

# **Char Development and Settlement Project Phase IV Bangladesh**

## **Agriculture Benchmark Survey**

**Technical Report No. 2**

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**Implementing Government Agencies:**

- **Bangladesh Water Development Board (BWDB)**
  - **Ministry of Land (MoL)**
  - **Local Government Engineering Department (LGED)**
  - **Department of Public Health Engineering (DPHE)**
  - **Department of Agricultural Extension (DAE)**
  - **Forest Department (FD)**
- and NGOs**

**BETS**

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## CHAPTER 1: INTRODUCTION AND BACKGROUND OF THE PROJECT

### 1.1 Introduction and background

Char Development and Settlement Project (CDSP)-IV, started in March 2011, with the mobilization of TA team. The focus of the activities is the development of five new chars namely:

1. Char Nangulia,
2. Noler Char,
3. Caring Char,
4. Char Ziauddin and
5. Urir Char.

The total land area of these five chars is around 30,000 ha, with an estimated population of 155,000 in 28,000 households (Table-1).

The chars are located under Noakhali and part of Chittagong district. See the map of the CDSP IV area on the following page. The geographical/ administrative distribution is as under:

- Char Ziauddin: under Subarnachar upazilla of Noakhali
- Char Nangulia: part of Hatiya and part of Subarnachar upazilla of Noakhali
- Noler Char: under Hatiya upazilla of Noakhali
- Caring Char: under Hatiya upazilla of Noakhali
- Urir Char: part of Sandwip upazilla of Chittagong district and part of Companiganj upazilla of Noakhali district.

These chars were accreted during 20-40 years and settlement started from 11-14 years ago, except Urir Char. In Urir Char, people were settled before the 1970s. The settlers were mainly river eroded from nearby adjacent areas like Hatiya, Bhola, Ramgati, Companiganj and Sandwip.

**Table 1: Area, population and households (HH) of Chars under CDSP IV**

Sl. No.	Name of the Char	Area		Population	Households
		Hectare	Acre		
1	Char Nangulia	8,990	22,000	67,000	12,000
2	Noler Char	2,690	6,650	33,000	6,000
3	Caring Char	6,850	16,920	33,000	6,000
4	Urir Char	10,300	25,441	11,000	2,000
5	Char Ziauddin	1,943	4,799	11,000	2,000
<b>Total</b>		<b>30,773</b>	<b>75,810</b>	<b>155,000</b>	<b>28,000</b>

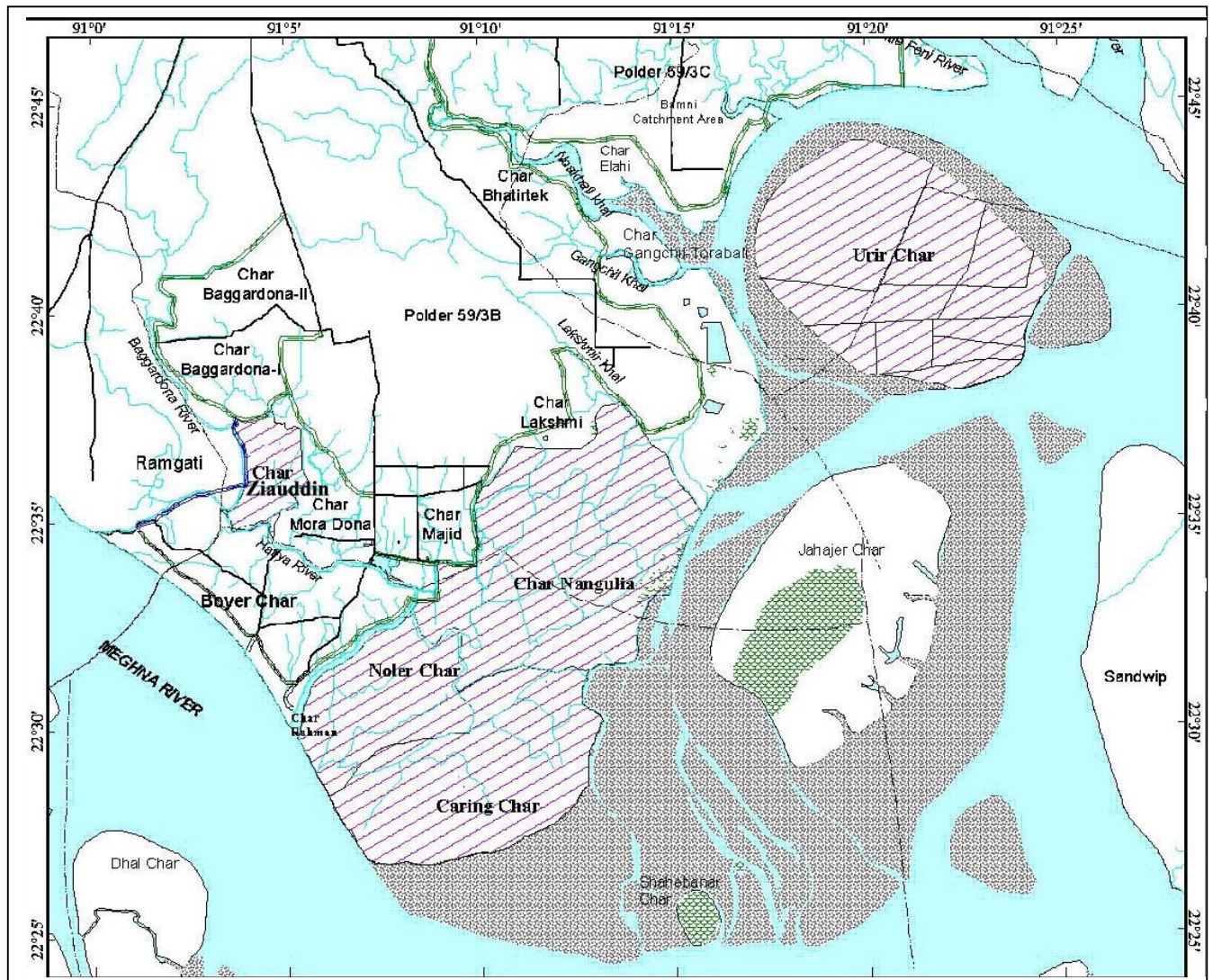
### 1.2 Objective of the project

The overall objective of the project is to reduce poverty and hunger for the poor people living on newly accreted chars. This is expected to be achieved through the process of improved and more secured livelihood. The purpose of the project, therefore, is to improve and enhance the security of livelihood of the settlers in these char areas.

This is applied in particular for the targeted 28,000 households of the CDSP IV project area. Objective and purpose will be achieved through six outputs:

- Effective management of water resources, protection against tidal and storm surges, improved drainage system;
- Climate resilient internal infrastructure of communication, markets, cyclone shelters, provision for potable water and hygienic sanitation;
- Provision of legal title to land for the landless settlers;
- Improved livelihood and household resilience;
- Institutional development in order to creating an enabling institutional environment;
- Knowledge management through undertaking and disseminating surveys and studies and by learning from contribution to ICZM efforts.

### AREA UNDER CDSP-IV



## **CHAPTER 2: OBJECTIVE OF THE BENCHMARK SURVEY**

The unprotected coastal chars are vulnerable to regular flooding and have saline soils. In most of the unprotected lands along the coast only one rice crop is possible in the aman season, when heavy rains temporarily decrease the salinity of the higher layers of the soil. In the winter season, at some places an additional crop is harvested. The overall cropping intensity is very low compared to other areas of the country.

The agricultural component of the project has the following specific objectives:

- Strengthening of agricultural extension services
- Support to homestead agriculture and agro forestry by contracted NGOs
- Surveys and monitoring

The specific objective of the agricultural benchmark survey is to find out the present agricultural status as regards to area under cultivation, cropping pattern, cropping practices of the area, use of HYV and modern technology etc. And also to identify the scope of potential modern technologies, suitable for the area in the light of the existing crop production practices.

## CHAPTER 3: APPROACH AND METHODOLOGY OF SAMPLING PROCEDURE

### 3.1 Preparation of survey questionnaire

A pre-designed survey questionnaire was prepared for the interviews, to collect the required data carefully. Before finalizing, the questionnaire was distributed to the Field Investigators (FI) and discussed among concerned TA team members and a two days orientation was organized, where project Director, CDSP-IV, DAE along with other concerned officers gave their valuable suggestion to develop the questionnaire. After getting feedback the questionnaire and the draft was tested in the field for two days with 20 samples and then finalized (Annex-1).

### 3.2 Sampling procedure and method of data collection

Six Sub Assistant Agricultural Officers were engaged for the benchmark survey in four chars. The survey in Urir Char was conducted by a separate team, engaged for the benchmark survey. Out of 28,000 HH, a total of 1400 HH were surveyed which covered 5% of the total HH by the stratified sampling procedure. It was planned to cover a minimum of 5 samples from each shomaj of the existing 172 of the project area, but 132 were covered (Annex-2). Remaining samples were surveyed at random by system walk through and transact method.

### 3.3 Quality control

To ensure quality of the survey, the information collected was checked so that information on each of the items was correctly recorded. If it was found that any of the items was overlooked, misunderstood or/and found contradictory, it was corrected through re-interview on-the-spot basis. The TA Team and DAE officials gave feedback after reviewing the filled in questionnaire on a sample basis and shared their experience with all the members of the survey team. As a follow-up work, the Field Investigators (FI) checked the questionnaire with each other when felt necessary. HHs in question was re-interviewed for obtaining correct data.

**Table 2 : Distribution of sample shomaj and households for benchmark survey**

Name of Char	Total area (ha)	Total Population	Total Shomaj	Sample Shomaj	Total HH	Sample HH
Char Ziauddin	1,943	11,000	12	12	2,000	100
Char Nangulia	8,990	67,000	82	65	12,000	600
Noler Char	2,690	33,000	32	24	6,000	300
Caring Char	6,850	33,000	26	17	6,000	300
Urir Char	10,300	11,000	20	14	2,000	100
Total	30,773	155,000	172	132	28,000	1,400



## CHAPTER 4: SURVEY FINDINGS

### 4.1 Family size

In the project area, family size varies from 6 to 7 per HH. Minimum 6.21 in Caring Char up to maximum 6.89 in Urir Char and total average stands at 6.52. The family sizes are 6.66 in Char Ziauddin, 6.61 in Char Nangulia and 6.44 in Noler char (Table 3). So, it is observed that in all chars average family size is identical.

### 4.2 Farm size

Farm size is based on land occupied by the farmers irrespective of land use. The size is the highest in Urir Char, with 3.15 acre, with minimal of 1.28 in Char Ziauddin while in Char Nangulia 1.42, Noler Char 1.60 and Caring Char 1.46 acre. The average size in the project area is 1.78 acre. The highest area of Urir Char may be due to old owners settled on their own land, which was previously lost by erosion (Table 3). The land occupied by the farmers is within 0.95 to 1.00 acre, means the identical size with an average of 0.99 acre. Rental/leased land varies from 0.3 to 0.5 acre but no land is found rental/ leased in Caring Char and Urir Char (Table 3).

**Table 3: Social and land size of HHs**

Name of chars	Family size (No.)	Farm size (Acre)	Land (occupied in acre)	Land (rental in acre)
Char Ziauddin	6.66=7	1.28	0.95	0.5
Char Nangulia	6.61=7	1.42	0.99	0.4
Noler Char	6.44=6	1.60	0.99	0.3
Caring Char	6.21=6	1.46	1.00	0.0
Urir Char	6.89=7	3.15	1.00	0.0
<b>Average</b>	<b>6.52=7</b>	<b>1.78</b>	<b>0.99</b>	<b>0.24</b>

### 4.3 Education (%)

Findings of the survey are indicating that an average of 48.8% of the farmers is illiterate. In Char Ziauddin it is the highest with 57% while in Urir Char it is the lowest with 42%. There is 50, 49 and 46 % in Char Nangulia, Caring Char and Noler Char respectively.

At primary level standard of education, it is the highest 58% in Urir Char, the lowest 42% in Char Nangulia and Noler Char while 34 and 49 % in Char Ziauddin and Caring Char respectively.

Average 6.8% are educated at high school level and was found 10% in Noler Char. Ten percent in Char Ziauddin and Char Nangulia while 5 in Caring Char & Urir Char.

Regarding college standard of education it was revealed that only 2% in Caring Char while none in the other Chars.

Above college level 2% is in Char Ziauddin and nil in other areas (Table 4).

**Table 4: Education level (%)**

Name of char	Illiterate	Primary	High school	College	Above
Char Ziauddin	57	34	7	0	2
Char Nangulia	50	42	7	0	0
Noler Char	46	42	10	0	0
Caring Char	49	49	5	2	0
Urir Char	42	58	5	0	0
<b>Average</b>	<b>48.8</b>	<b>45</b>	<b>6.8</b>	<b>0.4</b>	<b>0.4</b>

## 4.4 Occupation

### 4.4.1 Main occupation

Agriculture (Crop production) has been found to be the main occupation of the respondents in all five chars. The highest 94 % of respondents are engaged in the practice in Caring Char, while with 83% Urir Char is the lowest.

Day labor is the next main occupation, with average 4.6 %. It was found to be 6% in Urir Char, 6 in Char Ziauddin and 1 % of the respondents of Char Nangulia are having day labor as their main profession.

In fishing as a main profession, 1% people are engaged each in Noler Char and Urir Char while in other areas none was found as fisherman.

Because of the poor road communication network in the area, 2 % of respondents of Char Ziauddin and Char Nangulia were found to be rickshaw/ van pullers; they are able to move in the dry season but in the monsoon only means by foot.

Inhabitants of the area are engaged in other professions to maintain their livelihood as follows: 5, 7 and 4 % of the respondents of Char Ziauddin, Char Nangulia and Noler Char respectively.

**Table 5: Main occupation of the people ( %)**

Name of Chars	Farming	Fisheries	Day labor	Rickshaw/ van puller	Other
Char Ziauddin	88	0	6	1	5
Char Nangulia	90	0	1	2	7
Noler Char	93	1	0	0	4
Caring Char	94	0	0	0	0
Urir Char	83	1	16	0	0
<b>Average</b>	<b>89.6</b>	<b>0.5</b>	<b>4.6</b>	<b>0.6</b>	<b>3.2</b>

#### 4.4.2 Secondary occupation

As regards to secondary occupation, the survey reveals that farming is the highest with 17 per cent in Urir Char while the lowest is 2% in Caring Char, with 9% each in Char Ziauddin, Char Nangulia and 5% in Noler Char.

Fishing sector is occupied the highest as secondary occupation 27% of respondents in Caring Char; the lowest 2% in Noler Char.

In Urir Char 50% respondents are engaged as daily labor as their secondary profession while 21% in Caring Char is the lowest. In Char Ziauddin it is 23, and 24% each in Char Nangulia & Noler Char.

A very negligible percentage of 4, 1 and 1 of respondents are found rickshaw/van puller as secondary profession in Char Ziauddin, Char Nangulia and Noler Char respectively.

In other professions, the percents of 22 are involved highest in Char Ziauddin and the lowest 1 in Urir Char with a bit higher 2 in Caring Char and the remaining area it is 5 in Char Nangulia and 11 in Noler Char.

**Table 6: Secondary occupation of the project area (%)**

Name of Chars	Farming	Fisheries	Day labor	Rickshaw/van puller	Other
Char Ziauddin	9	7	23	4	22
Char Nangulia	9	4	24	1	5
Noler Char	5	2	24	1	11
Caring Char	2	27	21	0	2
Urir Char	17	10	50	0	1
<b>Average</b>	<b>8.4</b>	<b>10</b>	<b>28.2</b>	<b>1.2</b>	<b>8.4</b>

#### 4.5 Distribution of land (ha) and cropping intensity (%)

Char Ziauddin is found to be the highest in cropping intensity at 148% and Caring Char is the lowest having 111%. It may be due to Char Ziauddin is situated adjacent to the main land with better communication facility and the people settled there earlier than in Caring Char. The average intensity of all chars is very low at 127% compared to the national average of 181%. As regards to the land area cultivated, Urir Char is found the highest with 8751 ha and Char Ziauddin is the lowest with 1577 ha.

**Table 7: Distribution of land and cropping intensity (ha)**

Name of Chars	Single cropped area(ha)	Double cropped area(ha)	Triple cropped area(ha)	Total cropped area(ha)	Net Cropped area(ha)	Cropping Intensity (%)
Char Ziauddin	970	405	202	1577	1063	148
Char Nangulia	4990	834	784	6608	5090	130
Noler Char	1823	437	212	2472	2011	123
Caring Char	3234	434	102	3770	3390	111

Name of Chars	Single cropped area(ha)	Double cropped area(ha)	Triple cropped area(ha)	Total cropped area(ha)	Net Cropped area(ha)	Cropping Intensity (%)
Urir Char	6776	1411	564	8751	6971	125
<b>Total</b>	<b>17793</b>	<b>3521</b>	<b>1864</b>	<b>23178</b>	<b>18525</b>	<b>127</b>
% of total area	77	15	8	100		

#### 4.6 Land topography

Land topography is an important factor in agriculture for crop selection according to the level of the land, suitability, crop management, cropping intensity etc. Nevertheless, coastal agriculture faces scarcity of high land where a reasonably low salinity exists, hence particular crop selection considering land topography is important.

##### 4.6.1 High land

Among the surveyed chars high land is found maximum at 32% in Char Ziauddin followed by 15% in Char Nangulia and 12% in Noler Char. There is no high land found in Caring Char and Urir Char (Table 8). There is only 11.8 % high land on average in the 5 chars.

##### 4.6.2 Medium high land

Char Ziauddin, Char Nangulia, Noler Char and Urir Char occupy 38, 44 and 28 and 8 % of medium high land respectively. There is no medium high land found in Caring Char. Average 23.2 % of this type of land is available among the 5 chars which is slightly higher than high land.

##### 4.6.3 Medium low land

The average medium low land of the 5 chars is found to be 34.8%, which is the maximum land type in the chars. Caring Char is covering the highest 82%, followed by 49% in Noler Char. Remaining Char Ziauddin 15%, Urir Char 44% and Char Nangulia 28% of the land is under this land type.

##### 4.6.4 Low land

In the survey it was found the highest in Urir Char with 48 % low land, followed by Caring Char 18%. In Noler Char 11% land is under this type while 15% in Char Ziauddin and 13 % Char Nangulia (Table.8).

**Table 8: Land distribution as per topography (%)**

Name of Chars	High land (F0)	Med. high land(F1)	Med. low land(F2)	Low land (F3)
Char Ziauddin	32	38	15	15
Char Nangulia	15	44	28	13
Noler Char	12	28	49	11
Caring Char	0	0	82	18
Urir Char	0	8	44	48
Average	11.8	23.6	43.6	21

- F0= 0-30, F1= 30-90, F2= 90-180 & F3= >180 cm

#### 4.7 Cropping pattern

Cropping pattern is mainly depends on traditional practices and other related physical and socio economic factors of the area. Among the physical factors soil condition, climate, rainfall, irrigation and drainage condition are the main ones, while socio economic factors include farmer's choice for own consumption, market demand, cost of production and availability of inputs. By considering all the related factors farmers developed and practice a cropping sequence through out the year.

In CDSP-IV area T. Aman is the major crop during the monsoon as this cropping season is suitable due to low salinity in soil and water because of dilution of soil salinity in the rainy season. Some scattered crops are practiced during Kharif-I and rabi season. Hence during the survey in different CDSP-IV chars the following cropping patterns was seen.

**Table 9: Major cropping pattern of CDSP IV chars**

Name of char	Kharif-I	Kharif-II	Rabi
Char Ziauddin	Aus B. Aus Fallow	T.Aman T.Aman T.Aman	Rabi Fallow Rabi
Char Nangulia	Aus Fallow Fallow	T. Aman T. Aman Bontil/Talmakna	Rabi Fallow Fallow
Noler char	Fallow Fallow B. Aus	T. Aman T. Aman T. Aman	Rabi Fallow Fallow
Caring char	Fallow Fallow	T. Aman T. Aman	Rabi Fallow
Urir Char	Fallow Fallow	T. Aman T. Aman	Rabi Fallow

#### 4.8 Cropping season and production practices

Like in other areas of the country there are three cropping seasons in the project area. These are as follows:

- Kharif-1 (March 15- July15),
- Kharif –II (July 16- October15) and
- Rabi (October 16-March 15)

##### 4.8.1 Kharif-I: Aus crop

In Kharif-1 season crop production depends on the soil condition of the particular area i.e. soil salinity and start of monsoon. Therefore, the area planted in the Kharif-1 season is uncertain or unpredictable and it varies from year to year. Early rainfall of the year is suitable for Kharif-1 to cover more area for transplanting during the season.

In Kharif I, Aus is the main crop grown in the season, Hashikalmi (locally known as shaita) a local aus rice variety occupied 52% in Char Ziauddin and 5% in Char Nangulia while 1%

land was found to be occupied by this crop in Noler Char. It is insignificant in Caring Char and Urir Char.

Chandina, an improved variety under aus crop was found negligible at 1% of land in Char Ziauddin and in no other char it was found in practice.

HYV rice variety BRRIDhan 27 was found on 4% of land in only Char Ziauddin. Same is the case with China IRRI there on 16% of land.

In Urir Char two local varieties namely Khadia and Boilam covered 2% of the land but these varieties are not found in other chars.

Other aus rice varieties were found 3 and 1% in Char Ziauddin and Char Nangulia respectively (Table 10).

**Table 10: Area covered by aus rice crops (%)**

Name of variety	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
Shaita/Hashikalmi	52	5	1	0	0
Chandina (BR1)	1	0	0	0	0
BRRIDhan 27	4	0	0	0	0
China IRRI	16	0	0	0	0
Others/Khadia/Boilam	3	1	0	0	2

#### **4.8.2 Kharif II**

Transplanted aman rice is the major crop grown during monsoon throughout the country. In CDSP- IV most of the land has the same cropping system. This is the only crop grown in the project area as physical and climatic condition favor its production. T. aman is transplanted during rainy season when salinity becomes lower because of heavy rainfall, but it may be affected during the tillering stage due to draught and submergence during spring tide at flowering stage. Higher depth of standing water due to late drainage may be a constraint for introducing HYV. However, recently Bangladesh Rice Research Institute (BRRI) and Bangladesh Institute of Nuclear Agriculture (BINA) released some saline tolerant short duration varieties such as BRRIDhan53 (125 days), BRRIDhan54 (115 days), BRRIDhan56 (110 days), and BRRIDhan57 (105days) suitable for the season. These may be introduced in the area.

Two local varieties of rice crop, namely Rajashail and Kajalshail occupied the lion share of the land covered by T. aman crop. Out of that, Rajashail occupied 15% in Char Ziauddin, 67% in Char Nangulia, 46% in Noler Char, 97% in Caring Char and 60% in Urir Char.

Kajalshail, another local aman rice variety occupied 79% in Char Ziauddin, 28% in Char Nangulia, 26% in Noler Char, 19% in Caring Char and 39% in Urir Char.

Among the HYV rice varieties, BRRI Dhan41 occupied 10% area and BR23 occupied 8% area of Char Ziauddin. Gigas, another local variety, covered 3-6 % area except in Urir Char. Other HYV varieties were not practice in all the chars (Table-11).

**Table 11: Practice of varieties during T. aman rice (%) of HH**

Aman Rice	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
Rajashail (LV)	15	67	46	97	60
Kajalshail(LV)	79	28	26	19	39
BRRIDhan39	0	0	0	0	0
BRRIDhan41	10	1	1	0	0
BR23	8	0	0	0	0
Gigas(LV)	6	3	4	6	0
BR22	0	0	1	0	0
Others	3	4	0	0	0

#### 4.8.3 Rabi crop

Cropping in Rabi season entirely depends on soil salinity and availability of irrigation water. In some areas it is again difficult to cultivate due to prolonged drainage congestion if it rains long after the monsoon. Only non irrigated crops like khesari (Green gram), felon, lentil etc can be grown. Non availability of irrigation water and high salinity during this season was found in all the chars, leaving the majority of the area to remain fallow.

Among the rabi crops (i) vegetables like country bean, bottle gourd and okra are found to be cultivated as common crops in all the chars. (ii) Pulse crops are khesari (green gram), mung, and felon (iii) Among the spices crops, garlic, onion, chili and turmeric (iv) Sweet potato is also grown with large area coverage and recently (v) Soybean is introduced as oil crop in an area of Char Ziauddin where a seed production program was undertaken by BADC.

It could be noted that country bean is being practiced as a pit crop in homestead and road site plantation but not as field crop. As field crop only 1% area was found covered by this crop. Bottle gourd is also cultivated as a pit crop around the homestead.

In Char Ziauddin and Char Nangulia it was observed that okra is grown commercially. About 10% of the HHs in Char Ziauddin and 12% HH in Char Nangulia, 7 in Noler Char and 14 in Caring Char were involved in okra production, usually marketed at Karwan Bazar, Dhaka whole sale Arat (warehouse).

Among the pulse crops, Khesari covered 12, 8, 6 and 22 % of the HHs in Char Ziauddin, Char Nangulia, Noler Char and Caring Char. It is found insignificant in Urir Char.

Mung bean is grown in Char Ziauddin by 11 % of HHs. Felon is in Char Ziauddin with coverage of 13 %, but negligible in Char Nangulia with 1 %. Soybean occupies 12% in Char Ziauddin.

Among the spices crop, highest coverage of land by chili having 36% of HHs in Char Ziauddin, 10% in Char Nangulia, 16% Noler Char and 40% in Caring Char and 11% of HHs in Urir Char.

Sweet potato is being used as staple food during food scarcity and covers a good area of land up to 23% of HHs in Char Ziauddin, 4% in Char Nangulia, 6% in Noler Char, 19% in Caring Char and 4 % of HHs in Urir Char.

It is to be emphatically noted that rabi crop is still under threat by the high salinity rate of the soil during dry season i.e. December to April (Table 12).

**In Char Ziauddin it was revealed that 10% of the area in rabi season is covered by soybean which is treated as future potential commercial crop in the area.**

**Water melon is another recent emerging crop introduced in Char Ziauddin and Char Nangulia.** Although the coverage of this crop is not yet significant but it is expected to be a promising crop with good harvest for the char areas.

**Table 12: Percentage of HH with major rabi crops (as field crop)**

Variety	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
Country Bean	2	1	1	0	1
Khesari	12	8	6	22	1
Mung	11	0	0	0	2
Felon	13	1	0	0	0
Chili	36	10	16	40	11
Sweet Potato	23	4	6	19	4
Okra	10	12	7	14	0
Soybean	12	0	0	0	0

#### **4.9 Use of inputs**

Expected yields depend on modern practices of technology. A balanced dose of fertilizer can increase the crop yield up to 15-20%. But in the project area indiscriminate use of fertilizer was observed which has a negative affect on soil and yield for future.

In T.aman, fertilizer is used by most of the farmers in Char Ziauddin: urea 174 kg, TSP 116 kg and MoP 17 kg per hectare. Farmers of Char Nangulia are using 102, 22 and 5 kg of urea, TSP and MoP per hectare respectively.

In Caring Char it is found lowest as urea 98 kg, TSP 44 kg and MoP is nil.

Use of pesticide is 2.77, 1.73, 4.28, 3.3, and 1.81 kg/ha in Char Ziauddin, Char Nangulia Noler Char, Caring Char and Urir Char respectively.

The dose of fertilizer is using by the farmers can not be seen as balanced in the area. Same is the case with pesticides (Table 13).



**Table 13: Use of inputs in T. aman (Kg/ha)**

Input use	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
Urea	174	102	100	98	130
TSP	116	22	45	44	12
MoP	17	5	12	0	0
Pesticide	2.77	1.73	4.28	3.3	1.81

#### 4.10 Source of seed

Seed is one of the vital inputs for crop production; from the survey it is revealed that the major numbers of HHs are using seed for crop cultivation from farmer's own source. The rate of 82% in Char Ziauddin, 94 in Char Nangulia, 69 in Noler Char, 92 in Caring char and 98 Urir Char. Remaining HHs are collecting their seed from local market and neighbors, while a very negligible percent HH collects seed from the long distance govt seed dealer and private seed companies.

**Table 14: Source of seed (%)**

Source	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
Own	82	94	69	92	98
Market	64	20	21	83	1
Neighbors	3	2	3	0	4
Others	0	0	0	0	0

#### 4.11 Method of irrigation

Irrigation is another major input for successful crop production. Availability of sweet water could accelerate the crop yield to an optimum level as it is seen in other areas of the country. The project area faces a major constraint of non availability of suitable surface water and ground water and this issue is naturally pushed by the high salinity during the dry period (December-April). Only some pit crops are planted such as water melon and vegetables, through drip irrigation from nearby ponds, ditches etc for 1-2 months. This picture is common in the area: only 5% was found to use a local device (Don) for irrigation in Char Nangulia.

**Table 15: Method of irrigation (% of HH)**

Method/means of irrigation	Char Ziauddin	Char Nangulia	Noler char	Caring char	Urir char
Local	5	3	1	0	0
Low Lift Pump	0	0	0	0	0

#### 4.12 Crop yield

Information on production of major crops in the various seasons was collected from the farmers during the survey. Yields in different cropping seasons were found to be very low compared to the national average and yield potential of the particular variety. In all the chars usually local varieties are practiced with various constraints causing the low yields. Table 16 gives a summarized picture of yields in the three seasons.

**Table 16: Yield (mt / ha) of major crops of the project area**

Crops//variety	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
<b>Aus</b>					
Shaita/Hashikalmi/Khadia/Boilam	1.9	1.8	1.7	1.7	2.3 (Khadia) 2.3 (Boilam)
Chandina	2.5		-	-	
China IRRI	2.3	2.6	2.0	-	3.7
BRRIDhan27	3.2	3.4	-	-	-
BR11	-	-	-	-	3.7
<b>T.Aman</b>					
Rajashail	2.4	2.0	2.4	2.2	2.0
Kajalshail	2.4	1.8	2.0	2.1	1.9
BR11	2.5	3.7	-	3.5	-
Kalamota	-	-	-	-	3.2
BRRIDhan41	3.7		-	3.0	
<b>Rabi Crop</b>					
Country Bean	7.0	4.5	5.5	6.3	3.4
Okra	4.1	3.2	2.8	3.5	3.0
Khesari	0.6	0.7	0.8	0.5	0.7
Felon	.0.8	0.8	1.0	0.6	
Chili	1.0	1.0	0.6	0.5	0.5
Sweet Potato	7.5	10.0	15.0	3.0	12.5
Methi	1.6	1.5	1.9	1.8	
Soybean	1.2	-	-	-	-
Water melon	49.0	39.0	-		-

#### 4.13 Marketing of farm products, adapted technology and high value crops

Marketing is difficult in Urir Char because of its isolated location, far away from the main land and its ancient communication network. Caring Char and Noler Char have the same problem as Urir Char, but any way they can sometimes sell their products on nearby local markets outside the char. Char Ziauddin and Char Nangulia have better marketing facilities but in other chars have bad road links with the main land.

##### 4.13.1 Marketing of products

It is revealed that the HHs are marketing their produces mainly in local markets with Char Ziauddin at 43, Char Nangulia 46, Noler Char 66, Caring Char 98, and Urir Char 100 %. The rate of HHs marketing outside their area is found 24, 44, 50 and 33% for Char Ziauddin, Char Nangulia, Noler Char and Caring Char respectively while for Urir Char it is nil (Table 17).

**Table 17: Marketing of products by HHs (%)**

Marketing area	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
Local market	45	46	66	98	100
Outside market	24	44	50	33	0

*\*some of the percentage may be more than 100 due to multiple response*

#### 4.13.2 Market price of the product

It is revealed that the market price of all 5 chars is identical; it varies within the same range, so the prices of all agricultural products are shown as a common picture of all the chars.

**Table 18: Market price of the agricultural products (Tk/kg)**

Crops/variety	Range in Tk	Mean Tk
Paddy Aman	14-16	15.0
Aus	12-14	13.0
Eggplant	13-14	13.5
Country Bean	14-18	16.0
Okra	15-20	18.0
Khesari(Green gram)	16-17	16.5
Felon	40-45	43.0
Chili	90-120	105.0
Sweet Potato	6-8	7.0
Methi	36-40	38.0
Soybean	35-40	37.5
Garlic	30-40	35.0
Red amaranth	7-8	7.5
Cucumber	18-20	19.0
Ground nut	40-45	42.5
Yard long bean	15-20	17.5
Water melon	45-65	55

#### 4.13.3 Adaption of modern technology

Adaption of technology is very poor in the project area. Only rat control technology was found widely adapted, with exception of Urir Char. Rat trap is practiced by the HH (%) in Char Ziauddin 20, Char Nangulia 84 and Noler Char 50, Caring Char 33, but no practice was found in Urir Char.

NPK was found to be used as composite fertilizer only in Char Ziauddin with 12 % of HHs. Drum seeder was found to be used in Char Ziauddin by 2% of HHs. In other CDSP-IV area it was observed that no technology is practiced by the farmers. Practice of use of farm compost is insignificant.

**Table 19: Practice of modern technology (%)**

Technology	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
Drum seeder	2	0	0	0	0
Farm compost	2	4	2	3	2
NPK	12	0	0	0	0
Rat trap	20	84	50	33	0

#### **4.13.4 Adoption of high value field crop**

Adoption of high value crops such as Hybrid vegetables, HYV rice, tomato and papaya were found negligible. Most of the HHs in the project area is not aware of high value crops.

Char Ziauddin covers the maximum 32 % of HHs who are practicing HYV rice and 6% in Char Nangulia and four in Noler Char. In Caring Char and Urir Char it was noticed that cultivating HYV rice is negligible. Tomato and papaya are not practiced as HVC technology as a field crop.

Local banana (Deshi Kola/ kattali kola) is produced extensively in homestead gardening and also as road side crop throughout the project area but it was not found as a field crop. Most of the families are involved in banana plantation but without modern cultural activities. No papaya garden or homestead crop production was found in the area.

**Table 20: Adoption of high value crop as field crop**

<b>Name of high value crop</b>	<b>Char Ziauddin</b>	<b>Char Nangulia</b>	<b>Noler Char</b>	<b>Caring Char</b>	<b>Urir Char</b>
HYV Rice	32	6	4	1	2
Tomato	0	0	0	0	0
Banana	10	0	0	0	0
Papaya	0	0	0	0	0

#### **4.14 Gender participation in post harvest activities/operation**

Gender participation in agricultural activities and more specific in post harvest technology is very important to ascertain future interventions like planning of training.

In most of the HHs, it was found that women participation in post harvest activities is very much encouraging. Man and woman work together in most of the activities, which is found to be significantly more in comparison to other areas of the country.

##### **4.14.1 Harvesting**

Harvesting operation is done by men of 42% of HHs in Char Ziauddin, 67% in Char Nangulia, 69% in Noler Char, 51% in Caring char and 2% in Urir Char.

By women it is 9% in Char Ziauddin, 1% in Char Nangulia, 3% in Noler Char, 0% in Caring Char and 30% in Urir Char.

Same operation is done jointly by both man and women at 38% of HHs in Char Ziauddin, 19% in Char Nangulia, 18% in Noler Char, 41% in Caring Char and 64% in Urir Char, the highest percentage in Urir Char may be due their farm land is situated near and around their homestead (Table 21).

**Table 21: Gender participation in harvesting (%)**

<b>Gender</b>	<b>Char Ziauddin</b>	<b>Char Nangulia</b>	<b>Noler Char</b>	<b>Caring Char</b>	<b>Urir Char</b>
Man	42	67	69	51	2
Woman	9	1	3	0	30
Man & Woman	38	19	18	41	64

#### 4.14.2 Carrying

Carrying of farm produces was found to be done by man and woman in the following rates. Men do this post harvest operation in the rate of 52% in Char Ziauddin, 69 in Char Nangulia, 69 in Noler Char, 51 in Caring Char and 22 percent in Urir Char.

By women it is 7% in Char Ziauddin, 2 in Char Nangulia, 3 in Noler Char, 0 in Caring Char and 56 % in Urir Char.

Same activity is done jointly by both man and women in 30% of HHs in Char Ziauddin, 16 in Char Nangulia, 19 in Noler Char and 41 percent in Caring Char and 19% in Urir Char (Table 22).

**Table 22: Gender participation in carrying (%)**

Gender	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
Man	52	69	69	51	22
Woman	7	2	3	0	56
Man & Woman	30	16	19	41	19

#### 4.14.3 Threshing

Fifty seven percent of men are doing the threshing in Urir Char, which is the highest among the 5 chars followed by 41% in Char Nangulia. It is 31 in Char Ziauddin, 33 in Noler Char and 11% in Caring Char while by women it is 21, 7, 6, 4, and 0 % respectively. Same work is done by both man and women in 49, 39, 53, 83 and 17% of HHs in Char Ziauddin, Char Nangulia, Noler Char, Caring Char and Urir Char respectively. So it is highest in Caring Char (Table 23).

**Table 23: Gender participation in threshing (%)**

Gender	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
Man	31	41	33	11	57
Woman	6	7	4	0	21
Man & Woman	49	39	53	83	17

#### 4.14.4 Winnowing

Winnowing is done by man in the rate of 3% of HHs in Char Ziauddin, 2 in Char Nangulia, 5 in Noler Char, 0 in Caring Char, and 8 % in Urir Char. By women it is 60% of HHs in Char Ziauddin, 55 in Char Nangulia, 72 in Noler Char, 52 in Caring Char and 31 % in Urir Char.

Same operation is done by both man and women in 22% of HHs in Char Ziauddin, 31 in Char Nangulia, 13 in Noler Char, 41 in Caring Char and 57 % in Urir Char (Table 24).

This operation is usually done by women and that is a common phenomenon in this country.

**Table 24: Gender participation in winnowing (%)**

<b>Gender</b>	<b>Char Ziauddin</b>	<b>Char Nangulia</b>	<b>Noler Char</b>	<b>Caring Char</b>	<b>Urir Char</b>
Man	3	2	5	0	8
Woman	60	55	72	52	31
Man & Woman	22	31	13	41	57

**4.14.5 Drying**

This post harvest operation is mainly done by women in other parts of the country which is a common phenomenon and the same is seen in the project area.

Men do this operation at the rates of 5% of HHs in Char Ziauddin, Char Nangulia 0, and Noler Char 2, Caring Char 0 and Urir Char 3 percent. By women, in Char Ziauddin 60, Char Nangulia 55, Noler Char 72, Caring Char 52 and Urir Char 31 %.

Both men and women are involved in drying operation by 22% of HHs in Char Ziauddin, Char Nangulia 31, Noler Char 13, Caring Char 41 and Urir Char 57% (Table 25).

**Table 25: Gender participation in drying (%)**

<b>Gender</b>	<b>Char Ziauddin</b>	<b>Char Nangulia</b>	<b>Noler Char</b>	<b>Caring Char</b>	<b>Urir Char</b>
Man	5	0	2	0	3
Woman	57	79	80	52	78
Man & Woman	25	8	9	41	13

**4.14.6 Grading**

In Char Ziauddin, men are active to do this operation up to 4 % of the HHs, one percent in Char Nangulia, 1 in Noler char, 0 in Caring Char and 33% in Urir Char, which is the highest.

By women it was 55% of HHs in Char Ziauddin, 55 in Char Nangulia, 62 in Noler Char, 47 in Caring Char and 32 % in Urir Char.

Same activity is done by both man and women, with Caring Char in highest position with 97% of HHs, Char Ziauddin 28, Char Nangulia 30, Noler char 26 and Urir char 31 % (Table 26). This operation is usually done by women and that is a common phenomenon in this country.

**Table 26: Gender participation in grading (%)**

<b>Gender</b>	<b>Char Ziauddin</b>	<b>Char Nangulia</b>	<b>Noler Char</b>	<b>Caring Char</b>	<b>Urir Char</b>
Man	4	1	1	0	33
Woman	55	55	62	47	32
Man & Woman	28	30	26	97	31

#### 4.14.7 Storing media

Most of the HHs is storing their farm product in polythene bags. Average 45% of HH are using polythene bags for storing their farm product. Storing by polythene is done maximum by the HHs, because it is easy available and cheaper in price compared to other storing media.

Another major storing media is earthen pot; it covers 25% of the HHs in average are stored their seed, food grain and farm product by this media, It may be due to traditionally these earthen pot are available in coastal area and also affordable price for the poor farmer.

A negligible percentage of the families use drum i.e. in average only 3% of the HH was found of those who are financially solvent.

Plastic container is another media in the area to be used very negligible percent by the HH. Only 10% of the HH is found to use this container may be due to its non availability and a bit expensive for the poor HHs.

**Table 27: Storing media (%HH)**

Media	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
Plastic container	12	7	9	0	32
Drum	5	4	5	2	0
Earthen pot	31	22	29	54	0
Polythene bag	49	34	32	65	66

#### 4.15 Homestead agriculture

##### 4.15.1 Pond holding and size (decimal)

Every HH possess at least one pond and average 93 % of HH owns a pond within their homestead. Average pond size varies from 15 to 28 decimal in all the areas except in Urir Char where the size is 72 decimal. This is due to excavating the ponds during the land accretion period, which was done by erecting earthen cross bunds in low land areas (Table 28).

**Table 28: Pond holding and size (decimal)**

Item	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
HH (%)	98	99	98	72	100
Average pond size	15	28	19	13	72

##### 4.15.2 Number of trees per HH in and around homestead

Regarding fruit trees, 82% of HHs in Char Ziauddin possess fruit trees while 96 % in Char Nangulia, 94% in Noler Char, 97% in Caring Char and 100% in Urir Char.

Timber plants were found owned by 73% of HHs in Char Ziauddin, 89 % in Char Nangulia, 82% in Noler Char and 83% in Caring Char and negligible in Urir Char.

Medicinal plants were with 9% of HHs in Char Ziauddin, 10 % in Char Nangulia, 19% in Noler Char and 16% in Caring Char and 0% in Urir Char.

**Table 29: Percentage of HHs holding various species of trees (classification wise)**

Name of species	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
Fruit	82	96	94	97	100
Timber	73	89	82	83	48
Medicinal	9	10	19	16	2
Others	12	22	10	4	3

#### **4.15.3 Average number of trees per HH**

For the average number of trees, it is worthwhile to mention that banana plants take the lion part, as to 93 in Char Ziauddin, 45 in Char Nangulia, 54 in Noler Char 39 in Caring Char and 25 in Urir Char in an around the homestead area.

Jackfruit trees are with 13 in Char Ziauddin, 6 in Char Nangulia, 6 in Noler Char, 4 in Caring Char and 2 in Urir Char.

Coconut plants are 9 in Char Ziauddin, 8 in Char Nangulia, 9 in Noler Char, 4 in Caring Char and 8 in Urir Char.

Guava covers 5, each of Char Ziauddin and Char Nangulia, 6 in Noler Char, 4 in Caring Char and 2 in Urir Char. To note: guava can sustain well in saline soil as observed.

Papaya covers 4 in Char Ziauddin, 3 in Char Nangulia, 5 in Noler Char, 3 in Caring Char and 6 in Urir Char.

As regards to forest trees, rain tree occupies the highest number with 80 in Char Ziauddin, 55 in Char Nangulia, 54 in Noler Char, 39 in Caring Char and 20 in Urir Char.

Jhau are found 18 in Char Ziauddin, 24 in Char Nangulia, 6 in Noler Char, 1 in Caring Char and 9 in Urir Char.

Mehgani is occupying 9 in Char Ziauddin, 13 in Char Nangulia, 12 in Noler Char, 2 in Caring Char and 4 numbers in Urir Char.

Medicinal plants are very few in number such as 4 in Char Ziauddin, 1 in Char Nangulia, 2 in Noler Char, nil in Caring Char and 1 in Urir Char.



**Table 30: Average no of trees/plant per HH (Name wise)**

Average number of trees	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
Banana	93	45	54	39	25
Guava	5	5	6	4	2
Jackfruit	13	6	6	4	2
Papaya	4	3	5	3	6
Coconut	9	8	9	4	8
Rain Tree	80	55	54	39	20
Mehgoni	9	13	12	2	4
Jhau	18	24	6	1	9
Medicinal	4	1	2	0	1

**4.16 Use of agricultural equipments (%)**

As regards to use of agricultural equipments, Power tiller is on top of the list, followed by the use of deshi plough. The rate of use of power tiller is 60% in Char Ziauddin, 35 % in Char Nangulia, 36 % in Noler char, 52 % in Caring Char and 51 % in Urir Char. The tiller was found to be taken on hire basis. Taka 250-300 was charged for ploughing one acre of land.

Deshi plough is owned by the respondents; the rate of use is 14% in Char Ziauddin, 8% in Char Nangulia, 20% in Noler Char, 6% in Caring Char and 7% in Urir Char.

Sprayer is used by 13% each of Char Ziauddin and Urir Char, 1% in Noler Char, while it is not found in the other two chars.

Low lift pump is used at a very negligible rate in the area.

**Table 31: Use of agricultural equipment (%)**

Name of equipment	Char Ziauddin	Char Nangulia	Noler Char	Caring Char	Urir Char
Power tiller	60	35	36	52	51
Deshi plough	14	8	20	6	7
Pump	0	1	0	2	0
Sprayer	13	2	4	3	13

### **Bontil/Talmakna**

Bontil, a traditional crop, is found in Char Nangulia. According to the farmers opinion it was found during the pre-settlement period of this char; locally it is known as Bontil or Talmakna.

After introduction of this crop farmers started producing it during monsoon, confined to some low lying area where no other crops can be grown. In the benchmark survey it was found extensively produced in Beker bazaar, Belal bazaar, Selim bazaar, Tobakati, Tara market and Nabir pukur area and covers about 800-1000 ha.

It became a commercial crop and farmers are marketing the product (seed) as an element of “Ayurved medicine”. They prepared seed bed for seeding in June-August and transplant stem cutting in the month of August – September. It takes about 8-9 months for harvesting the crop in the month of February- March. Farmers are utilizing their land for Bontil/ Talmakna while no other crops are possible during T. Aman season due to late draining and frequent inundation occurring by high tide. It has the special characteristic that it can sustain 15-20 days under water.

Average yield is very low, only 750-1000 kg /ha but a good harvest could be obtained if modern practices are followed. The average price of the seed is found to be Tk 250.00-350.00/kg. Some exporters are of the opinion that it has a good export potentiality in Korea and China.

## **CHAPTER 5: CONSTRAINTS AND RECOMMENDATIONS**

### **5.1 Summarized constraints and recommendations**

During the survey a number of issues related to agriculture were identified which need to be addressed for future agricultural development. The focal constraints are summarized and possible strategies given below:

#### **Constraints of project chars**

- Scarcity of sweet water for irrigation in dry season
- High salinity of soil and water during dry season from December –April
- Only T. aman is the main crop in newly accreted chars
- Low yielding varieties like Rajashail, Kajalshail, Betichikon, Hashikalmi etc is practiced in T. aman
- Lack of saline tolerant variety for Kharif-1 and Rabi crops
- Lack of awareness about modern technology and appropriate variety
- Scarcity of inputs like HYV seed and fertilizer
- Inaccessible communication network in remote chars and adjacent areas
- No land titling and recording
- Low soil fertility

#### **Recommendations and mitigation (by project)**

- Project interventions will improve the situation in the chars drastically, as we have seen in the earlier phases of the project by introducing HYV and modern technology
- Emphasis should be given for location specific intervention on salinity, drainage congestion, water logging/ flooding depth and recommend appropriate technology
- Screening of suitable variety/ crops for unfavorable ecosystem should be given priority for increasing productivity within short possible time
- Appropriate crop, water and soil management technologies should be developed for coastal chars by the research organizations
- Introduction of saline tolerant modern HYV for replacing low yielding varieties along with improved crop management practices
- Development of farmers institution for supporting the program of DAE in implementation
- Agronomic research as well as breeding research is to be undertaken, to develop new variety and crop production techniques for unfavorable ecosystem
- Productivity Zone may be introduced for CDSP-IV coastal chars so that suitable crops and variety could be adapted for a particular land topography and salinity
- Introduction of high value homestead crops

- Ownership of land by titling and recording
- Rain water harvesting and conservation scheme may taken for irrigation support in dry season
- Government dealer for inputs such as seed & fertilizer and private seed companies should extend their services in char areas

## CHAPTER 6: SALINITY AFFECT IN CROP PRODUCTION

### 6.1 Affect of salinity in crop productions

Salinity has negative effect & influence on the crop production in different stages of the growing period. The nature of effect of salinity is shown below:

**Table 32: Affect of salinity in crop production**

ECe; ds/m	Soil salinity class	Characteristics
0-2	Non-saline	effect negligible
2-4	Slightly saline	Yield very sensitive, crops may be restricted
4-8	Saline	Yield of many crops restricted
8-16	Strongly saline	Yield satisfactory for tolerant crops
>16	Extremely saline	Yield satisfactory for very few tolerant crops

#### Project salinity data during agriculture benchmark survey

Soil salinity test conducted in November, 2011 and April, 2012 during agriculture benchmark survey in CDSP-IV area and synopsis of the average test result of 120 samples of different location is given below:

**Table 33: Salinity monitoring test result (ECe, ds/m)\***

Name of char	November /2011		April/2012	
	Top soil	Sub- soil	Top soil	Sub-soil
Char Nangulia	11.2	4.8	25.3	8.7
Noler Char	4.8	3.2	28.0	4.1
Caring Char	6.6	4.8	32.2	6.2
Char Ziauddin	10.6	3.6	14.2	4.8
Urir Char	8.5	5.0	16.1	7.8
<b>Average</b>	<b>8.2</b>	<b>4.3</b>	<b>23.2</b>	<b>6.4</b>

\*ECe, ds/m= Electrical conductivity, desi siemen/ meter. Top soil=0-10 cm, Sub soil=10-30 cm

## CHAPTER 7: POTENTIAL TECHNOLOGIES FOR PROJECT

### 7.1 An inventory of potential technologies

An inventory of the potential technologies is prepared based on the available information, technological literature developed in the previous phases of CDSP and experienced gained during implementation of project intervention. Recently some varieties and technologies were released from the research institutions adaptable for the area, which have also been included in the proposed intervention.

**Table 34: Potential technologies suitable for the project chars**

Cropping seasons	Crop, variety, technologies	Remarks
<b>Kharif-1</b>	<p><b>Aus</b> HYV: Purbachi (China IRRI) BR14, <b>BRRIDhan27</b>, BRRIDhan42, BRRIDhan43,</p> <p><b>Vegetables</b>                      Amaranth: BARI Data-1                      Okra: BARI Derosh-1, Local improved                      Kang Kong: BARI Gima kalmi-1,                      Bottle gourd: BARI Lau-4</p> <p><b>Pulses</b>                      BARI Mug-1, 2,3,4,5&amp;6                      BINA Mug-5,6,7</p> <p><b>Oil seed</b>                      Sesame: T-6                      Til: BARI Til-2,3,4                      Ground nut: BARI ChinaBadam2,3,4</p> <p><b>Spices</b>                      Chili: Local improved                      BARI Morich-1                      Turmeric: BARI Tumeric-1&amp;3</p>	<ul style="list-style-type: none"> <li>• Seeds to be dibbled at least 5 cm deep into the soil. For high and medium high land</li> <li>• Raised bed/ Elevated seed bed or Sarjan method is effective for salinity.</li> <li>• Mulching is effective during dry period</li> <li>• BRRIDhan27 found saline tolerant</li> </ul>
<b>Kharif-II</b>	<p><b>T.Aman</b>                      HYV: BR11, BR22,23, BRRIDhan41, 42,52, <b>53,54</b>, BINA7                      Local: Kajalshail, Rajashail, Gigas</p>	<ul style="list-style-type: none"> <li>• In high &amp; medium high land</li> <li>• In high, medium high and medium low land</li> <li>• In late draining and low land area</li> <li>• BRRIDhan41,53,54 released as saline tolerant</li> </ul>
<b>Rabi season</b>	<p><b>Root crops</b>                      Potato: BARI Alu-7(Diamond)                      BARI Alu -21                      BARI Alu-27</p>	<ul style="list-style-type: none"> <li>• Straw mulching needed for moisture conservation.</li> <li>• Mulching can be</li> </ul>

Cropping seasons	Crop, variety, technologies	Remarks
	<p>Sweet potato: BARI Alu-29 BARI Misti Alu-4 BARI Misti Alu-5 BARI Misti Alu-6 BARI Misti Alu-7 BARI Misti Alu-8 BARI Misti Alu-9</p> <p>Aroid: Latiraj</p> <p><b><u>Vegetables</u></b></p> <p>China sak: BARI Batisak-1 Eggplant: BRAI Begun-9,10 Country bean: BARI Shim-5, 6 Yard long bean: Kagor notaki Bottle gourd: BARI Lau-1,3,4 Tomato: Roma-VF, Hybrid</p> <p><b><u>Pulses</u></b></p> <p>Khesari: BARI Khesari-1,2 Mung Bean: BARI Mug-3,4 Felon: BARI Felon-1,2 Chick pea: BARI Chola2,3,5,6 Lentil: BINA Mashur-3,4 BARI Masur-5,6</p> <p><b>Garden pea:</b> IPSA motor suti 2,3</p> <p><b><u>Oil crops</u></b></p> <p>Mustard: BARI Sharisa-11&amp;16 BINA Sharisa-5 &amp;6</p> <p>Ground nut: BARI Chinbadam-8,9 Dhaka-1 BINACHinabadam 5&amp;6</p> <p>Soybean: Shohag(PB-), BARI Soybean-6</p> <p><b><u>Spices</u></b></p> <p>Chili: BARI Morich-1 Local improved</p> <p>Onion: BARI Pyaj-1&amp;4 Taherpuri</p> <p>Garlic: BARI Rashun-1&amp;2 Methi: BARI Methi-1&amp;2 Coriander: BARI-1</p> <p><b><u>Cerials</u></b></p> <p>Rice: <b>BRRIDhan47&amp; 55</b> <b>BINADhan 8</b></p> <p>Barley: BHL-15 (Line) Maize: Hybrid</p>	<p>practiced for moisture conservation in potato, water melon and cucumber production</p> <ul style="list-style-type: none"> <li>• Drip irrigation for pit crops</li> <li>• BRRIDhan47,55 and BINADhan8 released as saline tolerant</li> </ul>

### ***7.1.1 Proven and practiced technologies***

Proven and practiced technologies of various crops were found at different level of soil salinities during previous phases of CDSP. Some technologies were adapted by the farmers traditionally and on those basis CDSP experts working in the field and experiment conducted by the research organization. A synopsis of these tested technologies is presented below:

#### Dibbling method of aus rice

There are two types of aus rice culture; direct seeding and transplanting. In the direct seeding method, farmer are generally sow the dry seeds by broadcast or dibble the seeds directly into the sub-soil layer just after first shower in late March to early April and are grown under rain fed conditions until the crop is harvested in July/August. If monsoon starts early, direct seeding particularly dibbling is beneficial otherwise transplanting is an easy tool to avoid salt injury since planting of rice can be done in late April to early May.

#### Post harvest tillage

After crop harvest soil salinity is tends to go up quickly because of capillary rise. Post harvest tillage after T aman and rabi crop will break the soil crust and thus uprising of salinity along with the capillary water will be minimized. Repeat this tillage practiced again after rain which will help reduce soil salinity during sowing time.

#### Sarjan method

Production of vegetables in most parts of the coastal areas is often suffered from late drainage at the time of sowing vegetables. Sarjan method is a system for year round technology which enables to grow vegetables throughout the year. Raised beds alternates with low beds, have the opportunity for year round growing of non rice crops on the raised beds and rice in the low beds. Generally in the coastal region, the farmers grow vegetables on the edge of the access roads which connect their houses with main road. Washing down of salinity from top of this road side is creates a favorable environment for growing vegetables.

#### Summer vegetables

Potentiality of summer vegetables is mainly depends on some factors; of that early rainfall and reduced of soil salinity during that period. However, farmers are generally practicing by raising seedling in their around homestead and planted after shower on pond ridge/dyke or roadside high land. Mainly cucumber, sponge gourd, bitter gourd, snake gourd are practiced in this technology and getting better yield.

In Kharif-1; Groundnut, mung, okra and soybean are practiced in late rabi and early Kharif-1 and it is found suitable in PDZ-1 area. Some leafy vegetables such as amaranth, lalsak and spinach are found grow well during this period.

#### Relay cropping

Relay cropping of green gram into T. aman rice is a traditional practice in char areas. At maturity stage of rice, after drainage of stagnant water the green gram seed may be broadcasted with the available soil moisture at ripening stage of T.aman.

### Early sowing of tishi

Early sowing of Tishi Just after harvesting of previous crop (T.aman) having available soil moisture is the appropriate time to avoid high salinity at maturity stage of the crop.

### Use of mulching

Farmers are generally practiced mulching in raised seed bed of chilly and other seedling raising crops. Now this technology is practiced in potato, sweet potato and some vegetables. After tillage and fertilizer application, straw mulch is placed on the top of bed at 4-5 cm thick which preserved soil moisture and prevent uprising of salinity. Mulching is also help weed control.

### Drip irrigation for some crops

Irrigation through drop by drop into the pit is termed as drip irrigation. Scope of irrigation is very limited in coastal chars. Ponds and ditches near homestead are the main sources of water in dry season. So, drip method of irrigation is followed for maximum utilization of limited resource of water in crop production during rabi season. Farmers of char have small area for vegetable cultivation, so water can be supplied by a drum is connected by rubber pipe and placed at a higher elevation of the plot for watering into the pit crops. High value crop such as tomato, watermelon and some pit crops can be grown by using this technology. Locally available water pot (locally known as mog) and garden sprinkler (Zanjri) is also using by the children or woman for watering.

### Sowing time management of various crops to avoid salinity

Management of sowing time can help to avoid salinity for crop production by early or late sowing of some crops to ensure yield. Some examples are given below:

**Table 35: Sowing time management of various crops to avoid salinity**

Crops	Favorable sowing time in saline soil	Optimum sowing time
Wheat	November 1-20	November 2nd week- December 1st week
Chick pea	before 15th November	November 15th –mid December
Tishi	Before 15 <sup>th</sup> November	Mid October-mid November
Tomato	September-November (seed bed) October-December (transplanting)	November- mid January (transplanting)
Chili	November 1- December 10	October-December
Garlic	November 15-December 15	November- mid December
Onion	October (seed bed) 15th November-15th	October



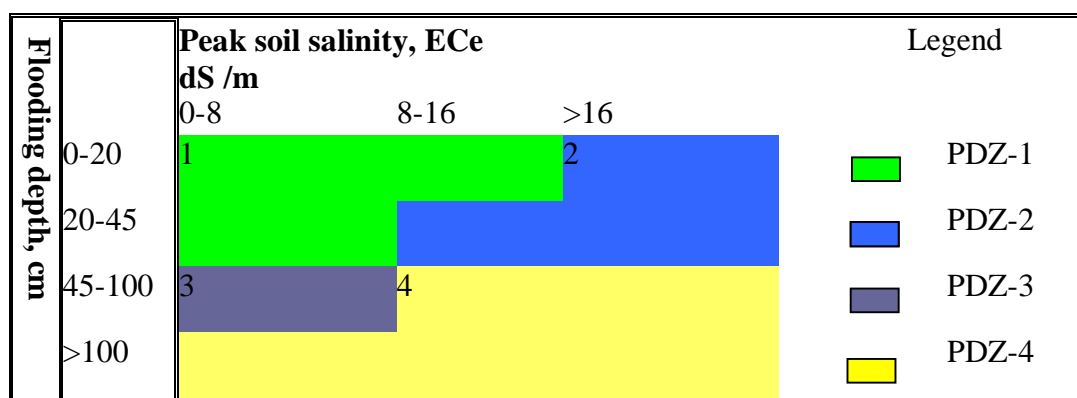
Crops	Favorable sowing time in saline soil	Optimum sowing time
	December (planting)	
Groundnut	15th November-15th December	mid November-mid December
Soybean	November	mid December- mid January
Sunflower	1st fortnight of November	mid November- mid December
Sweet potato	Mid January	mid October-mid November
Mung	Before 31st January	Last week of January-mid February

## 7.2 Productivity Zone (PDZ)

Productivity zoning of crop production in the previous phases of CDSP have been tried to implement in different char areas and recommended to practice this technology with specific crops/variety in a particular flooding depth of area and salinity level. In CDSP-IV areas it is under process to identify the zoning category, intensity of salinity and flooding depth of particular area. So at present it is not possible to recommend location wise suitable crops/variety but in general, the previous practiced technology is given, so that extension worker at field level could be able to practice in consultation during Farmers Forum group meeting.

### 7.2.1 Land zoning of agriculture (General concept of PDZ)

Two variables in productivity zone; a) flooding depth and b) soil salinity



#### PDZ-1: Shallow flooding low to medium salinity favorable condition in all seasons

- High to medium land
- Flooding depth up to 45cm; after rain drain few hrs- 3 days (Mid Oct-mid Nov.)
- Direct seeded dibbled aus can be grown successfully
- HYV Aman have potential but late plantation may suffer from drought
- Different aman varieties may be needed for high and medium land

- In high land Rabi can be planted early but may suffer from water scarcity and salinity stress in April.

**PDZ-2: “Shallow flooding, medium to high salinity”. Favorable for aman but limitations for aus and Rabi due to salinity.**

- High land flooded up to 20cm depth with high salinity
- Medium high land flooded 20-45 cm with medium salinity
- T. aus can be grown in medium high land
- HYV aman have potential but late transplanted aman may suffer from droughts unless late rain
- T. aus can be grown in medium high land
- Rabi crops tolerant to moderate soil salinity and less tolerant to late planting in medium land.

**PDZ-3: “Medium to deep flooding, low salinity”, flooding depth limits options in all seasons suitable for short season Rabi crops.**

- Medium-low to low areas with low salinity water logging may continue to early December and extend to January if late rain
- Transplanted aus rice is suitable if monsoon flooding not too deep (0.45–1.0 m), otherwise aman transplanting will be hampered.
- Currently available aman HYV are not suitable
- Late planted Rabi crops in risk of water congestion at maturation
- ‘Sarjan’ method can be tried with summer and winter vegetables
- Pit crops can be planted with drip irrigation

**PDZ-4: “Deep to very deep flooding” only suitable for tall aman varieties, boro if water is available.**

- Low to very low lying areas; similar hydrological conditions as PDZ 3, but longer period of water logging after monsoon
- Tall varieties of T. Aman are the only crop suited for this zone. Not possible in very deeply flooded (>1m) areas
- Boro can be grown if irrigation water is available.

## **CHAPTER 8: CONCLUSION**

It can be concluded from the survey findings that the status of agriculture in char area is lacking behind in compared to the other area of the country. Mainly T.aman is the only crop the farmers are practicing during rainy season at lower salinity with some traditional low yielding varieties. Some crops such as aus, summer vegetables, pulses, oil crops etc are insignificant in terms land coverage due to constraints of high salinity, non availability of irrigation water, scarcity of inputs, lack of saline tolerant HYV, and lack of knowledge on modern technology. Cropping intensity is very low in compared to the national average. But on other hand there is indication of huge potentiality for future agricultural development in the area if appropriate intervention could be provided to overcome the situation. Hence, it is expected that after implementation of project intervention of CDSP-IV, the situation will improve in livelihood of the peoples as we have seen in the earlier phases of the project.

**ANNEX-1: SURVEY FORMAT**

**AGRICULTURAL BENCHMARK SURVEY IN - CN/ NC/ CC/ CZ/ UC  
Social & Agriculture**

**Page-1**

Sl. No.	Farmer name	Far num	Vill./Samaj	Family size	Farm size(deci)	Land Own/ Rental	Education	Main occup.	Second-occup	Cropped area(deci)	Land Topo.
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Name of Surveyer

Date: \_\_\_\_\_

**Agricultural benchmark survey in - CN/NC/CC/CZ/UC  
Inputs use and yield**

**Page-2**

Sl. no	Farnum	Crop name	Seed (kg/hac)	Source of seeds	kg/ha					Irrigation		Source of inputs	Yield (Ton/hac)
					Urea	TSP	MOP	Manure	Pesticide	Local	LLP		
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

Name of surveyor: \_\_\_\_\_

Date: \_\_\_\_\_

Agricultural benchmark survey in -CN/NC/CC/CZ/UC  
agricultural production

**Page-3A**

1:Local 2:Outside 3:Consumption
---------------------------------------

SL #	Farnum	Cultivated area(dec)	Cropwise land (dec)	Yield(kg/dec)	Market	Price (kg/tk.)	Adaptable technology	High value crop
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Name of the Surveyor: \_\_\_\_\_

Date: \_\_\_\_\_

<u>Name of Crop:</u>	<u>Both Season:</u>	<u>High Value Crop:</u>	<u>Name of Technology:</u>
Aus: Saita/Hashikalmi-1	Okra-27	Hy breed rice-1	Drum Seeder-1
Chandina (BR-1)-2	Year Long bean-28	HYV rice-2	Farm compost-2
BR-27-3	Cucumber-29	Tomato-3	LCC-3
China irri-4	Bottlegourd-30	Banana-4	Guti Urea-4
BR-28-5	BR-11-30	Watermelon-5	NPK-5
Others-K1	BR-28-31	Papaya-6	Netting insect-6
Amon: Rajashail-6		Vegetable seed-7	Rat Trap-7
Kajolshail-7		Others-8	Light Trap-8
BR-39-8			Green manure-9
BR-41-9			nill-10
BR-23-10			
Gigas-11			
BR-22-12			
Others-K2			
Rabi: Country bean-13			
Bottlegourd-14			
Khesari-15			
Mug-16			
Felon-17			
Garlic-18			
Onion-19			
Chilli-20			
S. Potato-21			
Okra-22			
Tamaric-23			
Cucumber-24			
Soybean-25			
Mustard-26			

**AGRICULTURAL BENCHMARK SURVEY IN - CN/ NC/ CC/ CZ/ UC**

**Homestead Agriculture**

1:Countrybean,2:Bottlegourd, 3:Eggplant,4:Okra,5:Cucumber, 6:Redamaranth,7:Onion, 8:Others	<u>Post harvest activities-</u> 1:M,2:W,3:MW	<u>Storing activities-</u> 1:M,2:W,3:MW	1:Countrybean,2:Bottlegourd, 3:Eggplant,4:Okra,5:Cucumber, 6:Redamaranth,7:Onion, 8:Others
---	---	--	---

Sl. No.	Farnum	Vegetables name	Farm size (deci)	Harvesting	Carrying	Threshing	Winnowing	Drying	Grading	Plastic container	Drum	Earth pot	Polythene bag	Cost of production( tk/ha)	Market price(kg/tk)
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

Name of surveyor \_\_\_\_\_

Date: \_\_\_\_\_



**Agricultural benchmark survey in - CN/NC/CC/CZ/UC  
trees and agril. Machinery**

1: Fruit  
2: Timber  
3: Medicinal  
4: Others

1: Power Tiller  
2: Deshi Plough  
3: Pump  
4: Sprayer

Sl #	Far num	Production	Ponds size (dec.)	Tree num	Tree type									Tools name	Remarks
					Banana	Guava	Jackfruit	Papaya	Coconut	Rain Tree	Mehogoni	Jhau	Medicinal		
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

Name of surveyor \_\_\_\_\_

Date: \_\_\_\_\_

## ANNEX-2: LIST OF SHOMAJ

### Char Ziauddin

Sl. No.	Name of village/shomaj	Nos of HH
1	Manna/Shahabuddin shomaj	230
2	Abdur Rab Shomaj	100
3	Khaliler/Lalkalur Shomaj	265
4	Shafi Neta Shomaj	220
5	Folder Shomaj	180
6	Mohammadia Bazar	220
7	Mostafa Shomaj	120
8	Hoshenmiar Shomaj	108
9	Edris Majir Shomaj	160
10	Char Ziauddin Bazar Shomaj	325
11	Chowdhury Majir Shomaj	185
12	Siraj Bepari/Rahmatpur Shomaj	130
<b>Total</b>		<b>2243</b>

### Char Nangulia

Sl. No.	Name of village/shomaj	Nos of HH
13	Rasulpur/Kabir Ahmed Shomaj	200
14	Dakshin Mohammadpur/Karim Shomaj	175
15	Haji gram	300
16	Bhuiyan Gram	250
17	Purbo Bansh Khali	100
18	Uttar Mohammadpur	100
19	Char Nangolia 4 No Ward	250
20	24 Dag (Purba Char Majid)	200
21	Nabogram (Purba Char majid)	200
22	Paschim Belal Bazar Masjid Shomaj	150
23	Haji Para (Chmber Plot)	160
24	Noya Para	200
25	Nabir Pukur Masjid Shomaj	100
26	Rani Gram	250
27	Uttar Pashchim Chowdhury Gram	100
28	Molla Gram	250
29	Adorsho Gram	400
30	Pashchim Miaji Gram	120
31	Rasel Gram	150
32	Nasirpur/Kaladaur Bazar	300
33	Dakshin Chowdhury Gram	200

<b>Sl. No.</b>	<b>Name of village/shomaj</b>	<b>Nos of HH</b>
34	Dakshin Purbo Chowdhury Gram	200
35	Purbo Miaji Gram	120
36	40 Dag	60
37	Mohammadpur	150
38	Pashchim Faridpur (Masjid market)	190
39	Purbo Char Bashar	300
40	Pashchim Char Bashar	400
41	Dakshin Hemayetpur Masjid Shomaj	200
42	Rasulpur	180
43	Purba Faridpur	200
44	Dakshin Kerani Bazar	200
45	30 dag	60
46	Tara Market	150
47	40 Dag	80
48	Jashimuddin 50 dag	75
49	Alauddin Shomaj	100
50	Fakir Market	100
51	Beker Bazar	150
52	Babri Masjid Shomaj	100
53	Abdul Haque Masjid Shomaj	100
54	Musa Mia Masjid Shomaj	100
55	Kabir Chaowdhury Shomaj	100
56	Purbo Belal Bazar	150
57	Rahmatpur 200 Dag	200
58	Bissho Pur	150
59	Islampur	150
60	Tuba Kathi	200
61	Salim bazar	100
62	Sayed Pur	150
63	Sariyat Pur (Rickshwa Para)	150
64	40 Dag	100
65	Purbo Rob Bazar	100
66	Uttar Komolar Market	100
67	Siraj Koloni Masjid Shomaj	100
68	Haji Iddris Bazar	200
69	Rasul Pur (Zaker Shomaj)	150
70	Pashchim Dakshin Akram bazar	100
71	Al-Amin Shomaj (Solaman Bazar Shomaj)	225
72	Kabir Shomaj	150
73	Chan Kholā	200

Sl. No.	Name of village/shomaj	Nos of HH
74	Char Jamil	200
75	Sayed Pur	200
76	Nur Mohammad Shomaj	130
77	Karamotpur Shomaj	120
78	Alimpur Shomaj	80
79	Dakshin Char Noman Masjid shomaj	150
80	Bitul Mamur Masjid shomaj	150
81	Barak Shomaj	100
82	Mojam Market	150
83	Hemayet Bazar	150
84	Obyedia Masjid shomaj	150
85	50 Acar Masjid shomaj	200
86	Pashchim Char Akram	150
87	Uttar Purbo Char Noman	150
88	Samsuddin Deputi Masjid shomaj	150
89	Char Noman	200
90	Pashchim Char Kanko	200
91	Uttar Char Mojam	100
92	Char Lakshmi Mojam shomaj	200
93	Char Akram masjid shomaj	200
94	Ismail Bazar/ Akram Chowdhury Bazar shomaj	200
<b>Total</b>		<b>13475</b>

#### **Noler Char**

Sl. No.	Name of village/shomaj	Nos of HH
95	Islampur	180
96	Mannan Nagor	270
97	Mowlovi Gram	300
98	Molla Gram	170
99	Poshchim Adorsho Gram Chanandi	160
100	Purbo Adorsho Gram	200
101	Al Amin Shomaj	250
102	Dokshin Al Amin shomaj	150
103	Uttar Azim Nagor	180
104	Rosulpur Daroga Bazar	180
105	Aladin (Ziar Bazar)	165
106	Poshchim Adorsho Gram	200
107	Poshchim Adorsho Gram Ghat	100
108	Purbo Adorsho Gram	150

Sl. No.	Name of village/shomaj	Nos of HH
109	Uttar Shantipur	200
110	Dakshin Azim Nagar	300
111	Purbo Azim Nagor (Madrasha Bazar)	350
112	Purbo Azim Nagor Leski	120
113	Uttar Musapur	250
114	Dakshin Musapur	300
115	Modhya Musapur	350
116	Purbo Mazlishpur (Bangla bazar)	200
117	Modhya Mazlishpur	250
118	Uttar Mazlishpur	230
119	Dakshin Mazlishpur (Killar Bazar)	210
120	Dakshin Purbo Musapur	185
121	Modhya Shantipur	150
122	Dakshin Shantipur	150
123	Rahmatpur	350
124	Dakshin Azimnagar (Mohammadpur)	250
125	Tazimpur	150
126	Shabnaj Mashjid Shomaj (Project part)	250
<b>Total</b>		<b>6900</b>

### Caring Char

Sl. No.	Name of village/shomaj	Nos of HH
127	Krishnonagar Shomaj	250
128	Bathan Khali	200
129	Chowdhury Gram	200
130	Adarsho gram Leski	250
131	Motipur	270
132	Dhanshiree	150
133	Mohammadpur	230
134	CDSP Gram	100
135	Islampur	175
136	Rasulpur	250
137	Mula Gram	150
138	Molla Gram	200
139	Mowlobi Gram	250
140	Adarsho Gram	275
141	Hajipur Gram	260
142	Shahebani Bazar shomaj	270
143	Kuddus Howlader shomaj	400

Sl. No.	Name of village/shomaj	Nos of HH
144	Hasina Nagar	250
145	Joypur Shomaj	700
146	Mojib Nagar	170
147	Poshchim Mojib Nagar	100
148	Dakshin Mojib Nagar	80
149	Uttar Mojib Nagar	120
150	Ali Ahmed shomaj	350
151	Nijampur shomaj	600
152	Jaggonnatpur Mondir	120
<b>Total</b>		<b>6370</b>

#### Urir Char

Sl. No.	Name of village/shomaj	Nos of HH
153	Coloni bazar Moshjid shomaj	150
154	Moulana Iddris Shaheb Mosjid shomaj	100
155	Pakistan Mosjid shomaj	85
156	5 No. Digi Mosjid shomaj	56
157	4 no. ward Forest Office D. Mosjid shomaj	60
158	Salamat Koner Mosjid shomaj	45
159	Mostafiz Shaheber Mosjid shomaj	140
160	Shahid Mostan Achrayan shomaj	150
161	Police Fari Mosjid shomaj	52
162	Moulana Iddris Shaheber Mosjid shomaj (North)	20
163	Ayoub Alir Mosjid shomaj	60
164	Din Mohammad Kamler Mosjid shomaj	125
165	Janata Bazar Mosjid shomaj	300
166	Banglabazar Mosjid shomaj	240
167	Miarbazar Mosjid shomaj	200
168	Hafez Nazim uddin Mosjid shomaj	60
169	Darber Madrasha/Mosjid shomaj	50
170	Anjumazir Namarbazar Mosjid shomaj	220
171	Rajib bazar Mosjid shomaj	100
172	Salim Batynnar shomaj	20
<b>Total</b>		<b>2233</b>

