of 1991. (See Figure 1.2.1)

Prior to the commencement of construction works, detailed design works and tendering should be completed and concluded. The time required for this pre-construction arrangement is estimated at six months after conclusion of aid agreement.

Land acquisition, necessary for the project and undertaking by GOB should also be completed before commencement of works.

## 2. Cost Estimate

### 2.1 Basic assumption

The construction cost is estimated based on the preliminary design and following conditions. Figure 2.1.1 illustrates image of buildings and facilities for this MRDPP.

- a) The construction cost integrated by unit costs is estimated on the bases of the standard schedule of rate and unit prices in Comilla district prepared by LGEB for the budget year of 1988 - 89, and of the current market price in Dhaka in March 1989.

- b) The exchange rate used in the estimate is assumed as:

$$\text{US \$ } 1.0 = \text{Tk.} 31.9 = \text{¥} 127.6$$

- c) The construction equipment and machinery to be imported from abroad are estimated based on the CIF prices at Chittagong, and taxes/duties on these equipment and machinery are excluded in the cost estimate.
- d) Land acquisition and administration costs, 5% of the direct cost respectively, are included in the construction cost. The physical contingency related to the work quantities, 15% of the direct cost, is also included in the construction cost in view of the preliminary nature of the estimate.
- e) Price contingency is considered at an annual escalation rate of 10%.

#### Unit rate

Based on the LGEB's standard, unit rate for the MRDPP are estimated as shown in Tables 2.1.1, 2.1.2 and 2.1.3.

### 2.2 Project cost

#### (1) Construction cost

The total construction cost of the project over a 10-year period and the stagewise disbursement schedule, which is worked out based on the construction schedule, are summarized below and in Tables 2.2.1 & 2.2.2.

The details are stated in Tables 2.2.3 and 2.2.16.

(Unit: MTk.)

	Stage	Daudkandi	Homna	Total
1.	First stage	262.6	492.6	1,361.2
2.	Second stage	888.6	450.1	1,338.7
3.	Third stage	873.3	274.0	1,147.2
	Total	2,630.5	1,216.7	3,847.2

All first stage works are priority projects of the MRDPP.

Above construction cost is estimated based on 1988/89 prices excluding price contingency.

(2) Operation and maintenance cost

Annual O&M cost is estimated based on the following assumptions:

Irrigation & road facilities	:	2.0% of direct construction cost
Buildings	:	0.5% of direct construction cost
Equipment	:	5.0% of direct construction cost

Annual O&M cost is then as follows:

(Unit: million Tk.)

	Daudkandi	Homna	Total
Irrigation & Road Facilities	12.1	6.6	18.7
Other facilities & Equipment	26.4	11.3	37.7
Total	38.5	17.9	56.4

(3) Operation cost

Project operation cost is estimated at as following table. Purchase cost of paddy and fertilizer for UCCA's business is the largest operation cost.

(Unit: million Tk.)			
	Personnel Cost	Operation Cost	Total
1. UCCA	16.9	-	16.9
2. Godown	10.1	611.3	621.4
3. Rice mill	10.4	48.0	58.4
4. Inland Fishery	0.2	7.6	7.8
5. AMC	1.6	3.2	4.8
Total	39.2	670.1	709.3

(4) Priority project cost

The construction and operation cost of the priority project is shown in Table 2.2.17 and Table 2.2.18 and summarized below.

Construction cost	1,630.6 MTK
Operation cost	243.9 MTK

