

Char Development and Settlement Project (CDSP B) Bangladesh

Annual Outcome Survey 2023

Technical Report No. 6

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Government of Bangladesh / IFAD / Government of the Netherlands

Implementing Government Agencies:

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

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1. Introduction

Since the start of Phase IV, M&E system of CDSP has been including Annual Outcome Surveys (AOS) which gather information on log frame objective and outcome indicators as well as on several output indicators. These surveys cover CDSP I, II, III, and IV areas and incorporate indicators that have been covered in past CDSP B(AF) monitoring surveys. This enables the CDSP data-set to measure the long-term development benefits and their sustainability in all the CDSP chars.

As its title indicates, the survey is carried out on an annual basis as panel survey. The CDSP IV Baseline Survey was done at the end of 2011, but covered only the CDSP IV area, as did the 2014 AOS. The other seven AOS (2012, 2013, 2015, 2016, 2017, 2019 and 2021), as well as this round in 2023¹) cover all four CDSP areas. Annual AOS surveys have continued during CDSP B/AF in order to help identify changes in cropping and productivity that may be the result of loss of water management infrastructure to river erosion as well as continuing increases in production resulting from improvements introduced.

The objectives of the survey are:

1. To gather information on the key purpose and goal level log frame indicators, to show, on an annual basis, progress towards these indicators.
2. Measurement of outcomes to collect evidence for a “results chain” with changes in the physical environment and/ or improved technology, leading to changes in cropping patterns, resulting in increased crop yields and/ or income, which in turn results in increased sales and improved food security, leading finally to reduced poverty.
3. Evidence for IFAD performance indicators.
4. In addition, outcome surveys gather information on the project services received by respondents.

The current survey is the 9th round of annual outcome surveys (the project ends in mid-2024). Data collection took place in November and December 2023.

At the same time a dietary diversity survey was carried out only in the CDSP IV chars. This gathered some data that can be compared with the RIMS baseline survey of 2009 (carried out before the start of CDSP IV) and the mid-term AOS round of 2014. Results of this survey are in Annex 1.

2. Methodology

2.1 Sampling procedure

The sample design for CDSP AOS is a sample of 200 households from each of the three domains (CDSP I/II, CDSP III, and CDSP IV) making a total sample of 600. The sample is a ‘panel sample’ with the same households being visited each survey round, which minimizes sample errors caused by changes in the sample composition in each survey round. In 8th AOS round (2021) 42 sample households of Caring Char was dropped due to fact that this char had completely eroded away. Even taking replacement sample households was not possible at that time.

For the 9th round of annual outcome survey 2024, initially 545 HHs was selected based on the sample used in from the 8th round of AOS 2021. A significant number of the 2021 sample households could not be located for reasons like household head left the community, sold their home to another party, the homestead has been lost due to river erosion, or they found to be absent during survey.

¹ These dates refer to data collection. AOS reports are often published in the following year.

Table-1: Sample distributions over 2012 through 2023

CDSP Phase & samples	Union/ Char	Village/ Somaj	Sample HH as on 2012	Sample HH as on 2021	Sample HH as on 2023	
CDSP I&II (200)	Char Bata	Char Majid	22	22	22	
		Purbo Char Bata	24	24	23	
			Poshchim Char Bata	20	19	19
	Char Jabbar	Char Jabbar	14	13	12	
	Char Jublee	Modhya Char Bagga	18	17	18	
		Char Mohiuddin	20	20	20	
	Char Elahi	Gangchil	20	20	20	
		Char Kalmi	20	20	18	
	Char Clark	Baisakhai	20	20	19	
		Shudolpur	Nobogram	22	21	20
Sub-total (Domain-1)			200	196	191	
CDSP III (200)	Horni Union	West Gabtoli Adorsho Gram	9	9	10	
		Shahab Uddin Somaj	20	19	20	
		Mirajpur	21	18	19	
		Mohammadpur	10	10	10	
		Molla Gram	20	19	18	
		Adorsho Gram	20	19	19	
		East 10 Number	20	20	0	
		Forest Center	20	19	19	
		Ali Bazar	32	32	31	
		South Kata Khali	28	0	0	
		Jokhali			19	
Al-amin		28	27			
Sub-total (Domain-2)			200	193	192	
CDSP-IV (200)	Char Nangulia	Alamin Somaj	14	14	9	
		4 no. ward	14	14	13	
		Haji Gram	7	7	7	
		Nasirpur	14	14	0	
		Rani Gram	7	7	0	
		Sohag Chowdhury Gram	14	14	0	
		Rasel Gram			10	
		Ismail Bazar	14	14	0	
		Noler Char	Al Amin Somaj	7	6	9
			Dokshin Azim Nagar	14	13	4
	Dokshin Mojlishpur (K Bazar)		14	14	0	
	West Adorsho Gram				14	
	Caring Char	North Musapur	7	7	0	
		Adarsha Gram Somaj	14	0	0	
		Mohammed Somaj	14	0	0	
		Jagannathpur	14	0	0	
		Char Ziauddin	Ziauddin Bazar	8	8	8
			Sofi Neta Somaj	8	8	7
	Urir Char	Coloni Bazar Moshjid Somaj	8	8	0	
		Janata Bazar M S	8	8	0	
Ardarsha Gram				11		
Sub-total (Domain-3)			200	156	92	
Total samples			600	545	475	

Despite selection of some replacement sample households, a total of 475 sample HH were interviewed, well short of the target of 600.

Distribution of the sample households was as follows: (i) CDSP I&II 191 samples, CDSP III 192 samples and CDSP IV 92 samples. It was difficult to find replacement sample households in CDSP IV where whole communities have disappeared due to loss of land to river erosion, and results for CDSP IV may not be reliable due to the small sample size.

The dietary diversity survey was carried out only in the CDSP IV chars and with a larger sample of 734 households.

2.2 Survey questionnaire

Data was collected using a household questionnaire. This questionnaire is consistent with that in earlier rounds of AOS – to continue to build the annual data set of key indicators. Some additional indicators were introduced to gather information on changes in regards to the impact of land titling and dietary diversity. The updated questionnaire is attached as Annex 2.

2.3 Field data collection and data analysis

In November and December 2023, data was collected from the field by five (three men and two women) enumerators/field investigators hired by Socioconsult Limited and subsequently seconded to CDSP B(AF).. The two M&E Officers of CDSP B(AF) who have acted as supervisor for field data collection and a hired Data Entry Operator (DEO) and a Data Validator and Analyst were responsible for data entry and analysis. The field investigators (Fis) were trained for three days 7, 11, and 12 November 2023 for field data collection using the survey questionnaire during an interview session with selected households. The data collection process took near about 40 days including three days for training. After computer data entry using MS Access, further data checking took place, and then the data was analysed using MS Excel.

3. Results and discussion

3.1 Household composition

The composition of households in all CDSP B(AF) areas has been shown Table 2. This shows that the average household size is 6.24 persons – larger than the usual household size in rural Bangladesh (typically close to 5 persons). However, compared to the 2021 AOS, average household size has fallen by over one person in all the CDSP areas, with only around half the number of children aged under 5 years. All children in the 5 to 16 age brackets are at school – and it should be remembered that children only legally have to go to school up to the age of 10. The fact that 2% to 6% of children are not going to school in the CDSP I&II and III areas, while 100% are school going in in the CDSP IV area may reflect the picture of fewer dropouts due to the use of multipurpose cyclone shelters as schools and religious schools/madrasha. The table also shows that between 34% to 45% of women are not earning (or elderly or in education). This compares with 15% to 21% in the 2021 AOS. There is an opportunity for increased female employment, although some women may choose to not work as households become more prosperous.

Table 2: Household Composition

-	No. of people per household	Percentage of household members				
		Earning	Elderly or disabled	In education	Other	Total
CDSP I&II						
Men 16+	2.09	81%	9%	4%	6%	100%
Women 16+	1.91	41%	10%	4%	45%	100%
Child 5-16	1.43	0	1%	93%	6%	100%
Child under 5	0.80	0	0	3%	97%	100%
Total member	6.23					
CDSP III						
Men 16+	2.06	87%	9%	4%	0	100%
Women 16+	1.81	54%	11%	1%	34%	100%
Child 5-16	1.56	0	1%	97%	2%	100%
Child under 5	0.78	0	0	0	100%	100%
Total member	6.22					
CDSP IV						
Men 16+	1.99	86%	10%	3%	1%	100%
Women 16+	2.00	51%	10%	0%	39%	100%
Child 5-16	1.46	0	0	100%	0%	100%
Child under 5	0.79	0	0	1%	99%	100%
Total member	6.24					

3.2 Participation in Field Level Institutions

CDSP has promoted a range of field-level institutions (FLI) to support the work of project implementation and build community ownership of project outputs. In CDSP IV Water Management Groups (WMGs) were formed with an average of 36 members, representing hundreds of farmers in a water management catchment area formed by a drainage channel/khal. Farmers Forums (FF) were formed as a conduit for extension services from DAE, with about 23% of farmers being members. Social Forestry Groups (SFG) were formed to establish and maintain plantations on public land. Women from all households were given the opportunity to join micro-credit groups formed by CDSP partner NGOs (PNGOs). PNGOs also gave these groups support for livelihoods, legal rights, and disaster management, along with health services. Households were also members of the Tubewell User Groups (TUG) based around DTW installed by CDSP to provide domestic water. Labour Contracting Societies (LCS) were formed to undertake small construction contracts.

Table 3 shows the proportion of households reporting membership of these six types of FLI. This shows membership at the current time and membership at any time (both current and in the past). Relatively few of this FLI were formed during CDSP I and II, but other programmes will have formed groups in these areas, and NGO microcredit groups are found throughout the area. It would be expected that there would be some fall off in group membership as project activities come to an end and the immediate benefits of group membership are reduced. Compared with the 2021 AOS, participation in FLI is generally static or declining, exceptions being an increase in membership of Farmers' Forums in the CDSP I/II and III areas and

increased participation in Social Forestry and Tubewell User Groups in the CDSP I/II area. It is surprising that only around one third of all CDSP IV households report membership of TUG when almost two-thirds use DTW – which were almost all installed by the project with all households being enlisted into TUG at the time of installation of these DTW. It seems that many people do not realize that they are members of TUG. In general, in all CDSP areas, more households are reporting participation in FLI compared to the previous round of AOS in 2021 and 2023.

Table 3: Participation in Field Level Institutions (% of households)

Type of FLI	CDSP I&II		CDSP III		CDSP IV	
	Now	any time	Now	any time	Now	any time
WMG	6%	9%	9%	13%	7%	11%
FF	17%	25%	20%	33%	9%	21%
SFG	14%	20%	25%	28%	9%	11%
NGO	60%	69%	77%	83%	76%	82%
TUG	24%	31%	19%	35%	31%	37%
LCS	2%	2%	2%	8%	1%	0%

3.3 Settlement status

In the CDSP-IV area, 70% of households now have khatian land titles (Table 4), compared to 67% in the 2021 AOS. In CDSP- I, II, and III areas most people have got land titles via CDSP, but some purchased land, and a few inherited it. There has been an increase in this proportion since the first (2012) AOS in CDSP I&II and in CDSP III. As the selling of newly received land titles is not allowed, it is assumed that these sales were mostly informal.

Table 4: Settlement status of households

	CDSP IV	CDSP-I & II	CDSP-III	CDSP-IV
% of households	baseline			
Settlement programme / land title	1.2	63	81	70
Occupying <i>khas</i> land	91	8	4	27
Purchased land	8	93	26	7
Inherited land		20	9	3
Sample size (n)	1400	191	192	92

The average area operated (net of leasing land in and out) is 144 decimals in CDSP IV, with slightly smaller areas being operated in the older CDSP areas. (1 ha=247 decimals). The average areas operated have fallen slightly in all the CDSP areas since the 2021 AOS. Almost two-thirds of land in the CDSP III and IV areas is occupied via khatian settlement compared with half in the CDSP I/II area where more land has been purchased. Since the 2021 AOS in the CDSP IV area, the proportion of land occupied via khatian settlement has increased from 41% to 64%, and the proportion occupied informally has decreased from 29% to 21%.

Table 5: Area of land acquired through different means

	CDSP I&II		CDSP II		CDSP IV	
	decimals per HH	percent of area	decimals per HH	percent of area	decimals per HH	percent of area
The area occupied Land acquired by						
Khatian settlement	85	50%	104	63%	104	64%
Inherited	12	7%	4	3%	1	1%
Purchased	41	24%	19	17%	3	2%
Occupy informally	12	7%	3	5%	36	21%
Lease in	20	12%	17	13%	19	12%
sub-total	170	100%	147	100%	163	100%
Lease out	38	22%	25	17%	19	12%
Net area operated	132	78%	122	83%	144	88%
Sample size (n)	191		192		92	

3.3a. Status of investment in land-owning through land titling and its social impact

This section has been included newly to address recommendations of IFAD Supervision Mission (SM) of 2021. The key areas were considered: (i) the type of land owned and occupied, (ii) the status of investments on those land, and (iii) the social impacts to somaj/community due to development through investments.

(a) Type of land owning and occupying

According to the Government land settlement policy, landless poor char dwellers should be given a land title for a maximum of 150 decimals of land occupying. In reality, it is found that a char dwelling family gets an average of 1.3 acres (130 decimals) of land. After getting a title they use the land for homestead development, dig ponds/ditches, develop cultivable land, and keep some fallow land for grazing. To increase their cultivable area, they sometimes lease/mortgage land in.

(b) Status of investments on the land-owning through and possessing by other means

It has been observed that when char dwellers occupy newly accreted land, they generally do not invest their financial capital in building nice living houses and developing their land due to fear of eviction by the Ministry of Land, being the owner of the land. As soon as they receive permanent land titles (*khatians*), they start to invest in building nice living houses and developing land both for field crops and vegetables. When land is low lying, like Char Nangulia, they may develop 'sorjon' systems of fish cum vegetable cultivation.



A renovated living house built inside Sorjon plot within CDSP B(AF) areas at Char Maksumul Hakim



A piece of low-lying land developed as Sorjon system (fish cum vegetable) in Char Maksumul, CDSP B(AF) areas

Table 6: Status of investment on land after receiving land title

Investment in land	CDSP- I, II 2023		CDSP- III 2023		CDSP- IV 2023	
	% HH	taka /HH	% HH	taka/HH	% HH	taka/HH
Living house	88%	338,720	89%	257,549	88%	200,667
Pond	71%	33,005	85%	45,865	87%	39,435
'Sorjon' plot	2%	27,500	1%	30,000	3%	8,333
Land for field crop	33%	23,883	40%	24,112	50%	20,000
Land for vegetable	18%	15,700	25%	17,197	32%	13,345
Land leased in	6%	176,364	6%	108,181	1%	50,000
Total amount invested		383,168		322,877		256,677
Sale of land						
Land sold	11%	382,952	7%	232,000	3%	105,000
Sample size (n)	191		192		92	

Average value per household is the average for all households, not just those making investments or sales

The study data reveals that most households have invested in developing houses and ponds, and that houses are by far the largest investment. A good proportion (50% in the CDSP IV area) have invested in land for field crops. Some (3% to 11%) households have reported that they have sold some land, although selling land acquired through the land settlement process is illegal. Compared with the 2021 AOS, more money is being invested, especially in houses in the CDSP IV area (increase of 53%).

(b) The social impacts to somaj/community due to development through investments

To assess the social impact due to the acquisition of land through land titling and investment in the land, the sample households from all three domains of changes (CDSP I&II, CDSP III, and CDSP IV) have been requested to respond to seven open-ended questions. These are:

- Having a land title, are you more secure than before?
- Has your status in society changed?
- Has your mobility changed?
- Leading better family life?
- Do you have a more harmonious married life?
- Is your somaj /community at risk of river erosion?
- Enhanced capabilities to cope with misery/disaster? How?

The responses to the above seven questions have been processed and presented in table 7 to table 11 for respective sections as described below:

- (i) **Increased security of land tenure:** The study reveals that the land received by poor char dwellers through permanent land titles/*khatians* has a great impact on them. Land titles allow them to have permanent ownership rights which can be inherited. They are better secured than before and free from the torture of so-called 'bahinis' (armed gangs). They are now renovating their homes and living very peacefully with less fear of thefts etc.

Table 7: Having a land title and more secure than before

1. Having a land title, are you more secure than before?	
CDSP I&II (Responded HH 94%)	<ul style="list-style-type: none"> √ (25%) Become a permanent owner of land by receiving a land title (Khatian). √ (61%) Reduction of robbery √ (3%) More secured due to construction of embankments √ (2%) Construct Road and repair roads √ (2%) Secured from the tortures of armed gangs.
CDSP III (Responded HH 97%)	<ul style="list-style-type: none"> √ (53%) Become a permanent owner of land by receiving a land title (Khatian). √ (41%) Reduction of robbery . √ (5%) More secured due to construction of embankments
CDSP B(AF) (Responded HH 80%)	<ul style="list-style-type: none"> √ (49%) More secured due to construction of embankments √ (32%) Become a permanent owner of land by receiving a land title (Khatian). √ (8%) Bank of river shifted near of them due to erosion

- (ii) **Changes in the status** of household members in the somaj/community: At the beginning of CDSP, both men and women char poor households used to be socially deprived by literally

socially elite people, especially the women have less access to social positions like positions of local government memberships, committees of schools, religious institutions, markets, etc. The study reveals that currently, some char dwellers are invited to participate in social programs.

Table 8: Changes in the status of household members in the somaj/community

2. Have your status to society changed?	
CDSP I&II (Responded HH 79%)	(29%) Socially accepted/called to attend forum meetings (20%) invited to be member of FLIs, educational institutes (9%) They are more capable of sending kids to educational schools. (5%) Religious gathering/women are respected than before (3%) Become owner of land/received land title/khatians
CDSP III (Responded HH 86%)	(33%) invited to be member of FLIs, educational institutes (23%) Socially accepted/called to attend forum meetings (10%) They are more capable of sending kids to educational schools (6%) Due to education their kids now working abroad and earning foreign remittances
CDSP IV (Responded HH 78%)	(23%) Socially accepted/called to attend forum meetings (13%) invited to be member of FLIs, educational institutes (10%) We are invited to take memberships in school/madrasha committees (8%) Establishment of markets

- (iii) **Changes in the mobility of women:** Now women have easy access to markets and social gatherings. They can go to the market for shopping and even go to markets for selling poultry birds.

Some households (4%) said that their mobility has increased for increased income through receiving remittances from their kids serving Middle-East countries.

Table 9: Changes in the mobility of men/women

3. Has your mobility changed?	
CDSP I&II (Responded HH 76%)	(25%) Religious gathering/women are respected than before (16%) Socially accepted/called to attend forum meetings (16%) invited to be member of FLIs, educational institutes
CDSP III (Responded HH 82%)	(26%) Religious gathering/women are respected than before. (24%) invited to be member of FLIs, educational institutes (9%) Socially accepted/called to attend forum meetings
CDSP IV (Responded HH 74%)	(24%) Religious gathering/women are respected than before (23%) Socially accepted/called to attend forum meetings (7%) Establishment of markets (5%) Semi-Pacca walls/tin-shed houses

- (iv) **Changes observed since the start of CDSP:** Before CDSP living conditions in the coastal chars were harsh - the services of Govt. agencies were absent, people lived on newly accreted land where there were no roads, markets, no safe drinking water, and a lack of sanitation. There were no schools for the kids. Families have had hard times. CDSP has provided land, DTWs for safe drinking water, and built roads, bridges, markets, and multi-purpose cyclone shelters-cum-schools. The study finds that currently, 47% of coastal char families are sending

their kids to schools established in the cyclone shelters. Families are better off than before. Some families reported that due to high income they sent their family members abroad (Middle-East countries) for a job. They are very happy. They are regularly receiving remittances from their family members.

Changes since the start of CDSP

4. Leading better family life?	
CDSP I&II (Responded HH 76%)	(37%) Married life happier/economically more solvent than before (19%) They are more capable of sending kids to educational schools (13%) . Due to education their kids now working abroad and earning foreign remittances
CDSP III (Responded HH 83%)	(37%) Married life happier/economically more solvent than before (19%) Happy conjugal life. Happy family better than before (13%) Due to education their kids now working abroad and earning foreign remittances
CDSP IV (Responded HH 73%)	(29%) Married life happier/economically more solvent then before (18%) Happy conjugal life. Happy family better than before (12%) Income increased and more able to send family members to Middle-East countries (10%) Semi-Pacca walls/tin-shed houses

- (v) **More harmonious married life:** In the past family life was problematic. Many men had to migrate away to find work, leaving their wives to face the hazards of char life alone. As a result, there were frequent divorces. At present, couples maintain a happy family life. Households (64%-74%) have reported that they are leading happy married life and more families are happier than before CDSP.

Table 10: Enjoying a happier married life

5. Better bondage in conjugal life?	
CDSP I&II (Responded HH 80%)	(74%) Married life happier/economically more solvent than before (4%) Become owner of land/received land title/khatians (2%) Due to education their kids now working abroad and earning foreign remittances
CDSP III (Responded HH 81%)	(64%) Married life happier/economically more solvent than before (16%) Become owner of land/received land title/khatians
CDSP IV (Responded HH 73%)	(68%) Married life happier/economically more solvent than before (7%) Become owner of land/received land title/khatians (1%) Bank of river shifted near of them due to erosion

- (vi) **Risk of erosion along river banks:** In the recent year (since 2016) there has serious river erosion along the River Meghna bank. During 2017-2019, the Caring Char was completely eroded. Some parts of river bank areas of Char Nangulia, Noler Char, and Boyer Char have been seriously damaged and lost. During the study 52% of char dwellers of CDSP I&II reported that the river is far away, and they are safe and have no risk of erosion. The same applies to 36% of households in Boyer Char (CDSP III) and 41% of households in CDSP IV. But 27% of CDSP III and 25% of CDSP IV households say that the river bank is moving closer to them due to erosion.

Table 11: Status of erosion along river banks

6. Your somaj at risk of river erosion?	
CDSP I&II (Responded HH 53%)	(52%) River banks are far away and less chance of river erosion (2%) More secured due to construction of embankments (1%) Semi-Pacca walls/tin-shed houses
CDSP III (Responded HH 69%)	(36%) River banks are far away and less chance of river erosion (27%) Bank of river shifted near of them due to erosion (4%) Erosion of embankment of chars
CDSP IV (Responded HH 54%)	(41%) River banks are far away and less chance of river erosion (25%) Bank of river shifted near of them due to erosion (3%) More secured due to construction of embankment

- (vii) **Status on coping with disaster:** Coastal regions are always disaster-prone and affected by tidal surges, storms and cyclones. Before CDSP, char dwellers were often affected by natural disasters. Since the inception of CDSP, huge climate-resilient and climate protection infrastructures have been built. The study reveals that char dwellers have now enhanced their coping up strategies to deal with disasters. A significant number of households (between one quarter and one third, said they built stronger houses, and 51% of households in the CDSP IV area said that they benefited from cyclone shelters.

Table 11a. Status on coping with disaster

7. Enhanced capabilities to cope with disaster	
CDSP I&II (Responded HH 70%)	(25%) Semi-Pacca walls/tin-shed houses (24%) benefited due to build of cyclone shelters (19%) Planted more trees in homestead areas
CDSP III (Responded HH 75%)	(36%) Repairing of living houses (19%) Semi-Pacca walls/tin-shed houses (13%) Planted more trees in homestead areas
CDSP IV (Responded HH 83%)	(51%) benefited due to building of cyclone shelters (24%) Semi-Pacca walls/tin-shed houses (12%) Due to the construction of the cyclone centre by CDSP

3.4 Occupational profile

A comparison of the occupation of household heads between CDSP-IV baseline and present status of CDSP phases is shown in Table 12. In the CDSP I/II area the main occupations are small trade followed by day labour and crop farming. In CDSP III it is crops followed by small trade, and in CDSP IV crops followed by day labour. Second occupations are dominated by crop farming in all three areas.

Farming (crops) is by far and away from the most widely reported secondary occupation (32 to 35% of households).

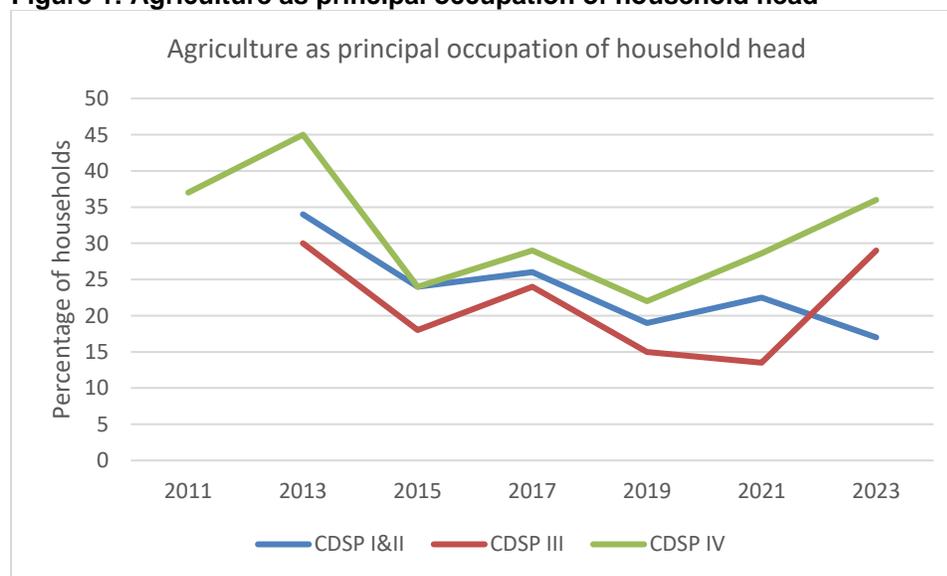
Table 12: Occupation of household head (percentage of households)

Occupation	Baseline 2011	CDSP I & II 2023		CDSP III 2023		CDSP IV 2023	
		primary	second	primary	second	primary	second
Agric/crop farming	37	17	32	28	29	36	35
Livestock		0.5	9	0	5	1	10
Day labour	31	19	5	12.5	11	22	11
Housekeeping	3	6	0	4	3	6.5	1
Fish/PL catch/dry	3	3	1.5	2.6	3	3	2
Salaried job	3	14	1	11	3	5	0
Small trade	9	22	2	20	2	13	4
Rickshaw / boat	4	2	0.5	5	0.5	1	0
Handicraft	0	2	0	0.5	0	0	0
Driver	0	4	0.5	4	0	2	1
Other	5	5	2.6	7	3	5	4
Total sample size (n)		191		192		92	

Note: not all household heads reported having a secondary occupation.

Figure 1 shows trends in the percentage of household heads reporting agriculture as their principal occupation. This shows that initially agriculture became more important in CDSP IV, but then moved into alignment with the older areas where agriculture had become less important. More recently an increasing number of household heads in both CDSP III and CDSP IV report agriculture as their principal occupation.

Figure 1: Agriculture as principal occupation of household head



3.6 Housing

The average size of the main houses observed in the CDSP areas is shown in Table 14 below. At the start of the project houses in CDSP I&II and III were 60% larger than those in CDSP IV. Since then the size of houses in CDSP IV has almost doubled, , and the gap has now virtually closed (see Figure 2). . Since the 2021 AOS the average size of houses in all three areas has increased as people continue to invest in housing. In all CDSP areas, floors are predominant mud, but brick and cement are starting to be used. Around 99% of all CDSP households now report tin (and sometimes brick/cement) walls, compared to only 13% of walls and 16% of roofs at CDSP IV baseline.

Table 14: Housing

	CDSP IV Baseline	CDSP I&II-2023	CDSP III - 2023	CDSP IV - 2023
Average size of main house (sq. ft)	253	488	531	503
Type of floor (% of HH)				
Mud	99%	77%	82%	96%
Bricks	1%	2%	0%	0%
Pacca	0%	23%	18%	4%
Type of Wall (% of HH)				
Leaf	4%	0%	1%	0%
Straw	34%	0%	0%	0%
Mud	0%	2%	1%	2%
Bamboo	50%	0%	0%	0%
Tin	13%	85%	84%	93%
Pacca/brick	0%	14%	15%	4%
Type of Roof (% of HH)				
Leaf	2%	1%	1%	0%
Straw	82%	0%	0%	2%
Tin	16%	93%	96%	97%
Pacca	0%	6%	4%	1%
<i>sample size (n)</i>	1400	191	192	92

Figure 2: Size of main house

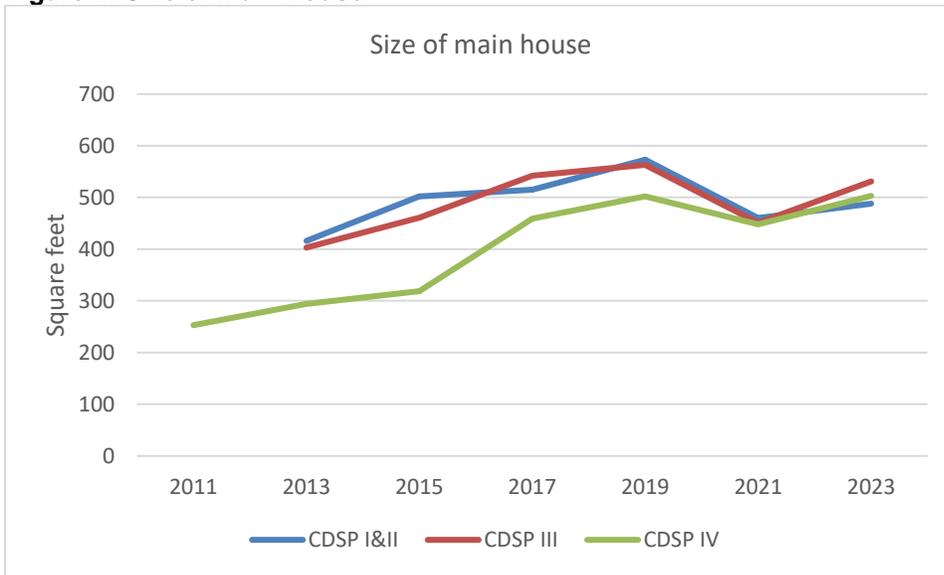


Figure 3: Straw roofing material

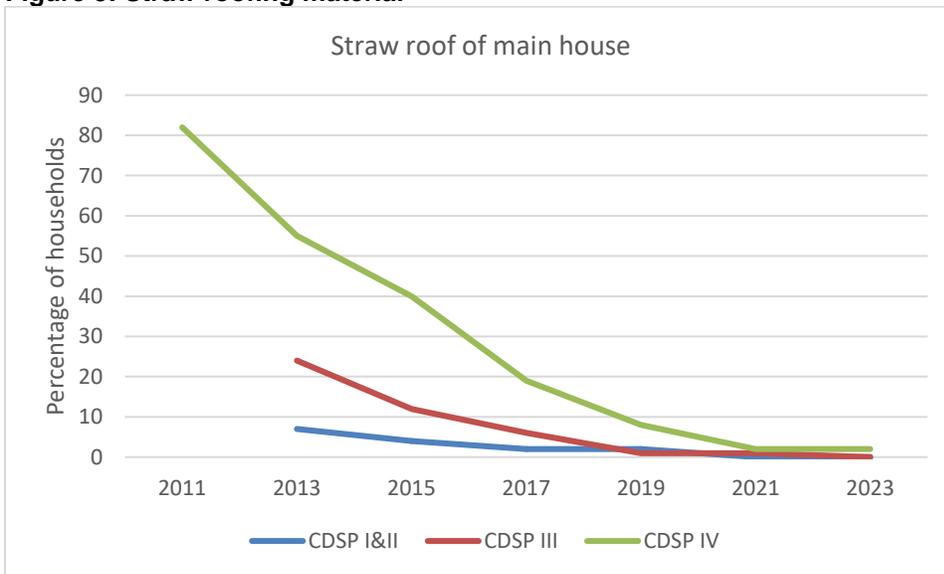


Figure 4: Tin roofing material

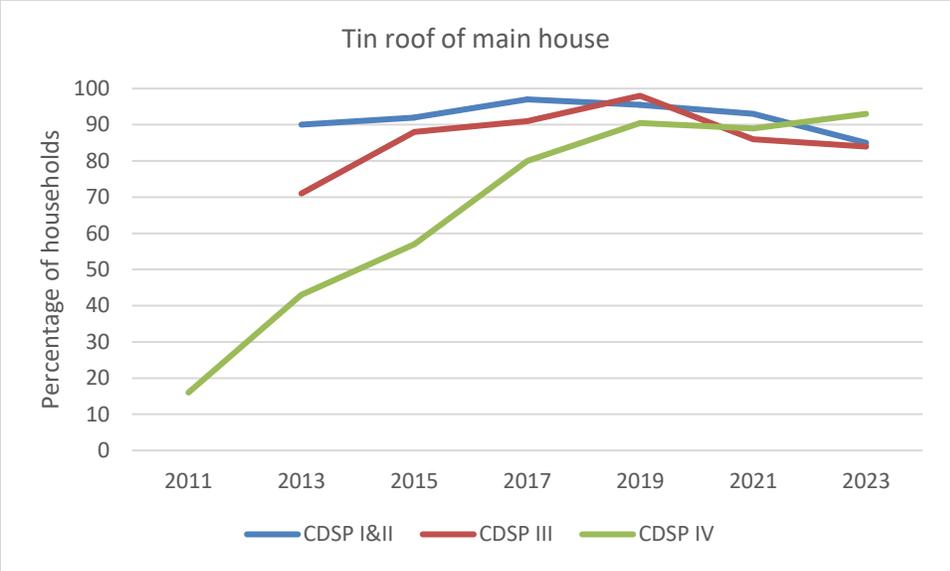


Table 14a: Percentage of households having tin-sheet wall in their living houses

AOS Year	CDSP I&II	CDSP III	CDSP IV
2012	55%	40%	31%
2013	64%	61%	43%
2015	77%	80%	63%
2016	84%	86%	72%
2019	89%	92%	90%
2021	82%	82%	89%
2023	85%	84%	93%

The older CDSP areas have themselves made remarkable progress since the start of CDSP IV. AOS data (Table 14a) on tin-sheet walls of houses shows that from 2012 to 2019, the number of households in CDSP I&II having tin walls increased from 55% to 89%, in CDSP III from 40% to 92%, and in CDSP IV from 31% to 90%. Although the proportion with tin walls has continued to increase in CDSP IV, it has begun to fall in the older CDSP areas as households upgrade from tin-sheets to pacca walls made of brick or concrete. These changes are due to better socio-economic condition of households and the fact of having permanent settlement through receiving land titles/'khatians'. The easy availability of building materials with lower transport costs due to improved communications may also be a factor. The trend in the use of straw and tin sheets as roofing materials across the three CDSP areas are illustrated in Figures 3 and 4.

3.7 Water supply and sanitation

Data in Table 15 shows how access to drinking has changed in CDSP B(AF) compared to the baseline situation. Although almost all households have been getting water from tube wells, the access to water has greatly improved in the CDSP IV area, with sources now being around 65 metres from the home as against about 370 metres in the baseline situation This saves much time in collecting drinking water, especially for the women of the households who usually perform this task. Figures 5 and 6 show how CDSP IV households have caught up with those in the older areas in terms of distance to a source of

drinking water in the wet and dry seasons. Since 2021 there has been a further reduction in the distance to water sources in the CDSP I&II and CDSP IV areas and a very small increase in CDSP III.

Table 15: Water and sanitation

	Baseline CDSP IV 2011	CDSP-I,II 2023	CDSP-III 2023	CDSP-IV 2023
Source of drinking water (% of HH)				
Shallow Tube well	3	52	50	32
Deep Tube well	96	47	49	64
Untreated pond water	2	1	1	4
Ownership of tubewell (% of HH)				
Owned by HH	5	40	38	26
Jointly owned	5	5	4	
Neighbors	27	25	16	17
Govt./Community	63	4	4	1
From CDSP	-	26	38	56
Distance from water source				
Dry Season (metre)	345	48	55	64
Rainy Season (metre)	418	50	56	67
Type of latrine used (% of HH)				
No latrine	5	1	0	0
Hanging/open	77	0	0	0
Ring slab (unhygienic)	14	16	20	24
Ring slab (water sealed)	6	65	68	68
Hygienic	0	18	12	8
Source of latrine (% of HH)				
Purchased from market	61	96	98	85
Purchased from NGO/other organisation	8	1	0	0
Donated by GO/NGO/other organisation	31	1	1	1
Installed by CDSP	0	2	1	14

Figure 5: Distance to potable water in dry season

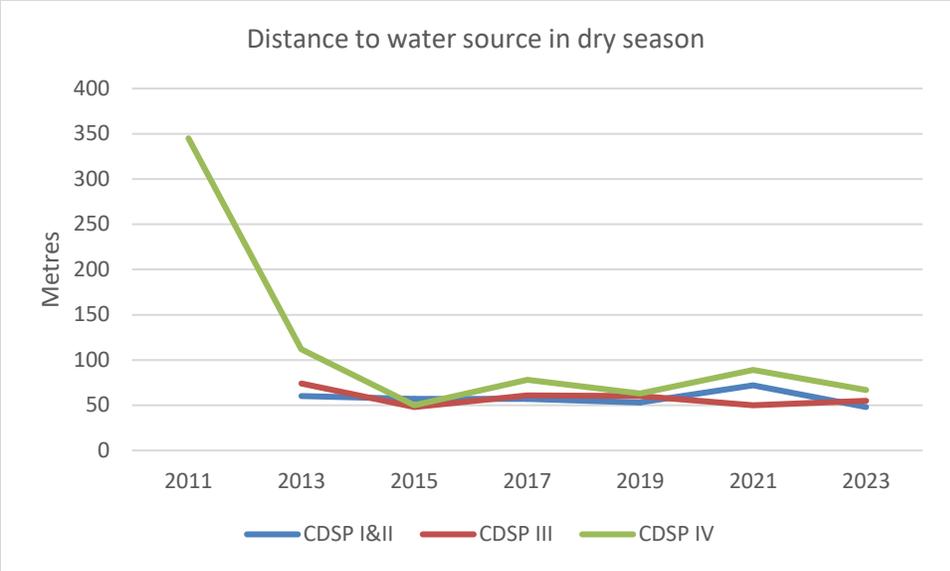


Figure 56: Distance to potable water in wet season

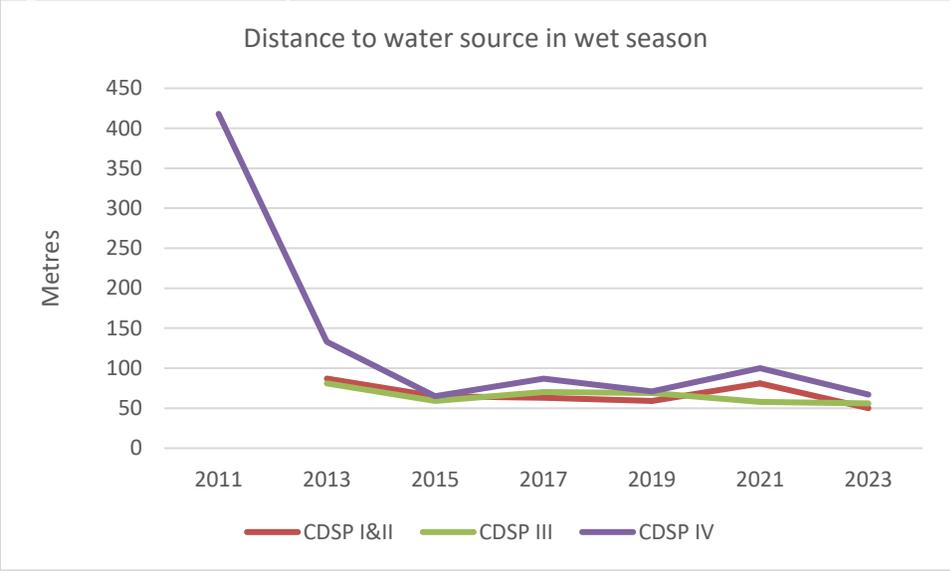


Table 15 shows that the use of water sealed ring slab and hygienic latrines in CDSP IV have hugely increased compared to the baseline situation (from 6% to 68%). However, 24% of CDSP IV (and 16-20% in the older CDSP areas) report unhygienic slab latrines – previously 96% had been hygienic. Maybe some latrines installed by CDSP are no longer hygienic (and it should be noted that only a minority of households now say their latrines were installed by CDSP). But, compared with the 2021, there has been a significant fall in the use of unhygienic sanitation in all the CDSP areas.

3.8 Health and family planning

The study investigated four areas of health practices of the char dwellers: washing hands before taking food and after returning from the latrine, immunization of children, visits of Community Health Workers, and use of family planning methods (see Table 16 below).

Table 16: Washing hands before taking food and after return from latrine (% of HH)

	CDSP IV baseline	CDSP I&II 2023	CDSP III 2023	CDSP IV 2023
<u>Washing hands before taking food</u>				
Do wash hands		100	100	100
Wash with plain water	96	16	17	10
Wash with soap	4	84	83	90
<u>Washing hands after return from latrine</u>				
Do wash hands		100	100	100
Wash with plain water	94	14	16	11
Wash with soap	0	86	84	89
Wash with ash	6	0	0	0
Sample size (n)	1400	191	192	92

All households said that they washed their hands before meals. But the CDSP IV baseline shows that soap was rarely used. Now most households use soap and the percentage so doing in all areas has risen significantly since the 2021 AOS. In CDSP I&II only 6% of households reported using soap or ash to wash hands in 2012, but now it is 86%. In CDSP III it is 84%. For CDSP IV use of soap or ash is 89% against 6% recorded in 2012.

Table 17 shows that most (84-88%) households have ensured immunization of their children, a big improvement from only 52% at CDSP IV baseline, but also in the CDSP I, II and III areas, where the figures were just above 70% in 2012. However, in the 2017 AOS 99% of households reported immunising their children, so there has been a slight drop across all CDSP areas which has continued since the 2021 AOS.

The visits of Health Workers to the community have increased compared to the CDSP-IV baseline situation (6% to 81%), obviously because of the project, but also in the older CDSP areas the situation has improved since 2012 (from around 64% to 69%). The government health agencies have intensified their support in an organised way with the support of Save the Children through the Ma Moni programme, focusing on maternal and child health.

The use of family planning methods had improved significantly across all CDSP areas. In CDSP IV this was due to the intensive support from the PNGOs, with use of FP increasing from 34% to 92% in 2017. It has now fallen back to 43%, and there have also been significant falls in the other CDSP areas from 76% in 2021. In the CDSP IV area the fall may be at least partly due to the end of CDSP support for the health activities of PNGOs.

Table 17: Health and family planning

% of hh	CDSP-IV Baseline	CDSP-I,II 2023	CDSP-III 2023	CDSP-IV 2023
Immunization of the children	52	84	85	88
how vaccinated:				
Upazila health centre		38	33	25
Special government program		50	55	62
Regular visit of Govt./NGO health worker	6	64	69	66
Use of family planning (% of eligible couples)	34	39	41	43
Users of: Temporary method	94	42	46	49
Permanent method	6	1	1	0
Sample size (n)	1400	191	192	92

3.9 Household and productive assets

A long list of family assets is examined in each AOS, see Table 18. The average total asset value in CDSP IV is over ten times the average asset value recorded during the baseline survey of 2011. Although the value of households' assets has also increased in older CDSP areas, and remains higher than for CDSP IV, the increase in asset value has been faster for CDSP IV. The list of assets excludes land and houses – which, if included, will have increased in value considerably.

In CDSP IV at the time of the baseline survey in 2011 no households reported ownership of solar systems, motorcycles or water pumps, but now these are owned by households 79%, 9% and 8% of households. Compared with the 2021 AOS there has been a 23% increase in total asset value in the CDSP III and IV areas and a 13% increase in CDSP I/II.

Table 18: Household assets (households in percent and value in Taka)

Household Asset		CDSP I & II 2023		CDSP III 2023		CDSP IV 2023	
		% of hh	Avg Tk	% of hh	Avg Tk	% of hh	Avg Tk
1	Cot/ Khaat	100%	17855	100%	15769	100%	13250
2	Almira	64%	9209	67%	8361	52%	8683

3	Showcase	72%	9271	63%	9062	65%	9175
4	Chair/table	97%	5541	97%	5500	95%	3833
5	Shinduk (Wooden box/Trunk- Tin)	37%	3921	48%	4064	49%	3956
6	Alna (clothes rack/wardrobe)	58%	2097	51%	2149	42%	2182
7	Ceiling/Table Fan	93%	5286	96%	4997	92%	3901
8	Radio/Cassette Player	2%	3733	1%	6200	0%	0
9	B&W TV	1%	5000	1%	2600	2%	3250
10	Colour TV	16%	13800	7%	13857	5%	13600
11	Mobile Phone	97%	12609	97%	16174	96%	10773
12	Sewing machine	16%	7150	18%	10500	22%	6675
13	Ornaments	88%	72131	90%	72119	89%	56866
14	Bicycle	31%	8225	22%	7023	28%	7077
15	Rickshaw/Van	2%	10333	2%	4400	1%	6000
16	Motor cycle	17%	107031	13%	100400	9%	87500
17	Auto rickshaw battery operated	4%	90250	2%	96667	1%	151000
18	Sprayer	15%	2641	18%	3867	20%	1750
19	Laptop	3%	41000	2%	36250	0%	0
20	Bullock cart	0%	0	0%	0	0%	0
21	Solar	72%	13474	70%	13841	79%	12849
22	Shop with land ownership	14%	786148	23%	464444	13%	695833
23	Tractor for cultivation	1%	70000	1%	95000	0%	0
24	Boat	0%	0	1%	15000	0%	0
25	Mechanized boat	1%	625000	0%	0	1%	300000
26	Thresher	4%	21714	5%	17222	2%	8000
27	Water pump	10%	19157	11%	25090	8%	14857
28	Fishing net	54%	6694	61%	2769	69%	2890
29	Fruit/timber trees	97%	53334	95%	55896	93%	38698
30	Cow	37%	175928	45%	167839	68%	105603
31	Buffalos	0%	0	1%	22500	0%	0
32	Goat	18%	11357	26%	16860	29%	13851
33	Sheep	2%	4375	2%	12666	0%	0
34	Chicken	82%	4601	81%	6683	91%	4637

35	Duck / goose	84%	6220	81%	8515	93%	6449
36	Pigeon	17%	5353	18%	3960	18%	2632
37	Rice husking machine	1%	50000	2%	93333	1%	35000
38	Trolley motorized	0%	0	0.5%	80000	1%	30000
39	CNG Auto	1%	265000	0.5%	150000	1%	480000
40	Cylinder Gas	45%	5609	36%	6628	25%	5391
41	Others	14%	120892	19%	114636	11%	27950
	Average total asset value		440666		456497		364075

** Asset value is the average per household for those households reporting the asset

Figure 7: Value of assets

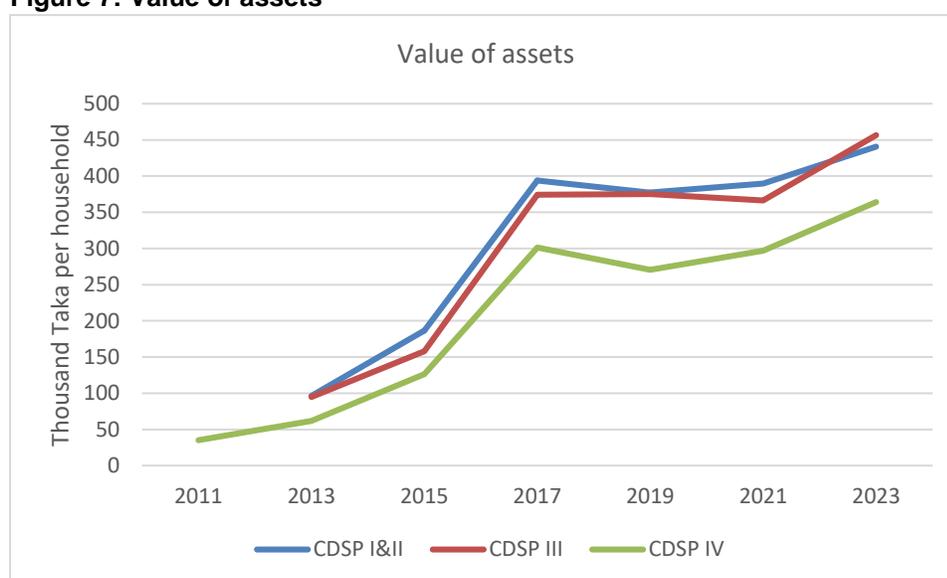


Table 20 shows the principal items (in terms of value) in each category of assets. Ornaments are the most valuable household assets, accounting for about 46% of the total value of household assets, followed by mobile phones at around 10%².

Table 20: Principal assets in each category

Category of assets	Principal items	Value of principal item as percent of category total		
		CDSP I & II 2023	CDSP III 2023	CDSP IV 2023
Household assets	Ornaments/ jewelry	46%	47%	46%
Non-farm enterprises	Shop with land	78%	87%	64%
Farm assets	Trees	87%	86%	90%
Livestock	Cows	84%	81%	83%

² Motorcycles are often used as taxis and so have been classed as a non-farm business asset.

The most valuable non-farm productive asset are shops with land - these now account for over three-quarters of asset value in this category and are owned by 13% to 23% of households. The farm productive asset category is dominated by timber and fruit trees³, which account for over 84% of asset value in this category and are now owned by 95% of households compared to 24% at CDSP IV baseline. In the livestock category, cows account for over 80% of asset value and are owned by two-thirds of CDSP IV households and under half of the households in the CDSP I, II, and III areas.

The increase in ownership and value of trees is particularly noteworthy and can be attributed to (i) secure land titles motivating investment in trees; (ii) the availability of tree saplings from the many plant nurseries established by enterprising households using loans from PNGOs; and (iii) the improvement in growing conditions for trees as a result of water management infrastructure. Trees now account for 10% to 12% of the total value of assets owned by all CDSP households (Table 15 and Figure 7).

3.10 Annual household income

Most households report income from a range of farm sources than from non-farm sources, underlining the importance of this sector (Table 22). Within agriculture, the homestead-based activity of poultry is reported most widely, although most households also have income from field crops, and over half from aquaculture. Within the non-farm sector, about one third of households report income from daily labour (which can include work on farms), fishing and handicrafts, with daily labour increasing to over half of all households in CDSP IV.

Table 22: Sources of income

Sector	Source of income	Percentage of households reporting income source		
		CDSP I & II 2023	CDSP III 2023	CDSP IV/2023
Agriculture related	Field crops	60%	69%	77%
	Homestead veg.	64%	71%	71%
	Aquaculture	51%	56%	59%
	Forestry/trees	6%	9%	12%
	Livestock	35%	42%	50%
	Selling straw	52%	57%	70%
	Poultry	80%	86%	84%
	Date juice	12%	25%	24%
Non-farm sectors	Daily labour	34%	34%	54%
	Jobs	26%	28%	21%
	Skilled work	7%	13%	10%
	Petty trade	16%	15%	9%
	Business	15%	15%	16%
	Rickshaw etc	2%	3%	0%

³ Timber and fruit trees are valued by respondents in terms of their value for timber and firewood

	Fishing	32%	35%	37%
	Remittance	8%	9%	10%
	Handicrafts	36%	34%	36%
	Pension & social	27%	18%	22%
	Begging	2%	2%	3%
	Other	17%	18%	14%

Since 2021 there has been an increase in the average number of sources of income reported by each household (Table ...) – showing livelihoods are becoming more diversified. This reverses a trend towards fewer sources of income. Notable changes (of over 10 percentage points) since 2021 is aquaculture and fishing being reported by more households in CDSP I/II and III, and daily labour by more households in CDSP IV, More households report income from pensions etc. in CDSP I/II and IV, but there are fewer households reporting date juice and handicrafts in CDSP III, and petty trade in CDSP IV,

Table 23: Change in sources of income reported between 2021 and 2023.

Sector	Source of income	Change* in percentage of households reporting income source		
		CDSP I & II	CDSP III	CDSP IV
Agriculture related	Field crops	-3%	7%	0%
	Homestead veg.	-7%	8%	-6%
	Aquaculture	12%	21%	1%
	Forestry/trees	4%	4%	4%
	Livestock	-5%	4%	-6%
	Selling straw	-2%	3%	3%
	Poultry	1%	1%	-6%
	Date juice	-6%	-15%	3%
Non-farm sectors	Daily labour	-2%	-8%	12%
	Jobs	-4%	-4%	1%
	Skilled work	-4%	5%	2%
	Petty trade	8%	-2%	-10%
	Business	1%	-1%	4%
	Rickshaw etc	-3%	-5%	-7%
	Fishing	12%	12%	8%
	Remittance	0%	0%	3%
	Handicrafts	7%	-10%	1%
	Pension & social	16%	9%	13%
	Begging	1%	1%	1%
Average number of income sources per household	2017	6.11	6.08	7.08
	2019	5.24	5.59	6.13
	2021	4.41	4.94	5.28
	2023	5.80	6.40	6.77

*Change between 2021 and 2023 in percentage points

Table 24 shows the average annual income for all households from different sources. The total average annual income of the sampled households in CDSP IV is 7% less than households in CDSP I&II and 11% less than households in CDSP III. Not only is the CDSP IV a more recently accreted area but has suffered

more from recent river erosion. It is also worth noting that the average income in CDSP III is now above that in CDSP I&II. Compared to 2021, average total household income has fallen in CDSP I/II and IV and risen in CDSP III. In all three areas non-farm income has fallen. In CDSP I/II agricultural income has increased but not by enough to offset the fall in non-farm income. In CDSP III a significant rise in farm income has more than offset the fall in non-farm income. In CDSP IV farm as well as non-farm income have fallen – although these falls are not large.

In CDSP IV the farm sector contributes about one-third of total income, with a slightly smaller contribution in older CDSP areas. Although in CDSP IV, agricultural income has increased by almost five times since the baseline in 2011, non-farm income has increased even faster. The fastest-growing agricultural source has been livestock and the fastest-growing non-farm source is remittances.

Table 24: Annual household income from different sources

Income source	Annual income Taka				Share of annual income				Increase CDSP IV 2011 to 2023
	CDSP IV baseline	CDSP I & II 2023	CDSP III 2023	CDSP IV 2023	CDSP IV baseline	CDSP I & II 2023	CDSP III 2023	CDSP IV 2023	
Agriculture-related									
Field crops	15,617	40,904	53,175	43,293	60.1%	32.1%	38.3%	33.5%	177%
Homestead veg.	3,115	18,173	17,036	19,913	12.0%	14.3%	12.3%	15.4%	539%
Aquaculture	2,713	22,767	16,757	20,598	10.4%	17.9%	12.1%	15.9%	659%
Forestry/trees		898	922	1,853		0.7%	0.7%	1.4%	
Livestock	2,666	26,960	21,731	21,954	10.3%	21.1%	15.6%	17.0%	723%
Selling straw		5,546	6,418	5,982		4.3%	4.6%	4.6%	
Poultry	1,887	11,069	21,054	14,004	7.3%	8.7%	15.2%	10.8%	642%
Date juice		1,183	1,771	1,763		0.9%	1.3%	1.4%	
sub-total- Agri Farm	25,998	127,500	138,864	129,360	100.0%	100.0%	100.0%	100.0%	398%
Non-farm									
Daily labour		55,468	57,906	85,435		18.7%	19.2%	32.4%	
Jobs	33,378	66,268	57,722	47,174	72.6%	22.3%	19.2%	17.9%	353%
Skilled work		11,192	26,427	18,457		3.8%	8.8%	7.0%	
Petty trade	6,879	26,013	33,703	15,457	15.0%	8.8%	11.2%	5.9%	916%
Business		54,738	46,792	54,457		18.5%	15.5%	20.7%	
Rickshaw etc	2,749	1,660	2,943	-	6.0%	0.6%	1.0%	0.0%	-100%
Fishing	2,093	11,310	10,998	9,435	4.6%	3.8%	3.7%	3.6%	351%
Remittance	601	36,649	32,615	19,826	1.3%	12.4%	10.8%	7.5%	3199%
Handicrafts	252	5,034	4,315	3,174	0.5%	1.7%	1.4%	1.2%	1160%
Pension & social		1,656	2,711	1,446		0.6%	0.9%	0.5%	
Begging		295	615	380		0.1%	0.2%	0.1%	

Other		26,398	24,490	8,333		8.9%	8.1%	3.2%	
sub-total (Non-farm)	45952	296,681	301,237	263,574	100.0%	100.0%	100.0%	100.0%	474%
Total farm	25,998	127,500	138,864	129,360	36.1%	30.1%	31.6%	32.9%	398%
Total non- farm	45,952	296,681	301,237	263,574	63.9%	69.9%	68.4%	67.1%	474%
Total	71,950	424,181	440,101	392,934	100.0%	100.0%	100.0%	100.0%	446%

Income from farm and non-farm enterprises is estimated as being net of enterprise operating costs.
Average income in Taka is average for all sample households, not just the households with that income source

Household income through remittance has a significant growth in recent years due to implementation of government’s IGA programmes launched by vocational training centres who are targeting demanded skill areas. Compared to the baseline (2011) average income from remittance has increased from Tk. 601 and in 2023 to Tk. 19,826.

Figure 8: Average household income

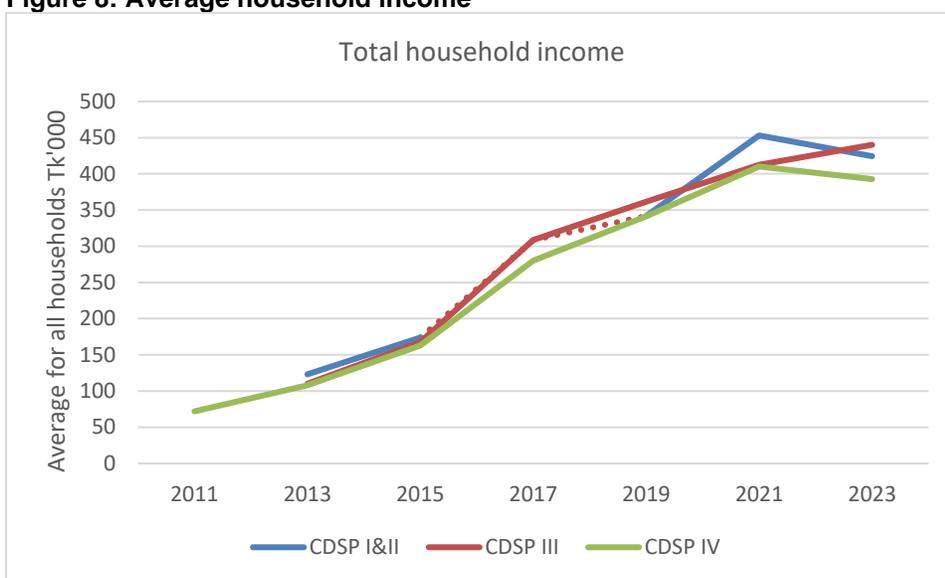
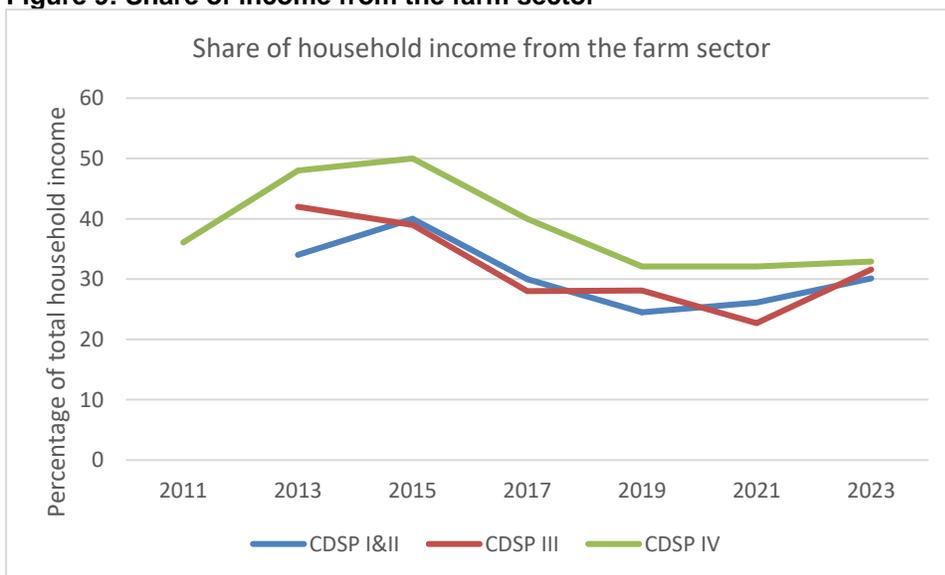


Figure 9: Share of income from the farm sector



Survey respondents were asked to place their own households in one of four wealth ranks – at the present time and five years ago. Table 19 shows that five years ago most households were in the poor and very poor categories but, compared with the other areas, very few of the CDSP IV households were in the medium or rich categories. Now, there has been a general move up wealth ranks, with almost no households saying that they are still very poor. However, CDSP III seems to have a higher proportion of poor households than either CDSP I&II or CDSP IV. On the other hand, there has a higher proportion of households in medium ranks than CDSP I&II and CDSP III. Given that these are self-assessments, caution should be used in drawing conclusions from this data.

Table 25: Wealth ranking

Wealth Status	CDSP I&II		CDSP III		CDSP IV	
	now	5 years ago	Now	5 years ago	now	5 years ago
Rich	29%	0%	21%	0%	10%	0%
Medium	56%	16%	66%	5%	74%	2%
Poor	13%	39%	10%	45%	14%	58%
Very poor	2%	45%	3%	50%	2%	40%
Total	100%	100%	100%	100%	100%	100%

Compared with the 2021 AOS, more households in CDSP I/II and III say they are now rich. In CDSP IV there has been little change, with slightly more households in the poor and very poor categories.

3.11 Crop production

3.11.1 Damage to crops from salinity, flooding and waterlogging

A core intervention of CDSP has been water management infrastructure to reduce such damage and improve the environment for crop growth. Data in Table 26 shows that 74-94% of farmers reported no damage from salinity, flooding, and waterlogging to aman paddy and rabi crops. Around 20% of farmers report slight damage from salinity and flooding for aman and rabi crops, with rather more damage in CDSP IV and less in CDSP I&II. Boro is more likely to be damaged in CDSP I&II and III than in CDSP IV, with 10% of farmers reporting moderate to heavy damage from salinity in CDSP III. Homestead vegetables and trees are less likely to be damaged and few farmers report damage to any crops from waterlogging or drought.

Table 26: Damage to Crops

Source of damage	Crop affected	Degree of damage	Percentage of farmers reporting damage		
			CDSP I&II	CDSP III	CDSP IV
Salinity	Aman	no damage	85%	79%	80%
		slight damage	15%	19%	20%
		moderate/heavy	0%	2%	0%
	Boro	no damage	73%	80%	88%
		slight damage	27%	10%	13%

		moderate/heavy	0%	10%	0%
	Rabi crops	no damage	82%	79%	74%
		slight damage	18%	21%	26%
		moderate/heavy	0%	0%	0%
	Homestead vegetable	no damage	85%	81%	96%
		slight damage	15%	18%	4%
		moderate/heavy	0%	1%	0%
	Trees	no damage	90%	84%	96%
		Slight	10%	16%	4%
		moderate/heavy	0%	0%	0%
Flooding	Aman	no damage	93%	84%	93%
		Slight	5%	7%	7%
		moderate/heavy	2%	9%	0%
	Boro	no damage	89%	88%	100%
		Slight	11%	13%	0%
		moderate/heavy	0%	0%	0%
	Rabi crops	no damage	89%	88%	94%
		Slight	7%	6%	6%
		moderate/heavy	4%	6%	0%
	Homestead vegetable	no damage	98%	89%	93%
		slight damage	2%	7%	3%
		moderate/heavy	0%	4%	3%
	Trees	no damage	98%	89%	94%
		Slight	1%	6%	3%
		moderate/heavy	1%	4%	3%
Waterlogging	Aman	no damage	95%	93%	96%
		Slight	3%	2%	4%
		moderate/heavy	3%	5%	0%
	Boro	no damage	100%	93%	100%
		Slight	0%	7%	0%
		moderate/heavy	0%	0%	0%
	Rabi crops	no damage	92%	100%	100%
		Slight	4%	0%	0%
		moderate/heavy	4%	0%	0%
	Homestead vegetable	no damage	98%	96%	99%
		slight damage	2%	3%	1%
		moderate/heavy	0%	1%	0%
	Trees	no damage	98%	96%	96%

		Slight	1%	4%	1%
		moderate/heavy	1%	0%	3%
Drought	Aman	no damage	95%	98%	98%
		slight damage	5%	0%	0%
		moderate/heavy	0%	2%	2%
	Amon	no damage	89%	93%	100%
		slight damage	6%	7%	0%
		moderate/heavy	6%	0%	0%
	Rabi crops	no damage	100%	100%	100%
		slight damage	0%	0%	0%
		moderate/heavy	0%	0%	0%
	Homestead vegetable	no damage	98%	99%	100%
		slight damage	2%	1%	0%
		moderate/heavy	0%	0%	0%
	Trees	no damage	98%	97%	100%
		Slight	1%	1%	0%
		moderate/heavy	1%	2%	0%

If we compare data in Table 27 with the previous round data (Table 21), it reveals that reports of crop damage have declined. This is despite the loss of a significant amount of water management infrastructure to river erosion. In contrast the 2021 AOS reported increased levels of crop damage compared to the 2019 AOS.

Table 27: Damage to crops during period of 9th round (AOS 2021)

Source of damage	Crop affected	Degree of damage	Percentage of farmers reporting damage		
			CDSP I&II	CDSP III	CDSP IV
Salinity	Aman	no damage	83%	76%	41%
		slight damage	15%	13%	37%
		moderate/heavy	2%	11%	23%
	Rabi crops	no damage	59%	79%	39%
		slight damage	35%	19%	45%
		moderate/heavy	5%	2%	16%
	Homestead vegetable	no damage	93%	80%	51%
		slight damage	7%	10%	39%
		moderate/heavy	0%	10%	10%
	Trees	no damage	95%	78%	60%
		Slight	5%	11%	32%
		moderate/heavy	0%	11%	8%
Flooding	Aman	no damage	97%	82%	43%
		Slight	2%	5%	33%
		moderate/heavy	1%	13%	25%
	Rabi crops	no damage	100%	98%	59%
		Slight	0%	0%	21%
		moderate/heavy	0%	2%	21%
	Homestead vegetable	no damage	99%	86%	55%
		slight damage	0%	3%	29%

		moderate/heavy	1%	10%	16%
	Trees	no damage	100%	84%	64%
		Slight	0%	5%	24%
		moderate/heavy	0%	11%	12%
Waterlogging	Aman	no damage	96%	80%	64%
		Slight	2%	13%	24%
		moderate/heavy	2%	7%	12%
	Rabi crops	no damage	94%	92%	70%
		Slight	6%	8%	23%
		moderate/heavy	0%	0%	7%
	Homestead vegetable	no damage	99%	89%	66%
		slight damage	1%	9%	26%
		moderate/heavy	0%	1%	7%
	Trees	no damage	98%	87%	72%
		Slight	2%	10%	24%
		moderate/heavy	0%	3%	4%
Drought	Aman	no damage	98%	95%	84%
		slight damage	0%	4%	10%
		moderate/heavy	2%	1%	6%
	Rabi crops	no damage	100%	100%	90%
		slight damage	0%	0%	7%
		moderate/heavy	0%	0%	3%
	Homestead vegetable	no damage	100%	98%	86%
		slight damage	0%	2%	9%
		moderate/heavy	0%	0%	5%
	Trees	no damage	100%	96%	88%
		Slight	0%	4%	10%
		moderate/heavy	0%	1%	2%

Although Tables 26 and 27 show low and reducing levels of crop damage from water-related factors, most respondents also said that salinity, flooding, and drainage had got worse over the last five years, although the situation had generally improved in the last couple of years. But there was a general improvement over both periods in terms of water shortages/drought. There is no evidence to support increased salinity, flooding, and waterlogging from cropping patterns and crop productivity, or from other studies and surveys, so this data has been omitted from this report.

3.11.2 Cultivated area

Data in Table 28 shows that all sample households have homestead land, and almost all have a pond – so interventions in homestead agriculture and aquaculture have the potential to reach virtually all households. Most households (57% CDSP I&II, 60% CDSP III, and 72% CDSP IV) have cultivated land for field crop production. The average area of cultivated land per household is around 63 decimals, and does not vary much between the CDSP areas, although in the CDSP IV sample the area of the fish pond and total area operated per household is higher. With a greater proportion of households cultivating land, crop farming is more important in CDSP IV than in the older areas.

Table 28: Land utilisation

	Land type	CDSP I&II	CDSP III	CDSP IV
Percentage of households who operate	homestead	100%	100%	100%
	pond	96%	99%	100%
	cultivated	57%	60%	72%
	fallow	6%	5%	8%
Average area per household in decimal	homestead	40	37	41
	pond	25	23	32
	cultivated	68	63	69
	fallow	2	1	2
	total	133	123	144
	Total sample (n)	191	192	92

*Average area is average for all households, not just those operating the type of land

Compared with the 2021 AOS, there has been a very slight fall in the proportion of households with cultivated land in the CDSP IV area, and increase in CDSP III. In all areas there has been a decrease in the average total area of land per household (which may reflect a rising population density). This fall has reduced the amount of cultivated land per household (areas of the homestead, pond and fallow land are little changed).

3.11.3 Crop area and cropping intensity

Calculations of cropping intensity in Table 29 uses two methods. Method 1 is the total area of all crops grown divided by the total area of land cultivated. Method 2 is the area of land single, double and triple cropped. Cropping intensities calculated by these two methods give similar results (within the expected margin of error) for each of the three survey areas. Cropping intensity for CDSP I&II is 163% (method 1) or 169% (method 2), for CDSP III the result is 166% and 167%, and for CDSP IV it is 145 and 149%. As might be expected cropping intensity is lower in the CDSP IV area compared with the older areas

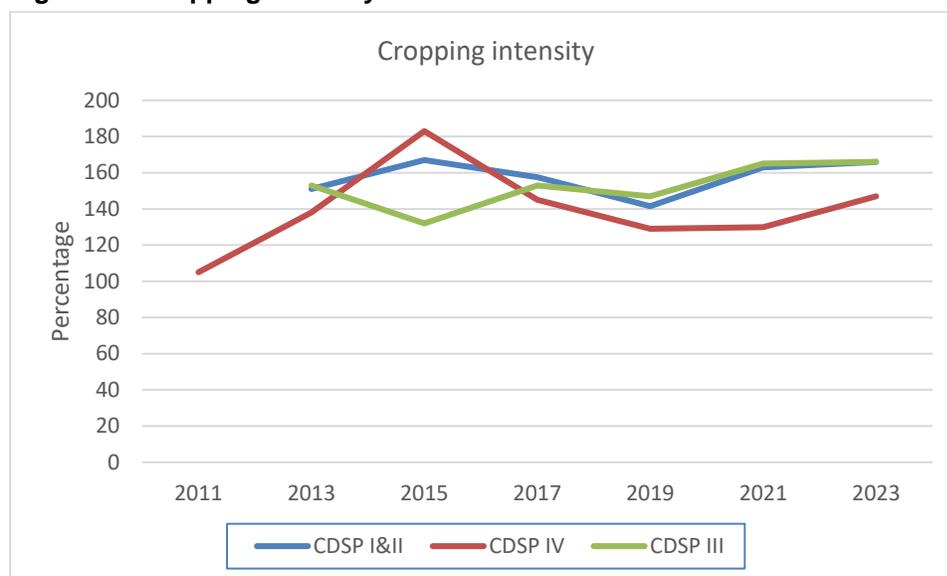
There has been an increase in cropping intensity in all the areas compared with the 2021 AOS. The increase is most significant in CDSP IV which recorded an increase from 130% to 147%.

Table 29: Average area cropped and cropping intensity

	Land Area, CI & Sample size	Units	CDSP I&II	CDSP III	CDSP IV
Method 1	Total area of field crops	decimal/hh*	201	104	96
	Total area cultivated	decimal/hh*	123	174	140
	Cropping intensity (CI)		163%	166%	145%
	Sample size (n)		191	192	92
Method 2	Area cropped once	decimal/hh*	44	37	53
	Area cropped twice	decimal/hh*	73	62	39
	Area cropped thrice	decimal/hh*	5	3	4
	Total area cropped	decimal/hh*	122	103	96
	Total area of field crops	decimal/hh*	206	172	143
	Cropping intensity		169%	167%	149%
	Sample size (n)		105	115	66

* average for number of cultivating households

Figure 11: Cropping intensity



Cropping in all CDSP areas is dominated by paddy, which is cultivated by over 97% of farmers (Table 30) and accounts for around 71% of the area of all crops in CDSP I&II, 66% of the cropping in CDSP III, and 86% in CDSP IV. Paddy used to be predominantly rainfed transplanted aman, but over the last five years boro has become a significant crop in all CDSP areas. In CDSP IV the area of boro now exceeds that of aman. Although boro has partly replaced aman the overall area under paddy has increased since 2019, especially in CDSP IV. In areas where the deep aquifer is the only source of fresh groundwater, irrigation of boro using this groundwater may not be sustainable and could threaten supplies of potable water.

Table 30: Cultivation of different crops and vegetables

	Name of crops	Percentage of farmers who grow			Percentage of cultivated area		
		CDSP I&II	CDSP III	CDSP IV	CDSP I&II	CDSP III	CDSP IV
Cereals	Aus	3%	3%	3%	3%	2%	3%
	Aman	73%	72%	61%	72%	67%	57%
	Boro	45%	39%	68%	40%	40%	65%
	Maize	2%	7%	5%	2%	5%	7%
	Total	99%	97%	98%	117%	114%	132%
Pulses	Keshari ¹	23%	10%	2%	10%	4%	2%
	Mung ²	13%	5%	5%	2%	0%	0%
	Felon ³	14%	13%	6%	2%	3%	0%
	Moshuri ⁴	2%	0%	0%	0%	0%	0%
	mash kolai ⁵	1%	0%	0%	0%	0%	0%
	Total	34%	21%	8%	14%	7%	2%

Oilseeds	soybean	25%	34%	5%	10%	24%	2%
	mustard	2%	4%	2%	0%	2%	1%
	groundnut	20%	14%	0%	5%	3%	0%
	sesame	0%	1%	0%	0%	0%	0%
	Total	35%	40%	6%	15%	29%	3%
Spices	Chilli	28%	30%	12%	4%	5%	1%
	Onion	3%	0%	0%	0.2%	0%	0%
	Garlic	4%	2%	0%	0.1%	0%	0%
	coriander	6%	4%	0%	0.3%	0.2%	0%
	turmeric	5%	4%	0%	0.3%	0.3%	0%
	Total	28%	30%	12%	5%	6%	1%
Roots and tubers	Sweet pot	7%	7%	2%	1%	1%	0.1%
	Cassava	0%	1%	2%	0%	0.3%	0.3%
	Total	7%	8%	3%	1%	1%	0%
Vegetables	Total	22%	16%	12%	8%	9%	8%
Melon & Other	Water melon	5%	0%	0%	4%	0%	0%
	Other	0%	0%	0%	0%	0%	0%
	Total	5%	0%	0%	4%	0%	0%
Total	Grand total	100%	100%	100%	164%	166%	146%
	N	1051	115	66	21067	19969	9231

¹Grass pea (Lathyrus sativus), ²Green gram, ³Cow pea, ⁴Lentil, ⁵Black gram

Table 31 Shows the change in cropping pattern since 2017. Compared with 2017, in all three CDSP zones, more paddy is being grown, although in CDSP I&II and III there has been no increase since 2021. The biggest increase in paddy has been in CDSP IV. In all three zones the area areas under pulses and oilseeds have fallen since 2017. In CDSP I&II there has been a sharp recovery in the area of pulses since 2021, although it is still down on 2017. CDSP III has a relatively large area of oilseeds, mainly soyabeans, which has declined slightly. In CDSP IV there was a very steep fall in the area of pulses between 2017 and 2019. This was mainly keshari – a low-value crop. The area of spices has declined in CDSP IV and, to a lesser extent, in CDSP III. There has been an increase in the area of vegetables in all three zones, with CDSP I&II and III now catching up with the larger area in CDSP IV.

Table 31: Change in cropping pattern since 2017

Name of crops		CDSP I&II	CDSP III	CDSP IV
2017	cereals	107%	99%	103%
	pulses	16%	13%	22%
	oilseeds	22%	30%	7%
	spices	5%	7%	4%
	vegetables	3%	2%	7%
	melons	2%	0%	1%
	other	2%	1%	1%
	total	157%	152%	145%
2019	cereals	113%	105%	101%

	pulses	10%	9%	5%
	oilseeds	10%	25%	8%
	spices	3%	4%	3%
	vegetables	2%	4%	5%
	melons	2%	1%	5%
	other	1%	1%	1%
	total	140%	148%	127%
2021	cereals	134%	117%	116%
	pulses	14%	5%	2%
	oilseeds	6%	27%	2%
	spices	2%	4%	1%
	vegetables	1%	6%	9%
	melons	1%	0%	0%
	other	1%	2%	0%
	total	160%	161%	130%
2023	cereals	118%	115%	132%
	pulses	13%	7%	2%
	oilseeds	14%	27%	3%
	spices	5%	5%	1%
	vegetables	7%	9%	8%
	melons	3%	0%	0%
	other	1.0%	2%	0.4%
	total	161%	165%	146%
change 2017 to 2023 in percentage points	cereals	11%	16%	29%
	pulses	-3%	-6%	-20%
	oilseeds	-8%	-3%	-4%
	spices	0%	-2%	-3%
	vegetables	4%	7%	1%
	melons	1%	0%	-1%
	other	-1%	1%	-1%
	total	4%	13%	1%

*** Crop area as percentage of total cultivated area

In CDSP IV, 1.5% of cultivated land is used by the sorjon system (integrated vegetable-fish production involving raised beds). Sorjon is an intensive system, with multiple cropping, and so is likely to account for about half of the field vegetable cultivation in CDSP IV. However, the area under sorjon has declined – in 2017 it covered 3.2% of cultivated land. It is known that some of the sorjon areas has been lost to river erosion and it is likely that fear of erosion discourages investment in developing new sorjon areas.

3.11.4 Production, consumption and sale of field crops

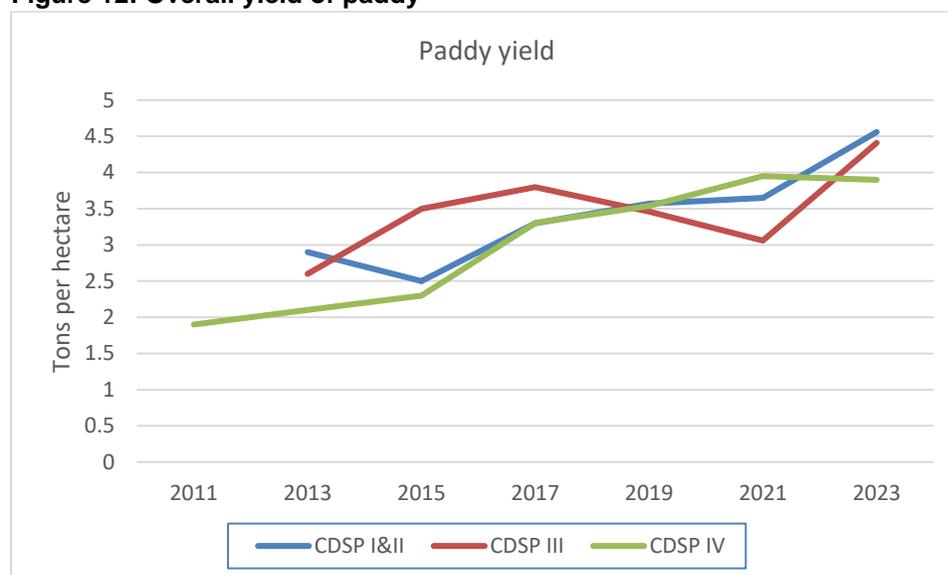
Details of paddy production are in Table 32. The most widespread type of paddy grown in all three areas is HYV aman (grown by 73% of paddy growers in CDSP I&II, 82% in CDSP III, and 50% in CDSP IV). However hybrid boro is grown by almost as many paddy farmers (45%) in CDSP IV, while the area exceeds that of HYV aman.

Table 32: Paddy production

Type of Paddy	CDSP I&II				CDSP III				CDSP IV			
	no. of HH	% of HH ¹	Area	dec./H H ²	no. of HH	% of HH ¹	Area	dec./HH ²	no. of HH	% of HH ¹	Area	dec./HH ²
Aus - local	2	1.9%	230	115	2	1.8%	200	100	2	3.1%	160	80
Aus HYV	6	5.8%	1699	283	2	1.8%	180	90	1	1.6%	120	120
Aman Razashail	9	8.7%	788	88	3	2.7%	276	92	11	17.2%	1425	130
Aman HYV	76	73.8%	8910	117	91	82.0%	21252	234	32	50.0%	2552	80
Aman - other	1	1.0%	150	150	2	1.8%	292	146	0	0.0%	0	0
Boro - HYV	18	17.5%	1753	97	18	16.2%	1870	104	13	20.3%	1353	104
Boro -hybrid	16	15.5%	1602	100	19	17.1%	1758	93	29	45.3%	2675	92
All types paddy	103	100%	15132	111	137	100%	25828	189	64	100%	8285	94.15

¹ Percentage of all paddy producers. ² Average area per farmer for those farmers who grow the crop. Area in decimals (=0.004 ha)

Figure 12 shows trends for the overall yield of all types of paddy. This shows a moderate upward trend in yields in all the CDSP areas.

Figure 12: Overall yield of paddy

Based on data on the area grown and total production, the yield of HYV aman has been calculated (Table 26). The yield has risen in the last two years. Yields fell between 2019 and 2021 and are now slightly higher than in 2019. Yields are not particularly high by the standards of Bangladesh. Too few farmers grow other types of paddy to give an adequate sample.

Table 33: Yield of HYV Aman paddy

Survey Domains	2021 AOS		2023 AOS	
	Kg per ha	sample n	Kg per ha	sample n
CDSP I&II	2657	86	4568	104
CDSP III	2628	93	4460	109
CDSP IV	3491	75	3892	64

Table 34 has data on paddy production and utilization from all three CDSP areas. Fifty nine percent of all households grow paddy – with growers producing on average 2.3 tons per year. Other households receive paddy as rent for land or some other payment in kind, so overall 64% of households utilise paddy – an average of 2.26 tons per household. Of this 1.21 tons (53%) is consumed and 1.0 tons (46%) is sold. Paddy is sold by 31% of all households (and just less than half of all households who grow paddy or receive paddy as rent for land). Overall 48% of total paddy production is sold. Compared with the 2021 AOS, 1% fewer households produce paddy, production per household is 2.33 tons, slightly less is consumed at home, and so 48% is sold – compared with 53% in 2021 the same as in 2012⁴.

Table 34: Utilisation of paddy

Indicators on Utilization	no.of hh	% of hh ¹	tons	ton/hh
Total paddy produced	282	59%	658	2.33 ²
Consumed at home	302	63%	368	1.21 ³
Kept for seed	55	12%	9.88	0.035 ²
Sold	149	31%	317	1.04 ³
Total paddy utilised	306	64%	693	2.26 ³
N	475	100%		
Percent of paddy production sold	48%			

¹ Percentage of all households. ² Average for households producing paddy ³ Average for all households utilising paddy.

Production and sales of other field crops are shown in Table 35. This shows that, in CDSP I&II the greatest sales revenue comes from field vegetables, followed by oilseeds, with pulses and spices also being significant. In CDSP III oilseeds are by far the most important in terms of sale value, while in CDSP IV field vegetables dominate. Compared with 2021 sales of oilseeds have increased considerably in CDSP III and also in CDSP I&II. The value of sales of field vegetables has increased in CDSP I/II but declined in the CDSP III and IV.

Table 35: Pulses, oilseeds and field vegetables

Indicators	% of hh grow ¹	Avg area decimal/hh ²	% of hh who sell ²	Avg sales Taka/year ³	Avg all HH Taka/year	Avg % of crop sold
CDSP I and II						
Wheat maize & millet	1%	2	0%	0	0	0%
Pulse crops	31%	46	82%	12500	2159	63%
Oilseeds	33%	53	100%	20897	3719	84%
Root crops	7%	14	100%	3286	120	86%
Spices	28%	33	79%	8348	1252	57%
Field vegetable	22%	46	96%	21535	2593	68%
All crop producers (n)	105					

⁴ Although the overall area of paddy has changed little, and aman yields are only slightly higher, the increase in area of higher yielding boro paddy will have increased production. Although sales are higher, income will have been constrained by the sharp fall in the price of paddy.

CDSP III						
Wheat maize & millet	2%	58	100%	5400	56	80%
Pulse crops	20%	34	63%	7738	967	70%
Oilseeds	42%	69	100%	21382	5457	87%
Root crops	7%	18	100%	3250	135	57%
Spices	30%	19	66%	4841	878	51%
Field vegetable	15%	35	100%	18941	1677	59%
All crop producers (n)	115					
CDSP IV						
Wheat maize & millet	0	0	0	0	0	0
Pulse crops	8%	20	60%	2200	120	60%
Oilseeds	6%	40	100%	8750	380	90%
Root crops	3%	15	100%	6000	130	78%
Spices	11%	11	58%	2571	196	33%
Field vegetable	12%	28	100%	39875	3467	69%
All crop producers (n)	66					

¹ Percentage of all crop producers. ² Average/percentage of households who grow the crop. ³ Average sales value for those households

3.11.5 Homestead vegetable production

Data in Table 37 shows that 64% of CDSP I&II households cultivate vegetables, root crops, and spices around their homesteads. The proportions are higher in CDSP III (72%) and CDSP IV (88%) Compared with the 2021 AOS, there has been a decrease in the proportion of households who are homestead growers in CDSP I&II and III, with no change in CDSP IV.

In CDSP &II less than half of homestead vegetable growers sell some of their production while in the other two areas almost two-thirds sell some of their produce. (Table 37). Average sales per grower who makes sales are higher in the CDSP IV zone at Tk16,569 per grower per year. The total value of sales of homestead vegetables exceeds that of field vegetables in all the three CDSP areas. Total sales per household of vegetables (field and homestead) in CDSP IV are almost double that of CDSP I&II and 78% more than in CDSP III.

Table 37: Sales of homestead vegetables

	CDSP I&II	CDSP III	CDSP IV
Households growing homestead vegetables as a percent of all households	64%	72%	88%
Households selling homestead vegetables as a percent of all homestead growers	46%	62%	63%
Average sales per year per grower that sells – Taka	14490	12413	16569
The average percentage of homestead production that is sold	60%	63%	72%

Average sales of homestead vegetables- average for all sample household Taka	3869	5431	9185
Average sales of field vegetables – average for all sample household Taka	2593	1677	3467
Average total sales of vegetables – average for all sample household Taka	6462	7108	12652
Homestead sales as percentage of total sales	60%	76%	73%

Compared with the 2021 AOS, a larger percentage of homestead growers sell vegetables. The average for all households of the value of sales of field vegetables have increased in CDSP III and IV , so the proportion of total vegetable sales coming from homesteads has increased. However in these areas the value of sales of field vegetables has decreased, so the total value of all vegetables sales are down. The opposite is true in CDSP I&II – less homestead sales, more field sales and total sales up.

3.11.6 Fruit and trees

Virtually all sample households have fruit trees (Table 38). CDSP IV households report on average almost 46 fruit trees. Although these are mostly banana (51 per HH in CDSP IV, 36 per HH in CDSP III, and 45 per HH in CDSP I&II), almost all households report mango and guava trees. CDSP III households have 45 fruit trees with CDSP I&II having on average 43. Almost all households report owning palm trees – mainly beetle nut followed by coconut. CDSP IV households own fewer palm trees than those in the older areas. Almost all households also report timber trees, with an average of 42 per HH in CDSP I&II and 38 per HH CDSP IV, and 42 per HH in CDSP III. Taking all trees together, households in the the older areas have over 400 trees and those in CDSP IV 344 trees.

Table 38: Fruit and trees

Fruit trees	CDSP I&II		CDSP III		CDSP IV	
	% of hh	avg trees/hh	% of hh	avg trees/hh	% of hh	avg trees/hh
Guava	52%	4.39	52%	2.93	66%	3.25
Lemon	39%	2.2	43%	2.17	62%	1.81
Banana	47%	39.7	56%	45.48	60%	51.05
Papaya	45%	5.95	46%	6.51	59%	3.46
Kul	41%	2.11	53%	2.16	63%	2.12
Jamrul	28%	1.5	25%	1.9	36%	1.55
Starfruit	34%	1.41	28%	1.38	33%	1.47
Mango	87%	14	82%	9.46	83%	6.51
jackfruit	51%	4.63	37%	4.21	32%	2.83
total fruit	95%	43.14	94%	45.17	97%	45.97
Palm trees						
Beetle	87%	34.22	89%	22.5	87%	19.25

Coconut	93%	14.49	93%	16.63	92%	9.33
Dates	30%	6.67	46%	8.85	42%	6.21
Plam	20%	2.79	17%	3.27	12%	6.27
total palm	94%	48.19	96%	44.08	94%	30.74
Timber trees						
Raintree	92%	17.08	94%	19.62	91%	17.35
Casuarina	38%	7.43	54%	11.5	62%	7.39
Mahogany	73%	20.06	69%	13.86	61%	10.61
Lombu	50%	7.82	54%	6.48	65%	8.47
Other	35%	5.76	26%	7.96	10%	12.33
total timber	96%	42.01	97%	42.11	91%	38.62
Total all trees	99%	425.13	100%	419.19	100%	344.76
Sales of fruit	64%	14145	67%	16337	61%	11339
% consumed	99%	62	98%	57	96%	62
Total hh (n)		191		192		92

Compared with the 2021 AOS, there has been an increase in the total number of trees in all three areas, although the number of fruit trees has fallen in CDSP IV. The major increase has been in timber trees. Average sales of fruit per household in CDSP IV have increased from Tk6,419 to Tk 11,339 and more is also being consumed at home. The survey did not collect specific information on firewood and timber sales, but some households reported this as part of household income – it was mostly included in the “other” category.

3.12 Poultry, livestock and aquaculture

3.12.1 Poultry

Table 39 shows that more than 91% of the households in all CDSP areas rear poultry. The average number of chickens per poultry-keeping household has increased by 62% times in the CDSP IV area, and the number of ducks has also increased. Almost all households have both ducks and chickens and some also keep pigeons (17% in CDSP IV, 15% in CDSP III and 18% in CDSP I&II). Compared to the 2021 AOS, there has been a large increase in the average number of chickens per household in CDSP III, and a small increase in CDSP IV. Production, consumption and sales of eggs and birds have increased in all three areas. The reason might be due to overcoming COVID 19 pandemic situation.

Table 39: Poultry rearing

	CDSP-IV Baseline	CDSP-I & II	CDSP-III	CDSP-IV
HH rear any type of poultry (% of all HH)	89%	93%	91%	95%
Average nos. of chicken per HH that own	6	10.1	16.2	9.7
Average nos. of ducks per HH that own	7	9.6	9.3	8.9

Average nos. of pigeons per HH that own		12.2	18.7	8.1
Annual production of eggs (Nos./ HH)*	156	692	716	845
HH consumption of eggs (Nos./ HH per year)*	47	346	396	427
Income from eggs (Tk/ HH per year)*	817	4964	4726	5525
No of chickens & ducks consumed HH/year*		15.6	14.8	14.1
No of chickens & ducks sold / HH /year*		13.3	53.3	10.2
Income from sales of chickens, ducks and pigeons (Tk/ HH per year)*		6721	15527	6812

** average for all sample HH (191 in CDSP I&II, 192 in CDSP III and 92 in CDSP IV)

3.12.2 Livestock

Table 40 shows that most households' rear bovines (almost all cattle), with a higher proportion of 68% in CDSP IV and fewer than 46% for CDSP III and 38% for CDSP I&II. Compared with 2021, fewer households own cattle in CDSP I&II and more own animals in CDSP IV. The number of animals per household has not changed much since 2021.. Milk production has increased in CDSP I&II and III, with income from milk sales increasing in all three areas compared to 2021.

Table 40: Cattle and buffalo

	CDSP-IV Baseline	CDSP-I &II	CDSP-III	CDSP-IV
Number of HH rearing cattle/buffalo (% of all HH)	75%	38%	46%	68%
Number of cattle/buffalo (average for all HH)		1.4	1.4	1.8
Number of HH with milk cows (% of all HH)		21%	21%	27%
Avg. milk production (Lt per year for reporting HH)	114	359	335	227
Percentage of milk consumed	56	35	31	48
Number of HH selling milk (% of all HH)		24	27	26
Avg. income from milk (avg for selling HH) Tk	2,850	19710	14419	10890
Number of HH selling cattle (% of cattle HH)		63%	44%	48%
Number of animals sold (avg for cattle selling HH)		2.2	1.7	1.2
Income from animal sales (avg for cattle sale HH) Tk.		91727	85205	59097

Beef fattening has become an important activity and 48% of CDSP IV, 63% of CDSP I&II, and 44% of CDSP III cattle keeping households report sales in the last year, with average sales of 1.2 to 2.2 animals. Although the value of these sales appears to be much larger than the value of milk sales, households spend a significant amount on purchasing animals to fatten and the value added by this activity will be lower.

A significant proportion of cattle and buffalo are share-owned. This enables a poor household to keep an animal that belongs to another person, with production (milk, calves) being divided (usually 50-50) between the keeper and owner. Table 41 shows that 28% of CDSP IV households that own cattle/buffalo do so via share-ownership arrangements and that 23% of animals are share-owned. Share ownership is less widespread in the older CDSP areas and is generally declining in all areas.

Table 41: Share-ownership of cattle and buffalo

		owned	shared	Total*	n
CDSP I&II	% of households	85%	15%	100%	74
	% of animals	91%	9%	100%	259
CDSP III	% of households	83%	17%	100%	92
	% of animals	86%	14%	100%	264
CDSP IV	% of households	72%	28%	100%	65
	% of animals	77%	23%	100%	164

* the total for households may exceed 100% as a few households have some animals that they own outright and other animals that are share-owned.

A minority of households CDSP project keep goats, and a very few have sheep. In CDSP IV 28% of households own goats (including a limited amount of share-ownership) – compared with 26% in CDSP III and 18% in CDSP I&II. On average each owning household will have around two or three animals and will sell a little more than one or two animals per year.

Table 42: Sheep and goats

		Goats				Sheep			
		Owners	Sample size	Animals per hh	Sample size	Owners	Sample size	Animals per hh	Sample size
		% of hh	n	Number	n	% of hh	n	Number	n
CDSP I&II	Owned	18%	191	2.38	34	2%	191	4.5	4
	Consume	2%	191	1.33	3	0%	191	0	0
	Sold	6%	191	3.25	12	1%	191	8	1
	Sales Tk	6%	191	23350	12	1%	191	96000	1
CDSP III	Owned	26%	192	2.34	45	0%	192	0	0
	Consume	2%	192	1.5	4	0%	192	0	0
	Sold	10%	192	1.75	20	0%	192	0	0
	Sales Tk	9%	192	10850	20	0%	0	0	0
CDSP IV	Owned	28%	92	2.23	26	0%	92	0	0
	Consume	1%	92	1.00	1	0%	92	0	0
	Sold	13%	92	1.83	12	0%	92	0	0
	Sales Tk	15%	92	14750	12	0%	0	0	0

3.12.3 Aquaculture

Almost all households have ponds and these are now nearly all cultivated – compared with little more than half at baseline (Table 43). Total fish production for households with ponds in CDSP IV has increased over six times since the baseline and now exceeds the other CDSP areas. The increase is due to support from CDSP in regard to fish culture, pond management, and fingerlings production. Fish production, consumption, sales and income has also increased in all CDSP areas since the 2021 AOS, although the average pond area has fallen.

Table 43: Aquaculture

Indicators	Units	CDSP IV Baseline	CDSP I&II	CDSP III	CDSP IV
Owning a fish pond	% of all HH	99%	96%	99%	99%
Cultivating fish	% of pond HH	51%	95%	99%	100%
Consuming fish	% of pond HH		98%	100%	100%
Selling fish	% of pond HH		60%	58%	59%
Area of pond	Decimal/pond HH		26.3	24.7	31.4
Area cultivated	Decimal/pond HH		21.9	19.0	28.0
Total production	Kg/pond HH	43	256	236	277
Yield	kg/decimal	1.7	12.12	12.54	10.01
Amount consumed	Kg/pond HH	29	103	108	125
Amount sold	Kg/pond HH	14	135	110	108
Average price	Tk/kg	105	285	277	263
Sales value	Tk/year	1,470	43847	30132	27583

3.13 Food security

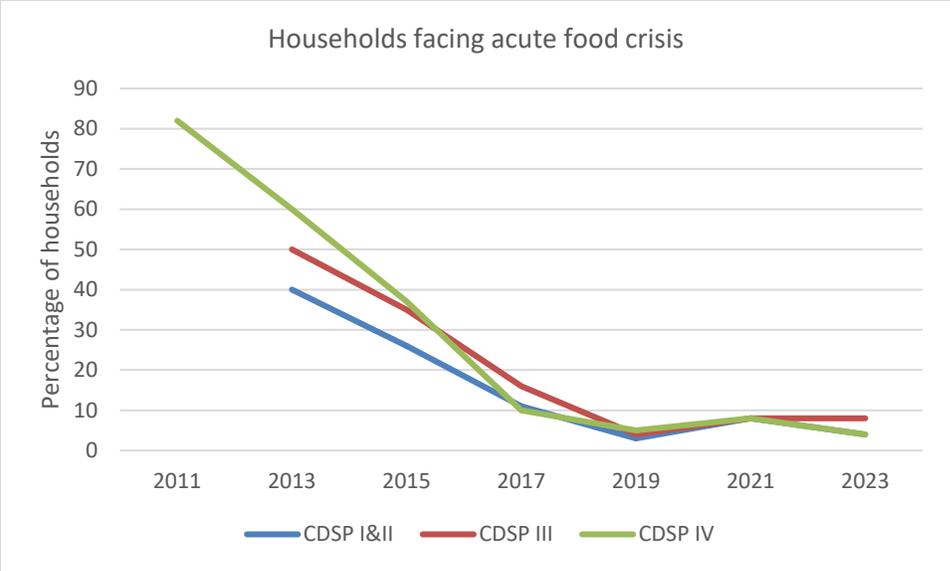
Survey respondents were asked how many months of a year they can meet their basic food (i.e. rice) needs from their production. Table 44 shows that, on average, CDSP IV households can meet household basic food needs from their own production for 9 months, 2 months more than in the baseline situation. In the older CDSP areas the average period is much the same – maybe a little worse than CDSP IV.

The respondents were also asked whether they faced any acute food crisis during the last year, at which time household members may have had to eat less than the usual quantity of food or an inferior quality of food. Only 4% of CDSP IV households said that they faced such a crisis, a significant improvement compared with 82% in the baseline situation, and is now the same, or better, than in the older CDSP areas. The considerable progress made in food security is shown in Figure 14 with the number of households facing an acute food crisis halving since 2017.

Table 44: Food security

Indicators	CDSP IV Baseline	CDSP I & II	CDSP III	CDSP IV
Average months in a year HH is able to meet the basic food needs from its own production	7	9	9	9
HH faced acute crisis in the last year (% of HH)	82%	4%	8%	4%
Sample size (n)	1400	191	192	92

Figure 14: Households facing an acute food crisis



3.14 Shocks and crises

Respondents were asked (with some probing) whether household members had faced any kind of accident, loss, or problem (called 'disaster') during last year, and, if they did, these incidents were identified using a 14 point checklist list (with provision to add more). For each reported disaster, its intensity and coping method were obtained through appropriate questions. It should be noted that during the baseline survey the respondents were asked to respond for the last five years, rather than just for the last one year as in the AOS.

Table 45 shows that, compared to the baseline situation, shocks or crises have been reduced in the CDSP IV area. At the start of the project, the two major shocks (reported by over 47% of households) were loss of crops – which has now been reduced significantly (2.1 % to 7.8%), but is still a source of loss – and displacement due to flood cyclone – which has been reduced to a low level (2.3 to 3.7% report). Serious illness of household members remains a major shock – with 24.5% to 30.9%) reporting this in the last year. However, two other important sources of loss in the baseline survey have been reduced: (i) death or theft of livestock or poultry (4.3% to 6.3%) only at CDSP IV and dacoity, theft, and mastanies in house/ business (0.5% to 3.3%). Over the last few years, losses from river erosion have reduced (3.3% in CDSP IV only, but at the baseline level, it was 8%. Overall, households in CDSP IV now face a serious compared to the level of shocks and crises to those in the older CDSP areas. It should be remembered that the survey could not cover those households (125 out of 600) who moved away in the last year having lost their land to the river due to loss of whole Caring Char which has disappeared and some other parts of Char Nangulia and Noler Char.

Table 45: Type of shocks or crises

Percentage of households reporting shocks in the last year	CDSP-IV Baseline	CDSP-I &II	CDSP-III	CDSP-IV
Death/ invalidity of earning member	4	5.2%	2.6%	2.2%
Serious disease of any member	20	30.9%	24.5%	27.2%
Displacement due to flood/ cyclone/ tornado	42	3.7%	2.6%	2.2%
River erosion	8	0%	0%	3.3%

Loss of crop due to flood/ drought	47	2.1%	7.8%	6.5%
Loss/ death/ theft of livestock/ poultry	15	5.2%	6.3%	4.3%
Damage to house from flood or storm		1.6%	2.1%	9.8%
Dacoity/theft/ mastans in house or business	15	0.5%	0.5%	3.3%
Loss of business/ investment	1	1.6%	0%	0%
Divorce/ separation	1	0%	0.5%	0%
Dowry	3	0.5%	0%	0%
Socio-political harassment, including bribes and tolls	1	1.6%	1%	2.2%
Women harassment (Violence)	0	0%	0.5%	0%
House destroyed by fire or other reason	2	0%	0%	0%
Others	--	1.6%	1%	2.2%
Total responses (n)		97	86	53
Sample size (n)		191	192	92

Respondents were asked to rank the impact of shocks as severe, moderate, or low (Table 45). Relatively few were rated as low impact, with most falling into the moderate category. River erosion in CDSP IV is mostly a severe shock as it means loss of land as well other establishments like living houses, cow sheds, and trees.

Table 46: Severity of shocks

Sl.	Types of shock	CDSP I&II			CDSP III			CDSP IV		
		severe	moderate	low	severe	moderate	low	severe	moderate	low
1	Death/invalidity of earning member	3.7%	0%	1.6%	1.6%	1%	0%	1%	0%	0%
2	Serious disease of any member	11.0%	19.4%	0.5%	5.8%	18.3%	0.5%	3.1%	9.9%	0%
3	Displaced by flood, cyclone	2.6%	1%	0%	2.1%	0.5%	0%	1.0%	0%	0%
4	River erosion	0%	0%	0%	0%	0%	0%	1.6%	0%	0%
5	Crop loss from flood/drought	0.5%	1.6%	0%	4.7%	2.1%	52.0%	2.6%	0%	0.5%
6	Loss of livestock/poultry	2.6%	2.1%	0.5%	2.6%	3.1%	0.5%	1%	1%	0%
7	House damaged by flood/ storm	1.0%	0%	0.5%	2.1%	0%	0%	4.2%	0.5%	0%
8	Dacoity/ Theft/ Mastanies	0%	0.5%	0%	0.5%	0%	0%	0.5%	1%	0%
9	Loss of business/investment	1.0%	0.5%	0.0%	0%	0%	0%	0%	0%	0%
10	Divorce/separation	0%	0%	0%	0.5%	0%	0%	0%	0%	0%
11	Dowry	0%	0.5%	0%	0%	0%	0%	0%	0%	0%
12	Socio-political harassment	0.5%	1%	0%	0%	1%	0%	0%	2.2%	0%
13	Women harassment (Violence)	0%	0%	0%	0%	0%	0.5%	0%	0%	0%

14	House destroyed by fire etc	0%	0%	0%	0%	0%	0%	0%	0%	0%
15	Others	0.5%	1%	0%	0%	1%	0%	0%	2.2%	0%
	Sample size (n)	191			192			92		

For each shock, respondents were asked what action they did to reduce and mitigate the loss. Multiple answers were possible. These have been summarized across all types of shock and the data is shown in Table 47. This shows that the most frequent response is to use savings followed by taking of loans. This shows the importance of access to financial services in building resilience to shock – which could be extended to insurance. The third most important action was to take materials on credit support from community groups and NGOs – showing the importance of CDSP FLIs.

Compared with the 2021 AOS, there is greater use of savings and help from relatives, but fewer people take loans, and more are inclined to do nothing.

Table 47: Actions to recover from shocks

Approaches/actions	CDSP I&II	CDSP III	CDSP IV
Sell land	2%	1%	0%
Sell livestock	4%	1%	0%
Sell trees	2%	5%	0%
Use savings	46%	53%	43%
Mortgage land	1%	0%	0%
Mortgage other property	3%	0%	2%
Help from relatives	0%	0%	0%
Take loan	30%	16%	26%
Take materials on credit	3%	0%	2%
Aid or relief	0%	0%	0%
Complain to authorities /Mobilise community groups / NGO	0%	0%	0%
Do nothing	16%	37%	53%
Other	1%	1%	4%
Total**	108%	114%	130%
Total responses (n)	97	86	53

** There have been multiple actions as reported for mitigation and shocks, So the total is more than 100%

Status of erosion along river banks: In recent years (since 2016) there has been serious erosion along the bank of the river Meghna. Between 2017 and 2019 Caring Char was completely eroded. Some parts of river bank areas of Char Nangulia, Noler Char, and Boyer Char were seriously damaged and eroded. In this study most (86%) char dwellers of CDSP I&II have reported that the river is far away, so they are safe and they have no risk from any types of erosions. Over 43% of the households of Boyer Char (CDSP III) reported that the river bank is eroding and approaching their homesteads, but 34% say they are still safe because the river is far away from their homes. On the CDSP IV chars, 56% of households say that the river bank is eroding and approaching their homesteads.

Table 48: Status of erosion along river banks

	Risk from river erosion
CDSP I&II (Responded 97%)	(99%) fully protected (1%) partially protected,
CDSP III (Responded 96%)	(57%) fully protected. (34%) partially protected. (9%) not at all protected.
CDSP IV (Responded 97%)	(44%) fully protected (21%) partially protected (35%) not at all protected

Strategies for mitigating and preventing with natural disasters: Coastal regions have always been disaster-prone and affected by tidal surges, storms and cyclones. Before CDSP, char dwellers were often affected by natural disasters. Since the inception of CDSP, huge climate-resilient and climate-protection infrastructure have been built. These include 103 cyclone shelters, 105 km of water control embankments, 7 rural markets, 743 km of rural roads, 244 bridges & culverts, 3,998 DTWs, and 48,534 hygienic latrines for individual households and mangrove plantations 9701 ha. The study reveals that char dwellers now have an enhanced coping strategy for disasters. Over half of households in all three domains (CDSP I&II, CDSP III, and CDSP IV) have reported planting trees as a means of protection, and over one third (37% to 43%) have renovated their living houses using CI sheet and bricks.

Table 49: Strategy to cope with natural disasters

Enhanced capabilities to cope with misery/disaster? How?	
CDSP I&II (Responded 73%)	(23%) Planting trees on the homestead (33%) Due to the construction of the cyclone centre by CDSP (33%) Renovated living houses
CDSP III (Responded 70%)	(16%) Planting trees on the homestead (27%) CI sheet tin shed, brick wall house quite strong (51%) Due to the construction of the cyclone centre by CDSP
CDSP IV (Responded 77%)	(14%) Planting trees on the homestead (24%) Renovated living houses (66%) Due to the construction of the cyclone centre by CDSP

4. Summary and conclusion

4.1 Comparison of some selected progress Indicators across rounds of AOS

Table 50 shows values and indications of increase or decrease for respective selected indicators across the baseline and 1st to 8th rounds of annual outcome surveys.

Table 50: Comparison of some selected progress indicators for CDSP IV

Indicators	Base-line 2011	Annual Outcome Surveys									Change 2021 to 2023
		2012	2013	2014	2015	2016	2017	2019	2021	2023	
Agriculture* as principal occupation of household head (%)	37	45	45	48	24	22	29	22	29	37	27%
Day labour as principal occupation of household head (%)	31	29	29	20	36	30	29	31	18	22	22%
Straw made roof of main house (%)	82	66	55	33	42	28	19	8	2	2	0%
Tin made roof of main house (%)	16	34	43	67	58	70	80	90.5	89	98	10%
Average distance (in meters) of drinking water source in dry season and wet season	345	154	112	120	50	44	78	63	89	67	-25%
	418	183	133	135	65	56	87	71	100	67	-33%
Average value of HH Assets (BDT)	35162	43797	61485	99204	126451	212010	301418	270448	296391	364075	23%
Annual HH Income (BDT)	71951	89800	107771	109207	163009	189627	280243	341502	410065	392888	-4%
Rice Production (MT/Ha)	1.9	2	2.1	2.2	2.3	2.9	3.3	3.54	3.95	3.89	-2%
Income from Homestead gardening (BDT/HH)	3742	6155	6526	4866	13288	10115	11234	7997	7885	9185	16%
HH facing acute food crisis (%)	82	66	60	53	37	35	10	5	8	4	-50%

4.2 Summary

The 2023 AOS shows that CDSP households continue to be larger than is usual in rural Bangladesh. The vast majority (93%) of children are **going to school**, slightly lower than in 2021. Participation in **field-level institutions** has generally decreased in all CDSP areas since 2021 as more time passes since active support for these institutions ceased, although membership of NGO groups is being maintained at a high level in the CDSP IV area. In the CDSP IV area, 67% of HHs have **legal titles for their land**, although 27% of the area of land occupied is still occupied through informal arrangements.

Households have made substantial **investments in their land**, mainly in building houses, but also in developing land, digging fish ponds and leasing in more land. Obtaining land titles and investing in their land has resulted in families feeling more secure, improved their social status, increased mobility and participation in social events and organisations. Life within families has also improved.

The **principal occupation of the head of** household is crop farming followed by day labour in the CDSP IV area. In the older areas small trade is important alongside crop farming.

There have been substantial improvements to **housing**, with CDSP IV households largely catching up with those in the older CDSP areas in terms of size of house and use of tin sheets for walls and roofs. Such changes are due to better socio-economic conditions and having permanent settlement through receiving 'khatians'. Domestic water has become more accessible with the distance to a source of **safe drinking water** falling to around 64-67 metres. This saves both labour and time for the women of the households.

Sanitation has also been greatly improved, with all CDSP IV households now using ring slap or hygienic latrines, most washing hands with soap before meals, and after using the latrine.

Households across CDSP show improvement regarding **immunization of children**, and over 88% are now vaccinated in CDSP IV. The visits of Health Workers to the community have increased in all CDSP areas.

Although there has been a large increase in the value of **household and productive assets** since the start of CDSP IV, but the value of assets has also increased in the older areas which remain ahead of CDSP IV.

Overall **average household income** in CDSP IV has increased by over five times since 2011 and has largely caught up with income in the older CDSP areas, being 7% less than households in CDSP I&II and 11% less than in CDSP III. Compared to 2021, average household income has fallen in CDSP I/II and IV and risen in CDSP III.

All sample households have homestead **land**, and virtually all have a pond – so interventions in homestead agriculture and aquaculture have the potential to reach all households. Over half (57%) of CDSP I&II and III households have cultivated land as do almost three-quarters (72%) in CDSP IV. The average area per household of cultivated land is higher in the CDSP IV sample – as is the area of fishponds.

Cropping intensity is about 166% in CDSP I&II and III and 179% in CDSP IV. Since 2021 cropping intensity has increased slightly in the older CDSP areas, with a more significant increase in CDSP IV.

Paddy is by far the most important crop, grown by almost all farmers. Over the last five years boro has become a significant crop, and is now the main type of paddy grown in CDSP IV. Irrigation of increasing areas of boro using groundwater may not be sustainable and could threaten supplies of potable water. The increase in boro has been partly offset by a decline in the aman area, but overall, there has been an increase in paddy area in all the CDSP areas.

Average **paddy yield** in CDSP IV is 3.9 tons/hectare, with higher yields of around 4.5 tons/ha in the older areas. The overall trend in yield is upwards.. In all CDSP areas 48% of all paddy produced is sold, with 31% of all households (and half of paddy producers) selling paddy. Compared with the 2021 AOS, 1% fewer households produce paddy, but about 5% more paddy is sold.

Other crops are grown largely for sale. In terms of the value of sales, oilseeds (mainly soybean) are the main crop sold in CDSP I/II and III, with field vegetables being the main crop sold in CDSP IV. Compared with 2021 sales of oilseeds have increased considerably in CDSP III and also in CDSP I&II. The value of sales of field vegetables has increased in CDSP I/II but declined in the CDSP III and IV.

Homestead production: almost 88% of CDSP IV households cultivate vegetables and spices around their homesteads, as do 64-72% in the older areas. Over 60% of homestead vegetable growers in CDSP I/II and III sell some of their production, this being 72% in the in the CDSP IV area. Compared with the 2021 AOS, more households sell vegetables. The value of sales of homestead vegetables have increased in CDSP III and IV, while the value of field vegetable sales has decreased (more than offsetting the increase , so three quarters of these sales now come from homestead plots.

Almost all households have **fruit and timber trees**. The average number of trees per household has increased since 2021. Compared to 2021 the value of fruit sales has increased, and fruit sales are worth more than sales of homestead vegetables in all the CDSP areas.

Poultry are reared by over 91% of households. The average number of birds per household has increased since the start of CDSP IV, as has egg and meat production. Compared to the 2021 AOS, production and consumption of eggs and birds have increased in all CDSP phases. Income from sales has also increased significantly, overcoming the COVID 19 pandemic.

Two-thirds of CDSP IV households' **rear cattle**, compared with under half in CDSP III and CDSP I&II. Compared to the baseline, milk production, consumption and sales have greatly increased. Only a few households keep sheep and goats.

Almost all households have **fishponds** and these are now nearly all cultivated – compared with little more than half in 2011. Since the 2021 AOS, average pond size, cultivated area and production have all increased, and the amount sold has also increased significantly in the CDSP III and IV areas.

In the CDSP IV area the proportion of households facing acute food crisis has reduced from 82% to 4% since 2011 and is now the same as in the older CDSP areas. This compares with 8% across all the CDSP phases in the 2021 AOS.

Household shocks and crises, such as those from natural disasters, ill health and lawlessness, have been greatly reduced in the CDSP IV area. Households in CDSP IV now face a similar level of shocks and crisis to those in the older CDSP areas. But over the last few years the number of CDSP IV households reporting losses from river erosion have increased - in 2017 it was 8%, in 2019 3%, and in 2021 18% and 3.3% in 2023 - considerably more than in the older CDSP areas. Moreover, the survey could not cover those CDSP IV households (64 out of 156) who moved away in the last two years - largely having lost their land due to river erosion.

Overall conclusion: data from the AOS show that the improvement in livelihoods and living standards since the start of CDSP IV is still continuing. As the area develops, living standards for CDSP IV households have steadily caught up with those in the older CDSP phases. But how have things changed since 2021 when the previous AOS was carried out?

4.3 Changes in CDSP IV 2021 to 2023

Data from the 2021 and 2023 AOS shows that a number of positive gains have been made in CDSP IV over the last two years. These include:

- More land is occupied with an official land title and less occupied informally.
- There are fewer reports of crops being damaged by flooding or salinity.
- There has been an increase the area of paddy, with a further increase in the proportion of more productive boro. The overall average yield of paddy has risen.
- With more paddy, and little change in the area of non-rice crops, overall cropping intensity has significantly increased.
- More households sell homestead vegetables, and the value of sales per household has increased.
- The number of trees per household has increased, as has the value of sales of fruit.
- Production, consumption and sales of eggs have increased.
- More households own cattle and income from sales of milk has increased. Although the average pond size has decreased, the volume of fish produced and sales of fish have increased.
- The number of households facing an acute food crisis has fallen.
- The value of household assets has increased.
- The size of houses has increased, and more houses have tin roofs and walls.
- The average distance from a supply of domestic water has fallen.
- More households are washing their hands with soap before meals or after using the latrine.

On the other hand, the AOS data also shows a number of indicators which have worsened for CDSP IV:

- There has been a fall in the average area of land per household, this being mainly cultivated land, with homestead land and pond area little changed. There has been a slight fall in the proportion of households cultivating land.
- Fewer households are members of CDSP Field Level Institutions.
- More households report being at risk from river erosion
- Sales of paddy and field vegetables are lower.
- There has been a small fall in farm average household income from farm and non-farm sources, although the number of income sources has increased.
- Wealth ranking shows slightly more households in the poor and very poor categories.
- Fewer couples are adopting family planning.
- Fewer children are being vaccinated.

Conclusions for recent trends in CDSP IV:

Livelihoods and living standards have been transformed for the inhabitants of the CDSP IV chars since this phase of the project started over 10 years ago, and in many ways these chars are now equal with those in the older established areas of CDSP I, II and III. The acquisition of formal land title has encouraged considerable investment in land and improved the social status and security of the households receiving these titles.

Over the last two years continued expansion of irrigated boro paddy has increased the total areas of crops grown (cropping intensity). The average yield of paddy has also increased, although this increase in production is not reflected in data on production and sales per household. The survey does not provide evidence of an increase in household income but there has been a significant increase in the value of household assets, and housing and access to potable water have also improved. There has also been an increase in sales of homestead vegetables, partly offsetting the fall in sales of field vegetables. More households now own cattle and milk production and sales have increased, as have poultry and pond fish.

However the benefits of intensive support in CDSP IV for field level institutions and health services are waning, with declining membership of CDSP groups and a small decline in some health service indicators. Despite the increase in area of crops and increases in livestock and fish production and income, average income reported by sample households has fallen. The impact of loss of land the river erosion is becoming more apparent. Although there are fewer reports of crop damage from flooding and salinity, more households say they are at risk from this erosion. The survey could not cover the 41% of households who had been interviewed in 2021 but now could not be found - largely because they had lost their land to river erosion.

5. Case study abstracts on best practices and lessons learned from field activities of CDSP

5.1 Introduction of High-Value Homestead Crops (HVHC) in Coastal Chars

Homestead agriculture and value chain development is the biggest and most important sub-component of the livelihood component of CDSP B(AF). Agriculture (field and homestead crops) is the main source of livelihood for the char dwellers. While Local Government and Engineering Department (LGED) is implementing a component aimed at developing homestead crops., the two partner NGOs) BRAC and SSUS) are focusing on homestead agriculture (fruits and vegetables and value chain development. They are promoting tree (fruit and timber) nurseries operated by NGO group members and promoting planting of trees around homesteads. Major interventions implemented are (i) Commercial Fruit Garden Demonstration plots (20 nos.) and (ii) Drip Irrigation Demonstration Plots (2 nos.). Drip irrigation system is

considered an efficient watering method that reduces water use significantly and, at the same time, helps plants grow better. It conserves water and fertilizer by allowing water to drip slowly. It is considered to be one of the most efficient and effective irrigation methods than traditional ones. It helps to reduce soil erosion and runoff by delivering water slowly and evenly to the roots.

5.2 Production and Use of Organic Fertilizer – Vermicompost to Enhance Soil Health

Agriculture (field and homestead crops) is the main source of livelihood for char dwellers. While LGED is implementing a component aimed at developing homestead crops, the partner NGOs are focusing on homestead agriculture (fruits and vegetables) and value chain development. Hundreds of vermicompost and quick compost demonstration plots have established through input supports in the form of cemented rings to encourage commercialization of vermicompost production and marketing. Major interventions implemented are (i) establishment of vermicompost plants (1000) and (ii) quick compost demonstration plots (200). Demonstration of vermicompost plants has been proved to be relevant and effective in the context of newly unfertile coastal char land areas. Case studies reveal that vermicomposting plants have a significant contribution to household income of char dwellers. In couple of cases, it is found that income from vermicompost become 2nd and 3rd source of HH income.

5.3 Tricho Compost – An Ideal Organic Fertilizer cum Organic Pest Control Liquid

Tricho-compost is the material that results when spores of a beneficial fungus, *Trichoderma* sp. are used in the composting process. *Trichoderma* sp. are natural competitors against a wide range of harmful fungi. When added to compost, they work as an anti-fungal agent to protect crops in the field. Benefits of using tricho-compost organic fertilizer are (i) trico-compost keeps soil health in good condition and enhances soil quality through enriching its fertilising capacity; (ii) it increases water-retention capacity of soil; (iii) tricho-compost destroy fungus in soil and protect soil from harmful fungus; and (iv) trico-compost helps in reducing salinity and acidity in soil through micro-organic reactions.

5.4 CDSP support to fisheries in Coastal Chars

CDSP B(AF) areas are fortunate in having rich inland and open water capture fisheries with aquaculture potential. This plays an important role in the development of the agricultural economy, nutrition, employment generation, protein intake, poverty alleviation, and improvement of the socio-economic condition of poor char dwellers. In coastal areas. Most of the water resources in the CDSP project area are suitable for fish culture. Major problems faced by the pond fish farmers of CDSP are low-quality fish seed, low-quality fingerlings, lack of proper technical knowledge for pond management leading to poor harvesting, ponds becoming dry during dry season, and low profit from fish culture. To meet local demand for quality fish spawn/seed two hatcheries have been established with a financial grant @Tk. 500,000 for each hatchery mobilized through two partner NGOs (SSUS and BRAC) to two private hatchery owners. The expected impact on production of fish spawn from the hatchery will be enormous.

Survey on Food Security and Nutrition

1. Introduction

Alongside the 2023 AOS (9th round) an additional survey was carried out to collect information on food security and nutrition to enable a comparison of indicators with RIMS surveys carried out at CDSP IV baseline in 2009 and at CDSP IV mid-term in 2014. And 2021 AOS. This study only applies to the CDSP IV area.

2. Methodology

2.1 Sample design and selection

The baseline RIMS survey was conducted in 2009 before initiation of CDSP IV. A total sample of 900 households was selected covering the three main chars of CDSP IV – Char Nangulia, Caring Char and Noler Char. In each of these chars 10 sample villages or somaj were randomly selected, and in each village, 30 households were randomly selected, giving a total of 900 sample households.

Table 1: Distribution of sample households in RIMS Baseline Survey 2009

CDSP IV/B(AF) Chars	Estimated population		Sample	
	No. of somaj /cluster villages	Number of households	Sample villages	Sample households
Char Nangulia	25	6,932	10	300
Caring Char	18	5,340	10	300
Noler Char	27	9,355	10	300
Total	70	21,627	30	900

The MTR RIMS survey of 2014 was conducted with 1080 sample households drawn from all five chars of CDSP IV. The three chars of RIMS baseline study plus two more chars of CDSP IV - Char Ziauddin and Urir Char. To accommodate these additional chars the number of sample villages was increased to 36, with 30 sample households selected in each village - as in RIMS baseline survey 2009.

Table 2: Distribution of sample households of MTR RIMS survey 2014

CDSP IV Chars	Area (ha)	Population	Households	No. of Somaj	Sample Somaj	Sample HH	Percent of Total HH
Char Nangulia	8990	67000	12000	82	18	540	4.50
Noler Char	2690	33000	6000	32	8	240	4.00
Caring Char	3000	16800	3249	15	4	120	3.69
Char Ziauddin	1943	11000	2000	12	3	90	4.50
Urir char	10300	11000	2000	20	3	90	4.50
Total	26923	138800	25249	161	36	1080	4.28

The present study of food security and nutrition uses a similar sample design (30 households per somaj) but has been adjusted to number of samples and somaj to reflect the population of different chars and the total loss of Caring Char due to river erosion. So, the size of the sample becomes 734 instead of 920.

Table 3: Distribution of samples of food security and nutrition survey 2023

CDSP IV Chars	Area (ha)	Population	Households	No. of Somaj	Sample Somaj	Sample HH	Percent of Total HH
Char Nangulia	8530	93701	15113	82	14	487	66.35
Noler Char	2560	40480	6152	32	5	108	14.71
Char Ziauddin	1943	15280	2380	12	3	99	13.49
Urir char	1230	18557	2725	20	4	40	5.45
Total	14263	168018	26370	146	26	734	2.78

2.2 Questionnaire

The respondents have been asked some questions on food security – whether they grow enough rice and whether they have a shortage of food.

Nutrition has been assessed in terms of dietary diversity. The foods necessary for our body generally are grouped into: (i) carbohydrates, (ii) proteins, and (iii) vitamins and minerals.

- Carbohydrates and fats (energy-producing Food) provide our bodies with energy. Most of the carbohydrates in the foods we eat are digested and broken down into glucose before entering the bloodstream.
- Proteins that help repair and build our body's tissues, allow metabolic reactions to take place, and coordinate bodily functions. Proteins also maintain proper pH and fluid balance in our bodies.
- Vitamins and minerals perform hundreds of roles in the body. They help shore up bones, heal wounds, and bolster your immune system. They also convert food into energy and repair cellular damage

In this study, diet diversity is considered an important measure of its quality. Thus, the number of different food groups consumed in a household is used as an indicator of the quality of the household diet. In the context of coastal chars, a total of 11 food was selected for the baseline study in 2009. These food groups were:

- Energy producing Food/ Carbohydrate & fats: Cereals, Roots/tubers, Sugar/Molasses, Oil/Fat/Butter.
- Protein: Meat, Fish, Egg, Milk/Milk products, Legumes/Pulse
- Vitamins: Vegetables and fruit

The questionnaire has been included in Appendix 2 of this Annex.

3. Results

3.1 Food security

Data in Table 4 shows that at baseline very few (2.4%) households grew enough rice, but at present 22% of households can meet their requirement from their own production. At baseline 80% of households grew some rice, but not enough to meet household needs. This has now fallen to 43%. Present survey data reveals that 31% of the households are now not growing rice at all, compared with only 18% at baseline. A significant number of households have ceased to grow rice: some have do not cultivate any agricultural land and rely on non-farm income sources, while others have converted their land to 'sorjom' (fish-cum-vegetables) or to fish ponds. These are more profitable than paddy production and are adapted to the year-round water logging that exists in some areas of Char Nangulia and Urir Char. If we exclude non-rice producing households, then the proportion of households that grow enough rice was only 3% at baseline, 23% at MTR and 49% now.

Table 4: Distribution of households by whether they grew enough rice for a year

	Baseline RIMS 2009		Mid-term RIMS 2014		2024	
	Number	Percentage	Number	Percentage	Number	Percentage
Grew enough rice	22	2.4	178	16.5	146	22
Did not grow enough rice	718	80	596	55	282	43
Did not grow rice at all	160	18	306	28	201	31

Currently 30% of households report a food shortage at sometime during the year (Table 5). This has declined from 87% at baseline and 73% at mid-term, but is considerably more less (30%) now reporting an acute food crisis in the 2023 AOS. Data for the main baseline survey in 2011 showed 82% of households reporting an acute food crisis, while the impact survey of 2017-18 shows this has now reduced to only 4%. This suggests that in the pre-project and start of project situation the vast majority of households (over 80%) experienced a food shortage – and this was a serious problem (acute crisis) for almost all of them. By the time of the mid-term RIMS in 2014, almost three quarters (73%) of households were still reporting a food shortage, but the 2014 AOS shows there was an acute food crisis for just over half (53%). So although food shortages were still widespread, this was not such a great problem (crisis) for many households. Moving on to 2023, this trend has continued, with a significant number of households (30%) reporting a food shortage, but only a much smaller number (4%) reporting an acute food crisis. Overall, the food security situation is improving but food supplies are not yet assured for all households.

Table 5: Distribution of households experiencing food shortage

	Baseline 2009		Mid-term RIMS 2014		2023	
	Number	Percentage	Number	Percentage	Number	Percentage
Experienced food shortage sometime in a year						
No	119	13	291	27	462	70
Yes	781	87	789	73	194	30

3.2 Dietary diversity

The extent of diversity in a household's diet was assessed by asking a respondent about how frequently the food groups consumed by the members of the household (Table 6). Cereals (almost all rice) and oils /

fats were consumed by almost all households every day. Three-quarters (74%) of households consume sugar every day, and over half consume fish. Most households consume most of the other food groups on at least half the days of the week, exceptions being meat/poultry and milk. Almost half of all households seem not to consume meat or poultry at all (except maybe at festivals). Milk is consumed regularly by 28% of households (who seem to produce their own), but infrequently, if at all, by other households. Considering that almost all households own poultry, egg consumption is surprisingly limited – daily by only 10% of households and on most days of the week by another 35%.

Almost all households (85%) consume fish from their own ponds, and over 80% consume their own vegetables and eggs. The area used to grow legumes and pulses has fallen as the area of paddy has increased, and most households now buy these foods in the market rather than grow their own.

Table 6: Diversity of diet

Food group	Frequency of consumption			Source of food	
	Regular: 7 days/week	Occasional: 4-6 days/week	Rarely: 3 & under days/week	own produce	buy in market
Cereals	95.42%	0.00%	0.10%	65.83%	73.47%
Roots & tuber	14.93%	42.22%	34.60%	8.84%	89.00%
Legume & pulse	32.31%	35.67%	26.98%	16.46%	91.31%
Vegetables	46.79%	33.53%	14.78%	80.48%	63.41%
Eggs	24.08%	30.33%	30.64%	78.81%	32.46%
Milk	31.40%	4.11%	7.77%	29.87%	19.51%
Meat & poultry	1.98%	22.10%	39.32%	53.65%	53.65%
Fish	60.67%	28.81%	5.18%	85.06%	84.90%
Oil/fat	95.57%	0.00%	0.15%	0.76%	93.59%
Sugar/honey	74.54%	10.97%	6.70%	0.45%	90.85%
Fruit	3.35%	16.31%	41.92%	44.81%	51.70%

4. Conclusion

This brief survey shows that food shortages have been greatly reduced, but still effect a significant number of households. Most households consume a range of food groups, including foods high in protein, minerals and vitamins, but there is scope to increase consumption, particularly of fruit, vegetables and eggs.

Char Development and Settlement Project (CDSP-B(AF))

Annual Outcome Survey (Round 9) Questionnaire 2023

(Including Modules on Dietary Survey and Impact on Land Titling)

CDSP Phase:

I	II	III	IV	B
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Sample ID:

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BL Sample ID:

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1. Profile Information:

Name of Respondent:..... Relation with HH Head:

Sex: M/F: Male/Female

Address:

Vill/Somaj:.....,

Char:.....Union:.....

Upazila:..... District: Noakhali / Chittagong

Mobile number :.....

National ID Card/birth certificate No,

Land mark: Nearby-Mosque/school/House of Elite person):

Write here:

2. Number of years living at this location**3. Member of CDSP Field Level Institutions (FLI): [tick all that apply]**

	WMG	FF	SFG	NGO	TUG	LCS
At present time						
At some time in last 7 years						

4. Household head: male / female**5. Occupation**

	Primary	Secondary
Household Head		

Spouse		
Occupation Code: Student-1, Unemployed-2, Agriculture/ Crop farming -3, Day Labor-4, Housekeeping-5, Fishing-6, Salaried Job-7, Fish drier-8, Small trade-9, Rickshaw/Van puller-10, Boat man-11, Retired person/ old man-12, Beggar-13, Disable-14, PL Catching-15, poultry/cow rearing-16, Handicraft-17, Driver-18, Others (Specify). -19		

6. Household composition

	Number of persons			
	Total	Earning income	Disabled/elderly	In education
Men (16+)				
Women (16+)				
Children – school age (5-16)				
Children under school age (<5)				
Total HH members				

7. Land holding:

7a. What area of land do you own, lease or occupy without a formal title?

How did you acquire this land?	Decimals
Khatian from government settlement programme	
Inherited the land	
Purchased the land	
Occupy informally	
Bondok/lease/cod/share-crop in	
sub-total	
less Bondok/lease/cod/share-crop out	
= Net land area occupied	

7b. What type of land is it?

	Decimals
Homestead	
Pond/ditch	
Cultivable / agricultural land	
Fallow land	
Total (should = A in table above)	

<< **CHECK THIS**

7.c Investment on Land for development after getting with Khatian/Land titling

Newly built/established	Y/N	Approximate cost in Tk.	Remark if any
Living house?			
Ponds(s)?			
Sorjon plot?			
Land used for crop?			
Land used for vegetable?			
Given Cod/rented?			
Did you sell land?			

If yes, how much land sold?			
Why have you sold land?			

7.d Social impact

Impacted areas of social status	Y/N	Explain how/reason	Remark if any
Are you secured than before?			
Have your status changed?			
Mobility changed?			
Better family life?			
Better bondage in conjugal life?			
Your somaj at risk of river erosion?			
Enhanced capabilities to cope up with misery/disaster?			
How?			

8. Housing:

Type of House	Size (Length X Width) Feet*	Type of Floor	Type of Wall	Type of Roof
Main House				
<p>Floor Type Code: Mud-1, Bricks-2, Pacca-3, Wall Type Code: Leaf-1, Straw-2, Mud-3, Bamboo-4, Tin-5, Brick wall-6 Roof Type Code: Leaf-1, Straw-2, Tin-3, Pacca-4, Others-5</p> <ul style="list-style-type: none"> Local unit: 1 hath=1.5 feet 				

9. Drinking Water and Sanitation:

Sources of drinking water:	Shallow Tube Well -1, Deep Hand Tube Well-2, Dug Well-3, Rain Water-4, Protected Pond Water (PSF)-5, Treated-boiled water-6, Untreated Pond Water-7, Untreated River/Canal Water-8, Others (specify).....9.	
Ownership:	Own by HH-1, Jointly Owned-2, Neighbour-3, Govt./Natural Sources-4, CDSP-5, others specify 6	
How far do you go for collecting Water:	Dry Season..... Metres	Rainy season.....Metres
Type of latrine used by HH:	No Latrine-1, Hanging/Open-2, Ring-slab (unhygienic)-3, Ring-slab (water sealed)-4, Sanitary Latrine -5.	

If the type of latrine is Ring-slab (unhygienic) or Ring-slab (water sealed) or Sanitary Latrine, where did you collect?	Buy myself from market-1, Buy through NGO/other organization-2, Donated by NGO/other organization-3 CDSP IV-4
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10. Health and Family Planning:

Do you wash hands before taking a meal? Yes / no	
If yes - How do you wash hand before taking meal? By only water-1, by soap-2, by ash-3	
Do your family members wash hand after using latrine? Yes / no	
If yes - How do your family members wash hand after using latrine? By water-1, by soap-2 & ash-3	
Do all the children of your family properly immunize? (min.5 vaccines) Yes-1 and No-2	
If yes, how you managed it?	Upazila Health Center-1, Union Health Center-2, Local Doctor-3, From NGO/Voluntary organization-4, Through government special program-5
Is there any Health Worker (Govt/NGO) visited regularly in your area? Yes-1/No-0	
Do you use any family planning method? Yes-1, No-0 and not applicable-9, If yes, which method: Permanent-1, Temporary-2	

11. Household Assets:

Sl	Type of Assets	Own[Tick]	Quantity	Present Value (Taka)
1	Cot/ <i>Khaat</i>			
2	Almira			
3	Showcase			
4	Chair/table			
5	<i>Shinduk</i> (Wooden box/Trunk-Tin)			
6	<i>Alna</i>			
7	Ceiling/Table Fan			
8	Radio/Cassette Player			
9	B&W TV			
10	Color TV			
11	Mobile Phone			
12	Sewing machine			
13	Ornaments			
14	Bicycle			
15	<i>Rickshaw</i> /Van			
16	<i>Motor cycle</i>			
17	Auto rickshaw battery operated			
18	Sprayer			

Sl	Type of Assets	Own[Tick]	Quantity	Present Value (Taka)
19	Laptop			
20	Bullock cart			
21	Solar			
22	Shop with land ownership			
23	Tractor for cultivation			
24	Boat			
25	Mechanized boat			
26	Thresher			
27	Water pump			
28	Fishing net (Type:.....)			
29	Fruit/timber trees			
30	Cow			
31	Buffalos			
32	Goat			
33	Sheep			
34	Chicken			
35	Duck / goose			
36	Pigeon			
37	Rice husking machine			
38	Trolley motorized			
39	CNG Auto			
40	Others (specify			

12. Crops grown

	Area Cultivated			Area Cultivated	
	In field (decimal)	In homestead (tick if grown)		In field (decimal)	In homestead (tick if grown)
<u>Cereals</u>			<u>Vegetables</u>		
Aus			Country Bean		
Amon			Long Bean		
Boro			Other type of bean		
Maize			<i>JaliKumra</i> (ridge gourd)		
<i>Cheena</i> (millet)			Bottle Gourd		
<u>Pulses</u>			Sweet Gourd		
<i>Keshari</i>			<i>Korola</i> (Bitter gourd)		
<i>Mung</i>			<i>Jinga</i> (Ribbed gourd)		
<i>Felon</i>			Dhundul (Sponge gourd)		
<i>Moshuri</i>			Okra (ladies finger - <i>bhindi</i>)		
<i>Mash Kolai</i>			Cucumber		
<u>Oilseeds</u>			Radish		n
Soybean			Carrot		

Mustard			Cauliflower		
Groundnut			Cabbage		
Sesame (<i>til</i>)			Spinach		
Spices			<i>Lal Shak</i> (Red amaranth)		
Chilli			<i>Puishak</i>		
Onion			Tomato		
Garlic			Brinjal		
Coriander			Melons		
Turmeric			Water melon		
Roots and tuber			Musk melon		
Sweet potato					
Cassava			Total area of <i>sojon</i>		
Fodder crops			Total area of field crops		

13. Crop production

13a. Paddy production in last 12 months -

What types do you grow in each season?

	Area decimal	Production maunds	Did you grow this 6 years ago		maunds
Aus – local			yes / no	Use of paddy of all types	
Aus – HYV			yes / no	Consumed at home	
Aman – Razashail			yes / no	Kept for seed	
Aman – HYV/IRRI			yes / no	Sold	
Aman – other			yes / no	total (= total production)	
				Total income Tk. *	
Boro – HYV, hybrid /Hudinya IRRI			yes / no	Income from paddy grass/ Khar	
total production				Total production 6 years ago	

Boro transplanted after 15 March should be classified as Aus HYV

13b. Other field crop production in last 12 months

	Area decimals	Income from crop sales Tk	Approx. % Of prod. consumed	Approx % of production sold*	Did you grow these crops 6 years ago?
Wheat, maize and millet (<i>cheena</i>)					yes / no
Pulse crops					yes / no
Oilseeds (til, mustard, soya, g-nut)					yes / no
Root crops (potato, sweet potato, alum, cassava, yam)					yes / no
Spices (onion, garlic, chilli, turmeric, coriander)					yes / no
Vegetables and melons grown in the field (NOT homestead)					yes / no

* remainder of production consumed at home

13c. Homestead vegetables

Do you grow homestead vegetables?	yes / no
if yes	do you sell some of these vegetables
	yes / no

	if yes	a) Income from sales in last 12 months	Tk
		b) Approx percentage of production that is sold	%

IN ABOVE QUESTIONS ENTER VALUE OF SALES NOT VALUE OF TOTAL PRODUCTION

13d. Cropping intensity - over last 12 months including leased in land

	Decimals of cultivable land	Include all land used by farmer at some time over last 12 months.
Single cropped		
Double cropped		
Triple cropped		
Four crops		
Five crops		

14 Trees and fruits

Sector	Name of tree	Number of trees owned
Fruit trees	Guava	
	Lemon	
	Banana	
	Papaya	
	Mamgo	
	Jamrul	
	Starfruit	
	Kul	
	Total	
Palm/Date/Coconut etc. trees	Beetle	
	Coconut	
	Juice	
	Total	
Timber and fuel wood	Koroi	
	Jhau	
	Total	

In last 12 months

Income from sales of all fruits and nuts	Tk
Approx percentage of production that was consumed at home	

15. Crop damage. Have you suffered losses from salinity, flooding and poor drainage?

Loss from:	Crops that were damaged	Damage in last 12 months	Change in damage compared with last year	Trend in damage since start of CDSP

Salinity	Aus			
	Aman			
	Boro			
	Rabi field crops			
	Homestead veg			
	Trees			
Flooding (Excess rainfall)/ ingress from river / sea	Aus			
	Aman			
	Boro			
	Rabi field crops			
	Homestead vegetable			
	Trees			
Drainage (lack of/damage of sluices, khals, bridge, culverts)	Aus			
	Aman			
	Boro			
	Rabi field crops			
	Homestead vegetable			
Drought (lack of rainfall)		- Aus		
		- Aman		
		- Boro		
		- Rabi field crops		
		- Homestead vegetable		
		- Trees		

Damage in last 12 months: 1=no damage, 2=slight damage, 3=moderate damage, 4=heavy damage, 5=total loss

Change/trend in damage: 1 = damage reducing, 2 = no change in damage, 3 = damage increasing

16. Poultry

	Chickens	Ducks & Geese	Pegion
Number of birds owned at current time			
In last 12 months for both chickens & ducks			
Eggs Total number of eggs produced			
Number of eggs consumed at home			
Number of eggs sold			
Average price per egg	Tk		
Total income from sale of eggs	Tk		
Meat Number of birds consumed at home			
Number of birds sold			
Average price per bird			
Total income from sale of birds			

17. Cattle and buffalo

	Cattle		Buffalo	
	own	shared	own	shared

Number of animals owned at current time				
Of these – number of milking cows & buffalo				
In last 12 months (for both cattle and buffalo)				
Milk Total milk produced (kg/litre)				
Milk consumed at home (kg/litre)				
Milk sold (kg/litre)				
Average price per litre/kg				Tk
Total income from sale of milk				Tk
Meat Number of animals killed at home				
Number of animals sold				
Average price per animal				Tk
Total income from sale of animals				Tk

18. Goats and sheep

	Goat		Sheep	
	own	shared	own	shared
Number of animals owned at current time				
In last 12 months (for both goat and sheep)				
Number of animals killed at home				
Number of animals sold				
Average price per animal				Tk
Total income from sale of animals				Tk

19. Aquaculture

	Pond	Sorjon/Kandi crop
Total area in decimals		
Area used for fish cultivation		
In last 12 months (for both pond and sorjon)		
Total fish produced (kg)		
Fish consumed at home (kg)		
Fish sold (kg)		
Average price per kg		Tk
Total income from sale of fish		Tk
Quantity of present stock (approx.) in the pond		

20. Household Annual Income: in last 12 months

Sources of Income	Amount (Taka)	Sources of Income	Amount (Taka)
Wage from daily labour		Income from sale of Khar	
Field Crops		Poultry Rearing	
Petty Trading		Job/salary	
Business		Skilled work	
Homestead Gardening (including fruits & trees)		Remittance	
Rickshaw/van/boat/vehicle		Handicrafts	

Pond Aquaculture		Pension & social benefits *	
Forestry/Trees		Begging and relief	
Fishing/PL catching		Date Juice	
Livestock Rearing		Others.....	

All these should be recorded net of expense incurred on inputs, raw materials and other costs. Social benefits includes fees for elder people, widow, disabled, freedom fighter etc.

21. Food Security:

- How many months you are able to meet the basic food (Rice/Pulse) needs from your own production:.....
- Does it happen that in certain months of the year your family members have to take less amount or low quality of food than usual? Yes/No
- If yes – how many months of food shortage

22. Wealth category (self-assessed): Now: rich / medium / poor / very poor
 Since CDSP: rich / medium / poor / very poor

23. Shocks and coping strategy

Did your household experience any kind of shocks or crisis during the last one year? Yes/No
 If yes, What type of shocks were faced by your household or household members and how were they coped with.

List of shocks		Indicate shocks specifying magnitude(*Code)	How it was coped with (**Code)
1	Death/invalidity of earning member		
2	Serious disease of any member		
3	Displacement due to Flood/cyclone/ tornado		
4	River erosion		
5	Loss of crop due to flood/drought		
6	Loss/ death/theft of livestock/poultry		
7	Damage to house from flood or storm		
8	Dacoity/ Theft/ Mastanies in house/business		
9	Loss of business/investment		
10	Divorce/separation		
11	Dowry		
12	Socio-political harassment, including bribe and tolls		
13	Women harassment (Violence)		
14	House destroyed by fire or other reason		
15	Others (specify)		

***Code:**1-Severe, 2- moderate, 3-Low
****Code:** 01- By selling land, 02- By selling domestic animals/birds, 03- By selling trees
 04- With own savings, 05- By mortgaging land, 06- By mortgaging other properties
 07- With help from relatives, 08- By taking cash credit, 09- By taking materials in credit
 10- Aid/relief, 11- Complain with police, *Salish* with the UP, By mobilization of community groups/CBO/ NGOs,
 12- Did nothing, 13. Others (specify).....

24. Effect of recent loss of Infrastructures (like bridges, slices, embankment)

Did your household have experience any kind of shocks or crisis during due to loss of infrastructures mentioned below: Yes/No). (ATTENTION: Applicable for CDSP IV sample HHS)

If yes, respond for such infrastructure.

List of infrastructure lost		Indicate shocks specifying magnitude(*Code)	How it was coped with (**Code)
1	Bridges at Janata bazar site		
2	Sluice DS I over caring khal near Shantipur		
3	Sluice DS II over South Katakhal khal at Nangulia site		
3	Sluice DS III over Hoar khal-I at Noler Char site		
4.			
5.			

***Code:**1-Severe, 2- moderate, 3-Low
****Code:** 01- By selling land, 02- By selling domestic animals/birds, 03- By selling trees
 04- With own savings, 05- By mortgaging land, 06- By mortgaging other properties
 07- With help from relatives, 08- By taking cash credit, 09- By taking materials in credit
 10- Aid/relief, 11- Complain with police, *Salish* with the UP, By mobilization of community groups/CBO/ NGOs,
 12- Did nothing, 13. Others (specify).....

25. Current status of protective infrastructure

At the current time to what extent is your land protected by embankments and sluices

Code: 01= fully protected, 02 = partially protected, 03 = not at all protected

Describe:

Thank you for your kind cooperation

Comments: -----

Field Investigator's Signature & Name:

Verifier's Signature & Name:

Date:

Date:

Char Development and Settlement Project (CDSP-B(AF))

Annual Outcome Survey (Round 2) Questionnaire 2023 (Including Modules on Dietary Survey and Impact on Land Titling)

CDSP Phase:

I	II	III	IV	B
---	----	-----	----	---

BL Sample ID:

--	--	--	--	--	--	--	--

Sample ID:

--	--	--	--	--	--	--	--

1. Profile Information:

Name of Respondent:..... Relation with HH Head:

Sex: M/F: Male/Female

Address:

Vill/Somaj:.....

Char:..... Union:.....

Upazila:..... District: Noakhali / Chittagong

Mobile number :.....

National ID Card/birth certificate No,

Land mark: Nearby-Mosque/school/House of Elite person):

Write here:

26. Supplementary Module: Diet and Nutrition (Included as per recommendation of SM 2023)

AOS 2021-Dietary-Nutrition Questionnaire

Self-evaluation of Dietary/Eating Behaviours Reported by Project Beneficiary					
Eating Behaviour in regard to food items	Frequency of Eating-Put (Tick mark √)			Source (Tick √)	
	Regular (7 days/week)	Occasionally (More than 3 days/week)	Rarely (less than 4 days/ week)	Own Prod.	Market
1. Cereals					
2. Roots/Tubers					
3. Legumes/Pulse					
4. Vegetables					
5. Eggs					
6. Milk/Milk products					
7. Meat					
8. Fish					
9. Oil/Fat/Butter					
10. Sugar/Molasses					

11. Fruits					
Scores:					
Total score out of 11	Regular + Occasional + Rarely=				

1. Cereals-> Rice/Ata/Bread, 2. Roots/tubers ->Kachu, Salgum, Potato, Sweet potato
3. Legumes/Pulses/Dal/Seeds of Beans, 4. Vegetables-Palog/lal shak/pui shak, 5. Eggs
6. Milk/milk products, 7. Meat ->(Beef, Mutton, Poultry birds, 8. Fish -> Local fish, Sea fish
9. Oil-> Mustard, Soya bean, Til-tishi, 10. Sugar-> Sugar, Molasses, Date juice, Fruits->Local & imported
Please Note: We have RIMS Baseline in 2009 and Mid-term RIMS survey

Evaluation Criteria:

Evaluation Criteria	9-11	5-7	1-4
	Good	Moderate	Low
Result (Put ✓ mark)			

Thank you for your kind cooperation

Comments: _____

Field Investigator's Signature & Name:

Verifier's Signature &Name:

Date:

Date:

Annex 3

List of Missing Sample Households for Annual Outcome survey 2023

ID	Phase	Name	Father ' Name	H/Wife Name	Bari	Location / Somaj
11002001	1	Rupiya Begum	Late Badsha Mia	Md Usuf Nobi	Rumar Bapar Bari	Purba Char Bata
12001012	1	Abu Jahal	Abdul Haque	Lake	Dulo Saran Bari	Char Jabbar
12001016	1	Rintu Sarang				Char Jabbar
13001009	1	Mosheul Arafath	Abul Hossain	Momataz Begum		Nobogram
13002012	1	Main Uddin	Late Abdul Alam	Bibi Khatiza	Main Uddin Bari	Char Kalmi
13002018	1	Md Akther	Late Ranu Mia	Mahfujia Khatun	Akther Bari	Char Kalmi
21002019	2	Robiul Alam	Kazal Mia	Sultana Begum	Robiul Alam Bari	Char Boishakhi
22002015	2	Abdul Kayum	Late Humayan Kobir	Hosnara Begum	Nobaber Bari	Char Boishakhi
31003001	3	Abul Basher	Late Mominul Haque	Ankurer Nisa	Abul Basher Bari	Mirpur
31003013	3	Aktheruzzaman	Late Montaz Sikdher	Bibi Halima	Nur Islam Sikdher bari	Mirpur
31005019	3	Monir Ahmed	Bosher Ahmed	Parvin	Monirgo Bari	Mollha Gram
31005023	3	Abdul Rahaman				Mollha Gram
31006014	3	Abul Khair	Mozammel Haque	Josna Begum		Mollha Gram
31007018	3	Md Ibrahim	Azaher Ahmed	Sokina Khatun		Forest Center
31009015	3	Md Imran Hossain	Late Abdul Motin	Rokiya Begum	Imran Bari	Ali Bazar
31011013	3	Abdul Motalab				Al Amin , BC
31012010	3	Nasir Uddin	Abdul Alim	Monowara	Nasir Master Bari	Jokhali , Bc
42007034	4	Md Hanif (Son)				4 No ward
42019001	4	Md Nur Nobi				Rasel Gram
42019003	4	Md Akter Hossain	Late Dalil Uddin			Rasel Gram
42019007	4	Md Sohid Ullha				Rasel Gram

ID	Phase	Name	Father ' Name	H/Wife Name	Bari	Location / Somaj
42019014	4	Md Jamal Uddin	Late Sofi Ullha	Roksana		Rasel Gram
42059024	4					Al Amin,CN
42059026	4	Balayat Hossain		Alo		Al Amin,CN
43007022	4	Monowara	Badu Alam			Al Amin,NC
45001003	4	Amir Hossain				Coloni Bazar Urir C
45001004	4	Jorina Begum		Late Siddiquer Rahaman		Coloni Bazar Urir
45001019	4	Krishno kumar		Monika Bala		Coloni Bazar Urir
42059004	4	Md Mosharf	Late Habib Ullha	Aliya Begum	Mosharef Bari	Al Amin , CN
31002020	3	Md Jahir Uddin	Nurul Islam	Aciya Khatun	Johir Bari	Sahabuddin somaj BC

*** Note: Absent 15 HHs, Sold and left away 12 HHs, Washed by erosion 3 HHs, Total 30 HHs.
 Surveyed Samples 476. Grand Total=506 samples

Case studies

1 Case Study on Introduction of High-Value Homestead Crops (HVHC) in Coastal Chars

Homestead agriculture and value chain development sub-component under Social Livelihood (SLS) of CDSP is the biggest and most important sub-component of the livelihood component of CDSP B(AF). Agriculture (field and homestead crops) is the main source of livelihood for the char dwellers. While Local Government and Engineering Department (LGED) is implementing a component aimed at developing homestead crops., the two partner NGOs (BNRAC and SSUS) are focusing on homestead agriculture (fruits and vegetables and value chain development. They are promoting tree (fruit and timber) nurseries operated by NGO group members and promoting planting of trees around homesteads.

Several high value homestead crops have been introduced by NGOs through establishing demonstration plots with continuous supports from of technical assistant team of CDSP B(AF). NGOs have been supported by specialized agriculturists to HVHC implement sub-component interventions. Major interventions implemented are:

- Commercial Fruit Garden Demonstration plots (20 nos.)
- Drip Irrigation Demonstration Plots (2 nos.)

The project beneficiaries have been trained through two types of trainings These were:

Training of Community Resource Persons (CRP) i.e. considering as Master Trainer Basic training for beneficiaries

Note: It is expected that each CRP will have outreach about 39 project beneficiaries selected from agriculture (both field crop and homestead vegetable interventions), poultry and livestock inter interventions including fisheries (aquaculture).

Establishment of Drip Irrigation system Demonstration at in the field

Drip irrigation system is considered an efficient watering method that reduces **water** usage significantly and, at the same time, it helps plants grow better. It conserves water and fertilizer by allowing water to drip slowly. It is considered one of the most efficient and effective irrigation methods than traditional ones. Demonstrations on drip irrigation have been carried out to show farmers' crops and technologies that were new to the char dwelling farmers. Only inputs related to the interventions provided organized in clusters with signboards for a maximum visible impact. CDSP B(AF) funded two drip irrigation demonstrations which were organized by two partner NGOs-SSUS and BRAC.





Production of vegetables (Bitter Gourd) using drip irrigation by Nurunnabi, Boyer



Production of vegetables (Colliflower) using drip irrigation by Nurunnabi, Boyer



Production of vegetables (Green Chilies) and cauliflower using drip irrigation by

The components/equipment of drip irrigation

The major components are:

- Water tank (1)
- An electric/solar pump (1)
- Drip irrigation pipes (sizes 6 ml, 8 ml and 10 ml)
- An auto controller (if needed to automate)
- Fittings and drip nozzle, and sprinklers
- Pressure gauge
- Laterals
- Micro-tubes



Basic Operation and Maintenance

Drip irrigation can be set to run automatically, like sprinklers, or controlled manually. Manual operation allows to take advantage of rainfall before applying unnecessary water.

The cost of a drip irrigation system varies depending on the size of the area to be irrigated and the type of emitters and tubing used. However, regardless of the size of the area being irrigated there is an initial upfront cost for standard items such as the valve, pressure regulator, and backflow preventer. CDSP B(AF) experienced that to operate 640 seedling points/Mada costs about Tk. 40,000 where the pipes could be used for at least 10 years.



Benefits of drip irrigation

- Drip irrigation helps to improve plant health by delivering water and nutrients directly to the roots.
- It Helps to reduce soil erosion and runoff by delivering water slowly and evenly to the roots.
- Drip irrigation helps to reduce water waste by delivering water only to the roots of plants.
- It also helps to reduce labor costs by eliminating the need to water plants by hand.
- It helps to improve crop yields by delivering water and nutrients directly to the roots.
- It helps to reduce the risk of crop loss due to drought by delivering water directly to the roots.
- It can help to reduce the risk of crop loss due to floods by delivering water slowly and evenly to the roots.

Feedback on demonstration of drip irrigation

The operating farmers provided their feedback in terms of very useful in the context of coastal char context. The following feedbacks have been received from the farmers who have been engaged with drip irrigation demonstration supported by partner NGOs: SSUS and BRAC.

- There have been less attacks of harmful pests in the homestead vegetable and other field crop.
- The reduction of water loss due to drip irrigation was very helpful in cultivation of vegetable of Sorjon plots. Especially, in the case of Sorjon plots drip irrigation was very helpful due to controlled

water use. The farmers did not face any loss of crops and vegetables due to longer period of drought.

- The have no problem during drought and sunny days due to controlled water supply to the roots.
- It helped them in reducing leaching of water and nutrients below the root zone.

2 Case Study on Production & Use of Organic Fertilizer – Vermicompost to Enhance Soil Health

Homestead agriculture and value chain development sub-component is an important sub-component of the livelihood component of CDSP B(AF). Agriculture (field and homestead crops) is the main source of livelihood for char dwellers. While LGED is implementing a component aimed at developing homestead crops., the partner NGOs is focusing on homestead agriculture (fruits and vegetables and value chain development. They are also promoting vermicompost orientation and demonstration plant operated by NGO group members and promoting production of vermicompost which is easy to produce and that benefits to reduce the salinity of coastal areas.

Hundreds of vermicompost and quick compost demonstration plots have established through input supports in the form of cemented rings to encourage commercialization of vermicompost production and marketing. Major interventions implemented are:

- Establishment of vermicompost plants (1000)
- Quick compost demonstration plots (200)

Establishment of vermicompost plants

Introduction

Project is encouraging project beneficiaries to produce and use organic fertilizers. The nutrients in organic fertilizers, including nitrogen, phosphorus and potassium, are released when soil organisms such as beneficial bacteria and fungi break down the fertilizer's pellets.

A total of 550 group members or char dwelling family members have been trained. A total of 550 technology demonstrations have been organized with small inputs and a signboard to promote new technology. Organic fertilizers are produced entirely of natural raw materials of plant or animal origin.

Rationale of vermicomposting

Vermicompost is the most common organic fertilizer. Vermicomposting is the scientific method of making compost, by using earthworms. Earthworms are generally found living in soil, feeding on biomass, excreting it in a digested form. Earth Worms breath through their skin. A worm can eat about half of its own weight in food scraps every day. Eight breeding worms can become 1,500 worms in 6 months.

Box-1: Easy Steps for Vermicomposting

Step-1: Cut all wastes e.g. organic waste, straws, fruit peelings, green kitchen waste etc. into small pieces and cubes. Add 50% cow dung by volume of waste cuts. Keep those in shade (free of sunlight) into a bamboo mat or polythene mat for two weeks

Step-2: Place RCC rings/bins in cool and put brick or stone chips in the bottom and put sand about 3-inch depth over the stone chips.

Step-3: Put all cut-pieces of organic waste mixed with cow dung. Add little water.

Step-4: Put 100-120 earthworm over the mixed waste and then put lead over the waste. Put some this over the ring to protect from sunlight. Earthworms do not like sunlight. They like to crawl in dark.

Step-5: Put always some water when compost becomes dry and maintain 60% moisture. Normally you need to put water every 2-3 days interval.

Step-6: Vermicompost will be ready for use 8 to 12 weeks of time.

Step-7: Sieve the vermicompost through a sieving net and use in crop field and garden mixed with some soil.



Vermicompost plant of Ms.
Nurun Nahar, Ali Bazar, BRAC



Vermicompost plant of Ms.
Parul Begum, Char Jatra,



Vermicompost plant of Ms.
Parul Begum, Char Jatra,

Outcome and impact of vermicompost as per feedback by farmers

- Farmers experienced faster rate of seed germination and rapid growth of seedlings and they are getting better production use of vermicompost
- Water holding capacity improves when vermicompost is used repeatedly into crop field,
- Use of vermicompost significantly reduces growth of weeds (nearly 50%)
- Less attack of pests and diseases due to use vermicompost.
- Farmers getting 30% to 40% more production than before due to use of vermicompost.
- Use of vermicompost reduces salinity and this is very important for the soil in coastal char land where salinity is very high
- Production increases due to use of vermicompost
- Taste of fruits and vegetables becomes very tasty
- If vermicompost is used for fruits and vegetables then these can be stored for 6 to 8 days and in case of chemical fertilizer, produces can be stored for maximum 3-4 days.
- They get higher number of fruits per plants and in vegetable crops when use vermicompost

Conclusion and ways forward

Demonstration of vermicompost plants has been proved to be relevance and effective in the context of newly unfertile coastal char land areas. Case studies reveal that vermicomposting plants have a significant contribution to household income of char dwellers. In couple of cases, it is found that income from vermicompost become 2nd and 3rd source of HH income.

Case study also reveals that cow dung is the main input for vermicomposting. Microfinance loan from NGOs revitalizes cow rearing as an important IGA. NGOs are encouraging their borrowers for installation of vermicomposting plants as profitable IGA. Cow rearing is now more feasible and safer than ever before as local paravets trained by CDSP B(AF), are providing their services in a very cheaper rate.



Vermicompost plant of Ms. Nurun Nahar, Plant built with a support of Tk. 6000 by BRAC, partner NGO of CDSP B(AF)



Vermicomposting Plant

It reveals that in most cases the farmers themselves are producing vermicompost for their own use. Many farmers used to sell vermicompost to the local markets @ Tk. 15-20. Couple of farmers are producing vermicompost commercially i.e. 100% sold to the markets. Study reveals that in couple of cases, it is found that income from vermicompost become 2nd and 3rd source of HH income.

3 Case Study on Tricho Compost – An Ideal Organic Fertilizer cum Organic Pest Control Liquid

Introduction

Tricho-compost is the material that results when spores of a beneficial fungus, *Trichoderma* sp. are used in the composting process. *Trichoderma* sp. are natural competitors against a wide range of harmful fungi; when it is added to compost, the latter can then work as an anti-fungal agent to protect crops in the field.



Trico Compost plants Operated by Project Beneficiaries-1. Abdul Khalekh, Madhya Ranna and Ms. Parul and Mr. Udayan

Trichoderma is a genus of beneficial fungus present in nature. It needs to be isolated from the soil in order to obtain a pure culture of *Trichoderma*. Soil samples from the root zone of plants are diluted up to 106 times in distilled water and then used as inoculum in a sterilized Potato Dextrose Agar (PDA) medium to allow the fungi to grow. From the fungi colonies in PDA growth medium, *Trichoderma* is isolated (by observing the spores/ conidia) and then put for pure culture in the same growth medium.

A higher dilution of the soil sample will lead bacterial colonies to grow in the growth medium, rather than fungi, which is not desirable. *Trichoderma* inoculum is a fresh and pure culture of *Trichoderma* sp. used in Trichoderma compost preparation. It is usually produced in a lab, where a specific *Trichoderma* species can be isolated and multiplied on a growth medium without contamination from other species of fungus.

Tricho-compost ingredients

Major ingredients are (a) Water hyacinth : 100-110 kg, (b) Cow dung : 8-10 kg (free gas), (c) Maize (banga): 500gm, (d) Poultry litter : 100-120 kg (one month old litter), (e) Nim pata : 3-5 kg, (f) Banana tree : 5-10 kg, (g) Wooden Crumber : 10-12 kg, (h) Ash : 10-12 kg, (i) Ring : 3 pcs, (j) Trico powder : 500 gm, (j) Polyethene Paper: 3-4 Gauze, and (k) Water : as required quantity.

Box# 1: Processing steps for tricho-composting

- Step-1: Selection and preparation of site
- Step-2: Collection of tricho-compost materials
- Step-3: Place the ingredients layer by layers
- Step-4: Applying tricho-vermes
- Step-5: Watering in layers
- Step-6: Cover the layers with polyethene
- Step-7: Mixing the layers from top to bottom
- Step-8: Compost collection
- Step-9: Apply compost into fields



Benefits of using tricho-compost organic fertilizer

- Tricho-compost keeps soil health in good condition and enhances soil quality through enriching its fertilising capacity
- It increases water-retention capacity of soil
- Tricho-compost destroy fungus exists in soil and protects soil from harmful fungus
- Tricho-compost helps in reducing salinity and acidity existing in soil through micro-organic reactions
- In many cases it helps to diminishes residuals of chemical pesticides remaining in soils
- Tricho-compost does not harm environmental environments and it is always environmental free.
- Like traditional compost, it improves soil structure, improves water holding capacity, can help regulate soil pH, and can assist with soil temperature maintenance
- Tricho-compost organic pest control works as a natural antifungal agent against harmful fungi (Pythium sp, Sclerotium sp, Phytophthora sp, Rhizoctonia sp, Fusarium sp, Botrytis sp, Sclerotinia sp which are mostly responsible for soil born disease and fungal wilt
- Because of the inclusion of poultry refuse, Tricho-compost provides resistance against bacterial wilt and nematode infestation
- Tricho-compost is the material that results when spores of a beneficial fungus, *Trichoderma* sp. are used in the composting process. *Trichoderma* sp. are natural competitors against a wide range of harmful fungi; when it is added to compost, the latter can then work as an anti-fungal agent to protect crops in the field

4 Case Study on CDSP's supports to enhance inland fisheries in Coastal Chars

Introduction

CDSP B(AF) areas are fortunate enough in having rich inland and open water capture fisheries with aquaculture potential. This plays an important role in the development of the agricultural economics, nutrition, employment generation, protein intake, poverty alleviation, and improvement of socio-economic condition of poor char dwellers. In coastal areas. Most of the water resources in the CDSP project area are suitable for fish culture. There are more than 14,000 ponds having areas of 1,680 hectares in Noakhali and 500 pond having areas of 417 hectares. in Chattogram (Sandip part).

Major problems faced by the pond fish farmers of CDSP are low-quality fish seed, lo-quality fingerlings, lack of proper technical knowledge for pond management leading to poor harvesting, ponds becoming dry during dry season, and low profit from fish culture.

Establishment of Hatchery with Technical Assistant

To meet local demand for quality fish spawn/seed two hatcheries have been established and a financial grant @Tk. 500,000 foreach hatchery mobilized through two partner NGOs (SSUS) and BRAC)) to two private hatchery owners. These were:

- Tanisha Fish Hatchery, Jubayer Bazar, Char Mojid, Subarna Char, Noakhali and supported by partner NGO: BRAC. It is built in an area of area of 12.96 ha having 26 ponds. Currently, it has about 300 kg of brood fish (
- Shouva Fish hatchery, Hazari market, Urir Char, Supported by partner NGO: SSUS. It is built in an area of 3.3 ha having 9 ponds.



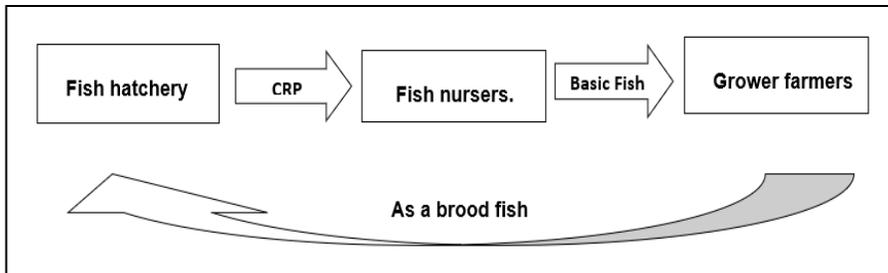


The grant money is from CDSP LGED Livelihood part. Tanisha Fish Hatchery has received BDT 0.5 million through signing an agreement with BRAC and SSUS. The grant was for hatchery structural development, operational inputs such as hormone (PG), brood fish (both male and female).

Provision of training for project beneficiaries

The training materials have been developed on hatchery management, pond fish culture, maintaining density of fingerlings, water quality, and pond management, new technologies like rice-fish, vegetables cum fish culture in Sorjon methods. CDSP provided training on hatchery operation that describes the supply chain of spawn from hatchery to grower farmers. (Refer to Diagram No. 1 below)

Diagram No. 1: Supply Chain of Spawn



Expected Outcome

Expected impact on production of fish spawn from the hatchery would be next four years has been shown in the table below:

Table No. 1: Impact Projection on Spawn, Fingerlings and Fish Production

Sl No.	Description	Production target					Remarks
		1st year	2nd year	3rd year	4th year	Total	
1	Spawn (Kg)	120	180	240	300	840	150 fish nurseries will be benefited
2	Fingerling (No.)	12 million	18 million	24 million	30 million	84 million	14,000 fish farmers will benefit.
3	Fish production (Metric ton)	5,500	6,500	7,500	8,000	27,500	1680 hectares of water bodies will come under fish farming.