Master File
On
Polder 30
Blue Gold Program
Khulna

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Khulna

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Acronyms

BADC	Bangladesh Agriculture Development Cooperation
BARI	Bangladesh Agriculture Research Institute
BINA	Bangladesh Institute of Nuclear Agriculture
BRRI	Bangladesh Rice Research Institute
BWDB	Bangladesh Water Development Board
CO	Community organizer
DAE	Department of Agriculture Extension
DAM	Department of Agriculture Marketing
DLS	Department of Livestock Services
DoC	Day Old Chick
DoF	Department of Fisheries
FAO	Food and Agriculture Organization
FFS	Farmer Field School
FFSO	Farmer Field School Organizer
FGD	Focus Group Discussion
HYV	High Yielding Variety
IRRI	International Rice Research Institute
KII	Key Informant Interview
KU	Khulna University
LCS	Labor Contract Society
MFI	Micro Finance Institute
NGO	Non Government Organization
SaFaL	Sustainable Agriculture, Food Security and Linkage
UP	Union Parishad
UZ	Upazila
WFC	World Fish Center
WMA	Water Management Association
WMG	Water Management Group
WMO	Water Management Organization

1. Introduction

The Blue Gold Program establishes and empowers community organizations to sustainably manage their water resources and based on their priorities, delivers the services for which those community organizations have expressed a demand.

Overall objective of the Program is:

"To reduce poverty by creating a safe living environment and a sustainable socio-economic development for 150,000 household living on the 160,000 ha of polders."

1.1 About the master file

Master file is an official document of Blue Gold Program. It contains all polder related information's which can be used for any source of information. All Blue Gold people can use the master file for their activities and it will be help to clear Component – 4 modes of activities.

The purpose of this master file is to provide all the necessary information for the polder 30 to design component-04 strategy including polder development plan (PDP), Value chain identification, analysis and value chain development considering the local context. This master file provides a sound understanding the opportunities and existing practice of the producers, HHs present status, production system, input and output market situation, infrastructures, communications, geographical location, human resources, value chain actors and their function in practice, identify the weakness of the services, scope for strengthening in the system at the polder area in a win-win situation. This master file will enable component-04 to design a program in which an optimal combination of quick wins and longer term interventions are combined.

1.2 Objective

- Prepare master file a Source of information.
- Any Blue Gold people can know about Component – 4 activities.
- If Polder development plan need any clarification then Master file will solve the understanding clearly.
- To assess present land use situation and physical features of the area.
- To collect information on soil texture, salinity, P^H value etc for land suitability assessment.
- To prepare crop calendar for each crop grown in the polder.

1.3 Data collection process

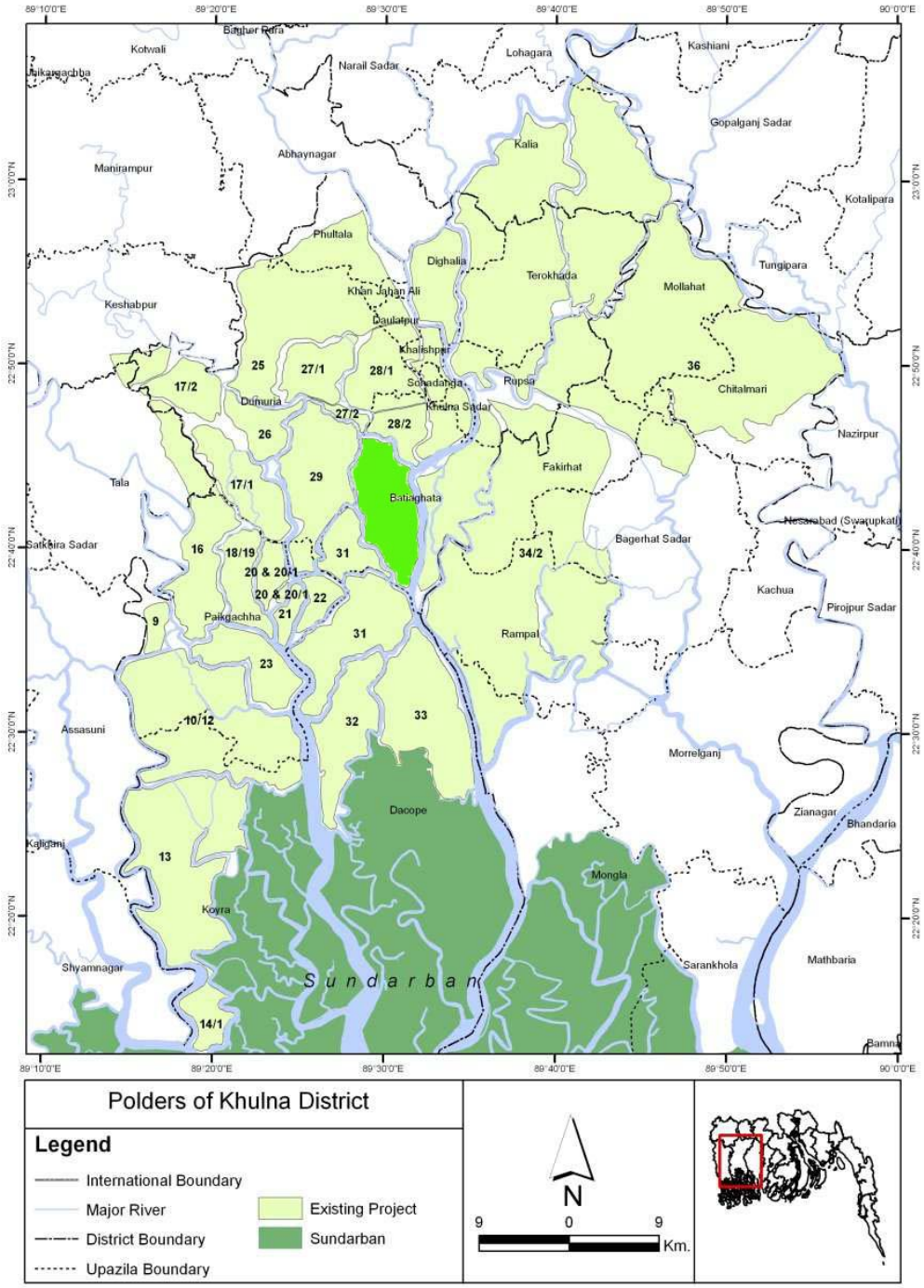
- Key Informant Interview (KII)
- Focus Group Discussion (FGD)
- Secondary data like- DAE, DLS, DOF, Union Parisad etc reports.
- Field observation.
- Market visit and,
- Validation of collected information from relevant sources.

2. Polders situation at a glance at Khulna

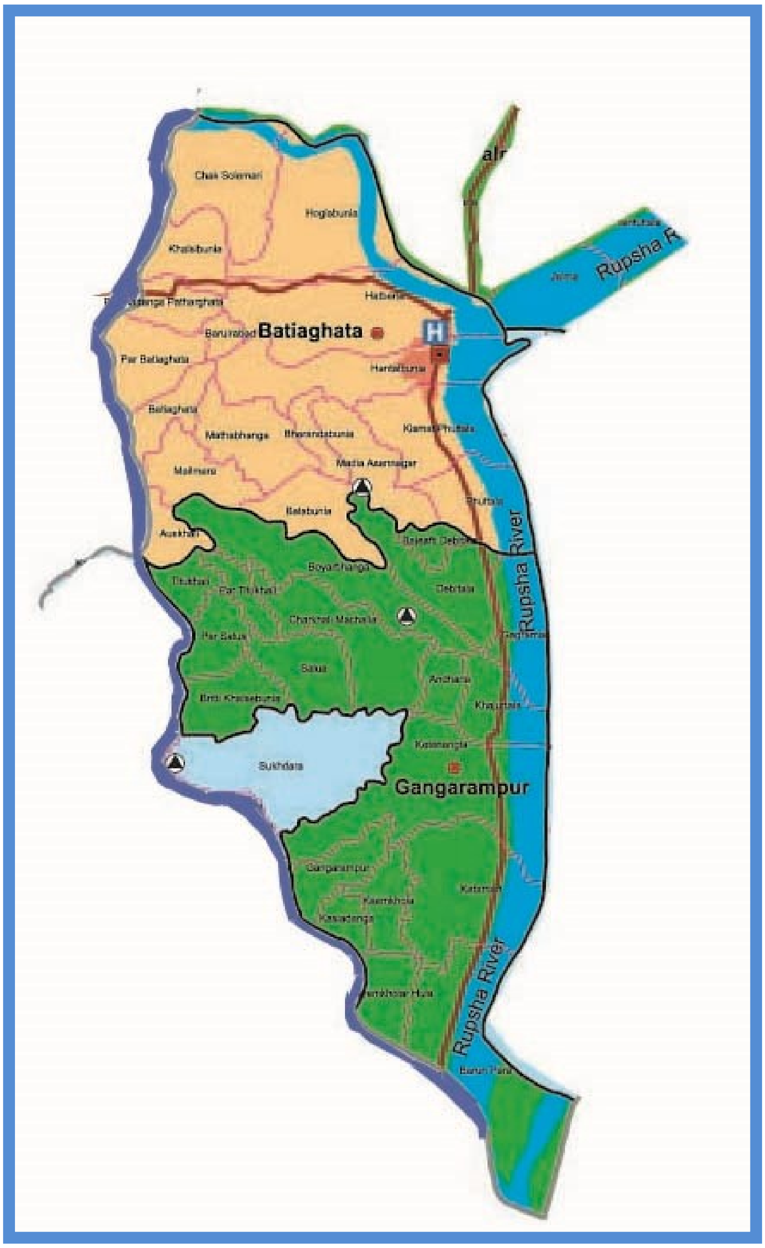
In Khulna around 20 Polder had been established in 1960-1970 by Water Development Board. While these have contributed significantly in enhancing food production in the initial decades, they are now gripped in second generation problems, both social and environmental. Major problems are……

- Siltation of river and Canals
- Week Drainage
- Water logging
- Soil and Water salinity
- Land use conflict

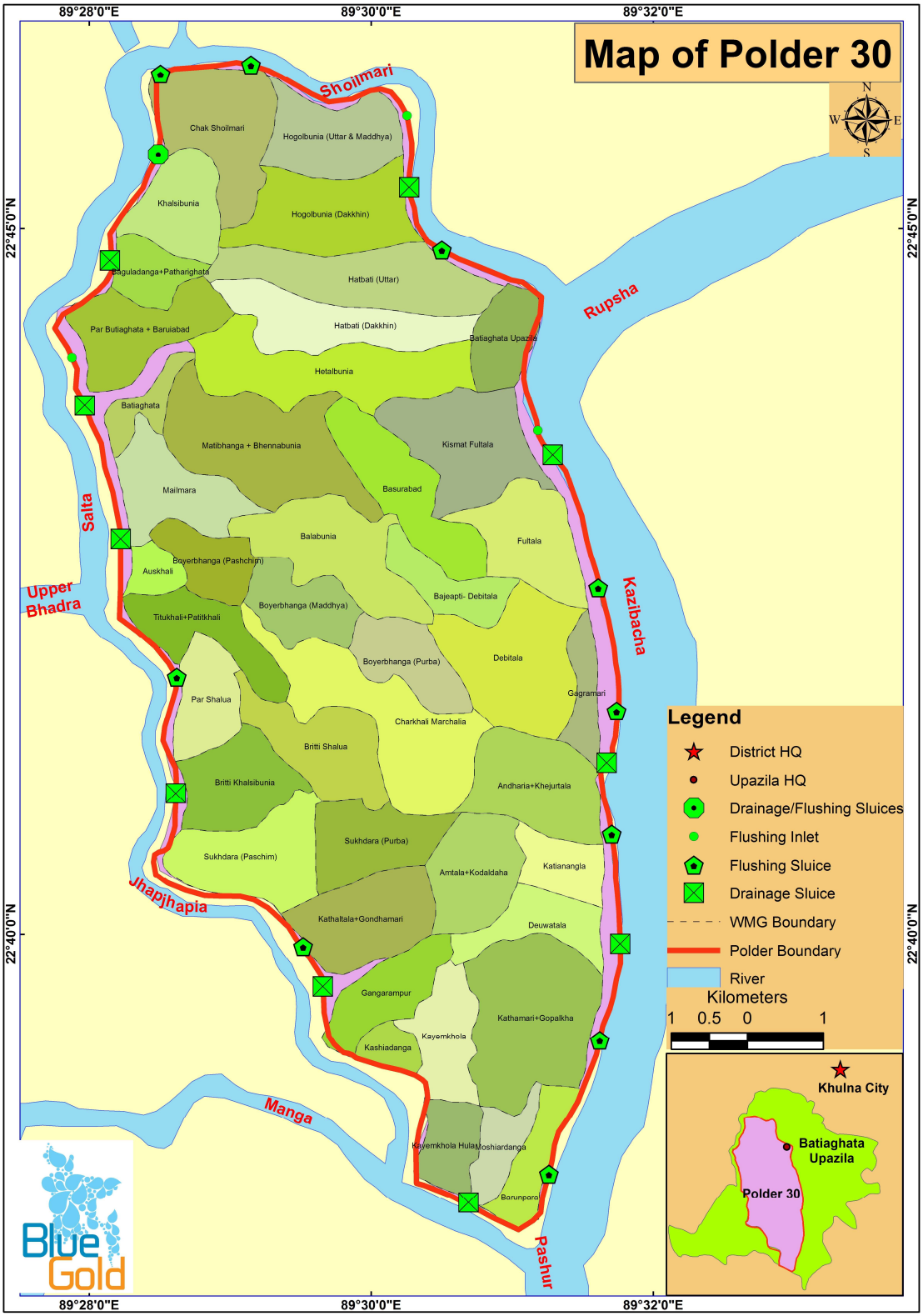
2.1 All Polder in one Map



2.2 Map of polder 30



Batiaghata
Gangarampur
Rupsha River
Rupsha River
Rupsha R



Date: 01/05/2014

3. Description of polder 30

Location of Polder 30 is-District –Khulna, Upazila- Batiaghata, Division (BWDB)- Khulna O & M Division-2

Area: Gross Area- 6396 and Net Cultivable Area is 4,048 ha

Structures:

Regulator	-	21	nos
Flushing inlet	-	03	nos
Drain channel	-	37	km
Embankment	-	40	km

3.1 Geographical location

Polder 30 lies between Latitude 22° 37'00" and 22° 46'00" North and Longitude 89° 27'00" and 89° 33'00" East. The gross area of the polder is about 6396 hectares, with a net cultivable area of 4,048 hectares. It is roughly shaped in the form of a rectangle, with the North/South axis more than twice as long as the East/West one.

The polder is generally flat, with elevations varying between Reduced Levels (RL) 1.2m and 1.9m. However, small differences can be important, especially when higher land in the form of levees occurs close to sluices or outlets.

3.2 General statistics

Administrative Units:

Polder 30 consists of 37 mouzas under 3 Unions (including a part of one Union) of Batiaghata Upazila of Khulna district; the 3 unions are Batiaghata, Gangarampur and Shurkhali (part).

a. Area:

Gross Protected Area of Polder 30 is 6396 Ha, Total Cultivable land is 4048 ha, Embankment length is 40 km, Regulator number- 21,

Flashing Inlet No.-03 and Drain Channel37 Km. Polder 30 consists of 37 mouzas under 3 Unions (including a part of one Union) of Batiaghata Upazila of Khulna district; the 3 unions are Batiaghata, Gangarampur and Shurkhali (part).

b. Climate:

Khulna is humid during summer and pleasant in winter. Khulna has an annual average temperature of 26.3 °C (79.3 °F) and monthly means varying between 12.4 °C (54.3 °F) in January and 34.3 °C (93.7 °F) in May. Annual average rainfall of Khulna is 1,809.4 millimetres (71.24 in). Approximately 87% of the annual average rainfall occurs between May and October.

Climate data for Khulna													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high °C (°F)	25.6 (78.1)	28.5 (83.3)	33.1 (91.6)	34.6 (94.3)	34.3 (93.7)	32.9 (91.2)	31.8 (89.2)	31.8 (89.2)	32 (90)	32 (90)	29.9 (85.8)	26.5 (79.7)	31.1 (88)
Average low °C (°F)	12.4 (54.3)	15.4 (59.7)	20.5 (68.9)	23.9 (75)	25.2 (77.4)	26.1 (79)	26 (79)	26.2 (79.2)	25.8 (78.4)	24.1 (75.4)	19.6 (67.3)	13.6 (56.5)	21.6 (70.9)
Precipitation mm (inches)	13.3 (0.524)	44.4 (1.748)	52.1 (2.051)	87.5 (3.44)							32.1 (1.264)	6.6 (0.26)	
Avg. rainy days (≥ 0.1 mm)	2	3	3	6	11					7	2	1	95
Source: Weather Base													

c. Natural Resource:

Land and water

LAND TYPE AND EXISTING CROPPING PATTERNS WITH % AREA COVERED

Based on depth of monsoon flood water on crop land, Types of Land are classified as High Land, Medium High Land, Medium Low Land and Low Land: The definitions of land types are as follows.

High Land: Includes all those lands which are not flooded in normal flooding situation. These lands are suitable for growing crops like Sugarcane, Banana and different fruits. Even in heavy rain situation water could not be retained more than 2-days by rising`ails`In well drained land. (0-30cm/Below 1ft)

Medium High Land: Includes all those lands which are slightly flooded and crops like Aus, Transplanted Aman or Jute are grown.
In normal flooding situation about 90cm (3ft) depft of water remains for about 2- weeks to a few months. (30-90cm/1-3 ft)
Medium Low Land: Includes those lands which are slightly deeply flooded and generally crop like broadcast Aman is grown during monsoon. But in some places Aus is also grown with it as mixed crop In flood season 90cm to 180cm(3ft to 6ft) depth of water remains standing for a few months continuously.(90-180cm/3-6ft)
Low Land: Includes those land which are deeply flooded and crop like broadcast Aman is mainly grown. But during dry season local Boro crop is grown in water logged lands. In rainy season 180cm to 275cm (6ft-9ft) depth of water remains blocked for a few months.
(More than>180cm/6ft)

There are two agro-ecological zones in the Polder namely

AEZ-11: Ganga Palal Bhumi and AEZ-13: Ganga Katal Palal Bhumi

01 AEZ-11: Ganga Palal Bhumi: This area covers 2% of the total area of the Upazila. This area is comparatively high land area. It includes a few small sized beel land areas. It includes man made filled high land also. This high land is normally not inundated but the small sized beel areas get inundated in little depth during rainy season.

02 AEZ -13: Ganga Katal Palal Bhumi: This area covers 77% of the total area of the Upazila. This area falls in all parts of the Upazilla excepting a little part in the east and in the south-west part. This area is surrounded by embankment excepting a little part in the south-east side of the Upazilla. Due to existence of embankment normally tidal water cannot enter into the area. When needed water is entered into the area with the help of Sluice gate constructed. The area outside the embankment is inundated due to tidal flow of river water and the

area inside the embankment is inundated with little depth during rainy season.

Ground Water:

For salinity problem ground water is not suitable to use in irrigation. So Shallow Tube Well (STW) and Deep Tube Well(DTW) are not established in the Polder/Upazilla for irrigation purpose.

Irrigation:

The area is river, canal and Khal surrounded area but due to salinity the water of those sources could not be used in irrigation especially in dry season. So cultivation of the area is rain dependent. Sweet water preservation for irrigation use has not yet developed. More over saline water intrusion through sluice gates by seepage is making sweet water unsuitable for irrigation. So water stored inside during dry season could not be used in irrigation.

To solve these problems canals, ponds and Khals could be re-excavated where needed to preserve river sweet water and rain water for use in irrigation during dry season. Steps should be taken so that none can use saline water in the crop field for Prawn Fish culture. This will help solve the problem of non cultivation of crops in vast area during Rabi Season.

T Aman is grown in maximum of the crop lands based on monsoon rain water. The coverage of T Aman is about 95% of the cultivable land. High Yielding Variety (HYV) is about 75% as reported by Farmers` The major one HYV is BR-23.Others are Local Varieties (LV) called BARAN (Coarse Type) in 19%. Aromatic Varieties are also grown called Benapol ,Rani Salute, Chini Kanai etc in 1% of the T Aman Crops

Second major crop grown is Sesame in Rabi season under non irrigation situation. The coverage is about 70% of the total cultivable land.

The third highest crop grown in the polder is Mugh which covers about 7.12%.

Cropping intensity of the Polder is 189% which is below national cropping intensity (191%) and it is also below progressive part of the country.

Water Management in the Polder

Main Problems

The polder was constructed to protect the area from damage caused by tidal inundation and saline water intrusion. Though the intended benefits were achieved at polderization, with the passage of time, water management problems came into view again. According to local people, there are three water management related problems in the area now:

- Drainage congestion,
- Shortage of water,
- Intrusion of saline water.

People of the polder area have been experiencing these problems on a regular basis during the last few years.

- Drainage Congestion

Drainage congestion has been reported in all the mouzas of the polder without exception. Manifold problems show up as a result of this.

It is a serious problem for T. Aman cultivation. In some areas, farmers cannot prepare seedbeds in time or the seedlings go under water and get rotten. Thus farmers often face a crisis of seedlings and they have to buy seedlings at high prices. Farmers also cannot prepare land for transplanting Aman in proper time, and delayed transplantation always means lower yield than usual. Due to this problem, T. Aman cannot be transplanted in relatively low-lying areas, and for the same reason farmers cannot go for high yielding varieties of rice, which generally are short-stem.

Transplanted paddy gets rotten if submerged for a few days, meaning that farmers may need to re-transplant. When paddy plants remain under water for long time, plants become weak and are susceptible to insect attack; according to farmers, insect attack is more in the paddy fields that suffer water logging than in others. In a waterlogged situation excessive weeds grow, affecting growth of paddy, and crabs also cut paddy plants. A natural consequence of all this is that yield turns out to be poor.

Drainage congestion caused by early rain during the Rabi season damages Rabi crops, like sesame and pulse. Flood depth does not have to be very much but, if water does not drain quickly enough, Rabi crops may suffer damage. Farmers have been experiencing heavy crop loss during last few years.
Drainage congestion brings sufferings to people in several other ways. Homesteads are submerged and mud-wall houses are damaged; communication is disrupted as roads go under water; ponds and *ghers* are submerged so that fish loss occurs; and cattle rearing becomes difficult as cattle grazing areas get submerged.

Drainage congestion also causes some health hazards. When *ghers* get submerged so that saline water mixes up with fresh water, people who come in contact with that water get skin diseases, especially itching.
There are several reasons for drainage congestion. The major reasons are:

- Most khals have silted up – some partially and some fully, and
- Most of the sluices are out of order.
- People also claim that insufficient ventage of sluices is another major reason for drainage congestion.

Many khals have been occupied by people with vested interests. Fish cultivators have made ponds by closing khals with crossdams; some farmers are cultivating paddy in khals; and some people have made houses in the khals.
Fishermen have also put *pata* (bamboo fence) in the khals for catching fish, creating obstruction to free flow of water. Some sluices, like Amtola and Kajurtala sluices, are operated by fishermen, who do it in the way it suits them; they do not see to the agricultural interests.
Drainage is also obstructed by water-hyacinth in the khals. Construction of roads has added to the problem of drainage congestion, as in many instances culverts have not been provided. Water logging in some areas is due to construction of *ghers* with mud-wall boundaries. Raising of homestead areas too has created waterlogged areas around settlement areas.

- ♣ Shortage of water

Shortage of water in most cases means deficiency of fresh/sweet water, and that mainly during the dry months of the year but it can also happen during the Aman season. Shortage of water was reported in all the mouzas of the polder.

According to local people, the most serious impact of deficiency of fresh water is felt in the Boro season. Most parts of the polder remain fallow due to lack of fresh water. Many farmers are interested in Boro cultivation but they cannot do it – presently only a small percentage of farmers can cultivate Boro and most of them do it under serious constraint.

Farmers cultivate some Rabi crops but their yields are also poor. Due to deficiency of fresh water, winter vegetables (sweet gourd, lady's finger, etc) also do not grow well.

Domestic work (cooking, washing) and bathing becomes very difficult for lack of fresh water.

For obvious reasons, women are the worst sufferers as they have to do everything to meet the demands of fresh water of all the members of household.

Culture fishery is negatively affected. As ponds and ghers start drying up, small fishes have to be caught prematurely, otherwise they die out. Fish also get affected by diseases when water reduces.

Farmers experience shortage of water also for T. Aman. For lack of fresh water farmers cannot prepare T. Aman seedbed in time. Sometimes the seedbed gets so dry that young seedlings die off so that farmers have to redo the seedbed or buy seedlings from others.

Due to shortage of water farmers cannot cultivate T. Aman on higher land beside the embankment.

Paddy plants do not grow well as they do not get the required amount of water; as a result the yield becomes poor. If paddy lacks water at its flowering stage; that affects grain formation and eventually the yield.

A major reason of shortage of water is that most khals within the polder have silted up; depth and width of khals have reduced – so they have lost water retention capacity. Parts of some khals have been turned into agricultural land, and at some locations houses

have been constructed on khals. Besides, some khals are leased by fishermen so that farmers cannot use water from those khals as they require.
Another reason for shortage of water is that most sluices are out of order so that they cannot retain water.
Some needs for fresh water could be met by ponds and tubewells. But ponds dry up during *Chaitra*, *Baisakh* and *Jaistha(March to May)*, and not all the villages of the polder have a sufficient number of tube wells.

- ♣ Saline Water Intrusion

Water in the rivers that surround the polder is saline during the Rabi season. Out of 37 mouzas in the polder, the problem of saline water intrusion was reported in 18 mouzas.
Saline water intrusion is sometimes a result of people's deliberate action, while sometimes it is not at all wanted. It goes without saying that it is not seen as a problem by the shrimp cultivators; in fact, they do everything to bring saline water in their shrimp fields.
The most serious concern of the farmers is that soil fertility is reducing day by day as an effect of saline water intrusion. The salinity effect is most strong during dry months so that yields of Rabi crops (sesame, pulse, etc) are low; even the yield of T. Aman is negatively affected. For obvious reasons, crops of the low-lying areas are easily affected.
Seeds of T. Aman do not germinate due to salinity in the soil. Seedlings in seedbeds die out/are burnt, as it were, if they come in contact with saline water or if there is a residue of salinity in the soil. Failing to produce their own seedlings, farmers sometimes have to buy seedlings from others.
Water in khals being saline, farmers cannot use it for irrigation. This is why the cultivation of Rabi crops is decreasing rapidly. Farmers cannot cultivate Boro though many farmers would be willing to go for it.
Saline water cannot be used in domestic work like cooking and washing. Farmers cannot take domestic animals for bathing in khals when water is saline because animals may drink that water and get diarrhea. Cattle feed crisis also occurs in the area - grass does not grow if soil is saline; this is why cattle rearing is decreasing in the area.

Sweet-water fish are gradually reducing in number. For the same reason trees are yielding less fruit and are even dying.

One big reason for saline water intrusion in the polder area is that none of the sluices and inlets are in good order; one or other element of structure is damaged/missing in all cases so that water control capacity is lost. Saline water enters into the area during high tides even when no one may be willfully bringing it in. Saline water also enters into the area through *chela* in the embankment (seepage) during high tides.

Another reason for saline water intrusion in the polder area is that the shrimp cultivators are bringing in saline water2; they are not considerate of farmers who do not want saline water to
come into their lands. Shrimp cultivators bring saline water into the area through sluices/inlets or through pipes placed in the embankment by them unlawfully. They also use pumps to bring in saline water from outside the embankment. 'Fishermen groups' are also leasing some khals and there they retain saline water for shrimp cultivation.

- ♣ Gender Perspective on Water Management Problems

All categories of women are aware of the water management problems in Polder 30. Women belonging to the small farm families particularly expressed their experiences in greater detail, about the deteriorating impacts of the various structures and saline water intrusion into the polder. During the past 10-12 years the cropping pattern has changed so much that it has brought about a lot of changes also in livelihood and life-styles.

Non-availability of sweet water has created severe problems for women since they are responsible for fetching water for all domestic needs, and it is often very difficult to get accessibility to potable drinking water sources. Although it is considered women's work to
fetch water for all domestic needs, it is men who decide about how to use land and water.

Women have no decision-making powers even with respect to sources of water for basic domestic use. Even at household levels, prevailing power relations between men and women
usually ensure that the water needs of women receive lower priority than those of men, although the economic contribution of women's work has significant importance to the household sustenance.

Most of the households in the area depend on khals for domestic uses (cooking, cleaning, washing clothes bathing of domestic animal etc.). Women members of the household normally do these activities, and for most of these activities, women need access to both quality and sufficient quantity of water. In some cases, women need water for some other activities like kitchen gardening, rearing of fruit bearing trees, ducks rearing etc. Women are very much concerned about water management. They also participate in agriculture directly either as agricultural labourers or as a member of a male headed farming family.

- ♣ Conflicts Arising from Water Management Practices

The most important among water management conflicts in the polder is that between farmers and shrimp cultivators. The latter do everything to bring saline water into their *ghers*, as mentioned above; they often are influential people of the area. The farmers, on the other hand, helplessly see their crops failing – being damaged or yielding poorly.

Sometimes there is contention between farmers of highland and lowland over maintaining water level in the area by operating sluices. Highlands are likely to get the required water level only after the lowland areas have attained a certain level of water, which may be too much for crops in the lowlands.

Realizing the negative impacts of saline water on soil and crop cultivation, in some areas the landowners are making concerted effort to reduce bagda (shrimp) cultivation and to increase golda (lobster)cultivation instead, for which not saline water but sweet water is needed.

It is a new situation now in the polder, especially after the WMGs have been reformed. There needs to be a well-coordinated effort to draw all the concerned parties together to deal with water management issues, in order to avoid conflict between the WMOs and the Local Government Institutions, especially the Union Parishad, over the question of leadership and the control of local resources.

Land Ownership

As in most rural areas, land is one of the most important assets in the polder area. In a rural setting, not only does it have financial importance, it also carries some social value. People with more land usually obtain more status in rural society. The survey results show that a large number of households in the polder have very little of this valuable asset. Agricultural land is most dear to the poorer section of the population – about 27% of the total households of the area do not have agricultural land, while 4% of households do not even own any homestead land.

The people who do not even have their own homestead areas have their houses/huts on khas (common) land, including the slopes/berms of embankments and roads or on some other people's land under some informal arrangements. In the latter instance, the tenants may or may not pay an annual rent but they always have to show general subservience to the landowners and have to comply with their various types of demands.

Ownership of Agricultural Land

Name of Union		Total No. of HHs	Distribution of HHs according to land ownership situation		
			No. & % of HHs not having even Homestead	No. & % of HHs having only Homestead	No. & % of HHs having Homestead & Agricultural land
Batiaghata	No.	3373	144	720	2509
	%		4	21	75
Gongarampur	No.	3677	160	870	2647
	%		4	24	72
Surkhali(Part)	No.	547	39	147	361

	%		7	27	66
Total	No.	7597	343	1737	5517
	%		4	23	73

Source: Para to Para Survey under IPSWAM Planning study,2005

Name of Union		Total No. of HHs	Distribution of HHs according to their Major Income Sources						
			Agriculture	Fish catch/ Trading	Agric Labour	Non Agric Labour	Business/ Trade	Service	Self employed
Batiaghata	#	3373	1358	262	766	452	177	235	123
	%		40	8	23	13	5	7	4
Gongarampur	#	3677	1332	188	989	464	289	286	129
	%		36	5	27	13	8	8	3
Surkhali(Part)	#	547	144	16	205	80	58	19	25
	%		26	3	37	15	11	3	5
Total	#	7597	2834	466	1960	996	524	540	277
	%		37	6	26	13	7	7	4

Source: Para to Para Survey under IPSWAM Planning study, 2005

Daily Wage Rates in the Area

As indicated in the Table below, wage rates are not the same at any point of time. In fact, wage rates are not the same for different types of work, neither are wages for any work the same throughout the year, nor are wages for any work equal in different parts of the polder at any given time. There are also clear differences between wage rates in Batiaghata Union and those in the rest of the polder; because the wage-rates shown here include those at Batiaghata Upazila

Headquarters, which are always higher than those in the remaining part of the polder.

The economic activities of the polder area being predominantly agriculture based, wage rates increase and decrease with the rise and fall in agricultural labour demand in the polder area.

During the peak agricultural periods when, for example, transplantation and harvesting of paddy take place in the months of Asar, Sravan, Bhadra, Agrahayan, Poush and Magh,(August to December) the wage rates are high. In contrast, when agricultural activities decrease, for example, during Aswin, Kartik, Falgun and Chaitra, the labour demand reduces and consequently wage rates fall. There is yet another factor that influences wage rates, that is gender. Females, though in small numbers, participate in agricultural activities. However, their wages are always Tk. 25–30 less than that paid to males for the same work, the only reason for fixing such rates being the standpoint that females are less capable of working than males.
In the rates shown here food costs (Tk. 40–50) has been included, where applicable. The rule of providing food to labourers in addition to cash payment is not uniform in the polder area. In all the villages of Batiaghata Union and in about 50% of the villages of Gangarampur Union it is customary to provide food to labourers, while in the remaining parts of the polder food is usually not provided to the labourers; in some villages food is provided only during peak agricultural periods.

d. Human resource:

Topic	Polder 30
Number of HH	9095
Total Ares	6396
Cultivable area	4048
Literacy Rate	77.7
Total Road	120 km
Road density	1.63%

Source: DAE

e. Village wise Population:

Sl. No.	Union	Village Name	Total No. of HH
1		AMTALA	354
2		ANDHARIA	134
3		AUSKHALI	72
4		BAGULADANGA	44
5		BAJEAFTI DEBITALA	84
6		BALABUNIA	210
7		BARUIRABAD	56
8		BARUN PARA	99
9		BASURABAD	225
10		BATIAGHATA	198
11		BHERANDABUNIA	99
12		BOYARBHANGA	539
13		BRITTI KHALSEBUNIA	411
14		BRITTI SALUA	98
15		CHAK SOLEMARI	110
16		CHARKHALI MACHALIA	85
17		DEBITALA	465
18		DEOATALA	322
19		GANGARAMPUR	394
20		GONDHAMARI	120
21		HATBATI (BARA)	629
22		HETALBUNIA	354
23		HOGOLBUNIA	458
24		JHARBHANGA	41
25		KAEMKHOLA	373
26		KANTHALTALA	37
27		KASIADANGA	96
28		KATAMARI	167
29		KATIANANGLA	387
30		KISMAT PHULTALA	297
31		MAILMARA	264
32		MASIAR DANGA	129
33		MAITBHANGA	171
34		PAR BATIAGHATA	147
35		PAR SALUA	240
36		PATHARGHATA	77
37		PHULTALA	262
38		SUKHDARA	662
39		TENGRAMARI	72
40		TITUKHALI	113
	TOTAL(40 Village)		9095

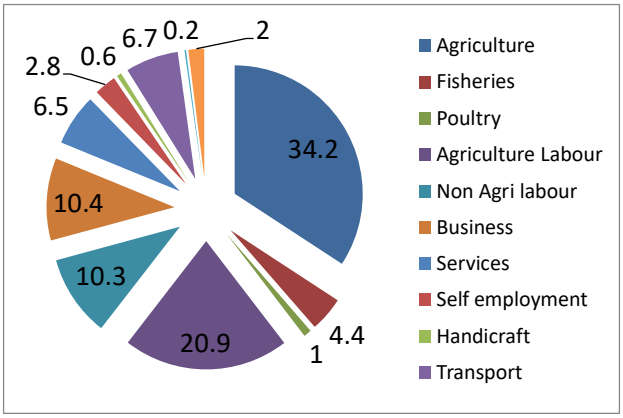
Source: Componant-1 HH Survey Report

f. Occupation:

HH Main Source of Income

	Polder Number		30
		No.	%
Household main income source	Agriculture	3111	34.2
	Fisheries	404	4.4
	Poultry	90	1.0
	Agriculture Labour	1901	20.9
	Non-agriculture Labour	940	10.3
	Business	948	10.4
	Service	588	6.5
	Self employment	258	2.8
	Handicrafts	54	0.6
	Transport	609	6.7
	Begging	14	0.2
	Others	174	2.0
	Total HH	9095	100

Source: Componant-1 HH Survey Report



g. Average HH Coasting Expenditure line item in %

Sl.#	Costing expenditure Line item	%
1	Food and Beverage	62.96
2	Clothing and Footwear	6.88
3	Gross rent, Fuel & Lighting	14.69
4	Furniture, Household Equipment & Operation	2.7
5	Medical care and health expenses	2.79
6	Transportation & Communication	2.98
7	Education, Recreation & cultural Services	3.2
8	Miscellaneous Goods and Services	3.8
	Total	100

Source: KII

h. Market Information:

Name of the Hat		Batiaghata	Mailmara	Badamtola	Boyervanga	Bot tola
Foundation Year		1976	1820	1955	1972	2000
Village		Hatbati	Mailmara	Mailmara	Boyervanga	Per Batiyaghata
Post Office		Batiaghata	Kanchan nagar	Kanchan nagar	Boyervanga	Kanchan nagar
Union		Batiaghata	Batiaghata	Batiaghata	Batiaghata	Batiaghata
Market Type		Formal	Formal	Formal	Formal	Informal
		Daily, Tues day	Daily, Monday, Friday	Daily, Sunday, Thursday	Daily, Monday, Friday	Sun/ Wedness day
		7 am- 5pm	2pm-6pm	3pm-6pm	2pm-6pm	2pm-6pm
		Wholesale/ retail	Primary/Retail	Primary/Retail	Primary/Retail	Retail
Total Market Area (Decimal)	Govt. Covered	300	25		3	
	Govt. Open	335	50		22	
	Total(A)	695	75		25	
	Pvt. Covered	50	0	10	0	
	Pvt. Open	10	0	65	0	
	Total(B)	60	0	75	0	
	Grand Total (A+B)	755	75	75	25	
Number of stalls,sheds & Shed area(in SFT)	Shed No.	3				
	Shed Area	1500				
	Agri stall	75	26	15	15	
	Non-agri	100	18	10	13	
Infrastructure		Bank, P.O., Telephone, Deain, Govt. Godown, Pvt. Godown, Toilet, School, College,Mosque, mondir	Electricity, Tube well, School	Electricity, Tube well, Bank, Mosque	Post Office, Tube well, School, Play ground	Pucca road, Semi Pucca road & Earthen road
Connectivity		Waterway, Pucca Road, Semi pucca road & Earthen Road	Waterway, Semi pucca road & Earthen Road	Waterway, Semi pucca road & Earthen Road	Waterway, Pucca Road, Semi pucca road & Earthen Road	

.Name of the Hat		Katianangla	Amtola	Amtola(Ganger Goda)	Titukhali	Boron para	Sukdara
Foundation Year		1998	1950	1925	1997	1990	1920
Village		Katianangla	Amtola	Gongarampur	Titukhali	Boron Para	Sukdara
Post Office		Katianangla	Katiananglа	Katiyanagla	Sukdara	Katiyanagla	Sukdara
Union		Gongarampur	Gongarampur	Gongarampur	Gongarampur	Gongarampur	Surkhali
Market Type		Formal	Formal	Formal	Formal	Informal	Formal
		Daily, Sat day	Daily, Tues day	Daily, Mon day, Fri day	Daily, Sat day, Wed day	Sun day	Daily, Sun/ Thurs day
		3pm- 6pm	3 pm-6pm	7 am-11am	7am-11am	3.00 pm -6 pm	12pm-6pm
		Wholesale/ retail	Primary /Retail	Primary/Retail	Primary/ Retail	Retail	Wholesale/ retail
Total Market Area (Decimal)	Govt. Covered	30	5	0	10	0	200
	Govt. Open	30	25	0	40	0	400
	Total(A)	60	30	0	50	0	600
	Pvt. Covered	10	5	10	0	0	0
	Pvt. Open	10	10	65	0	0	0
	Total(B)	20	15	75	0	0	0
	Grand Total (A+B)	80	45	75	50	0	600
Number of stalls,sheds & Shed area(in SFT)	Shed No.		0	0		0	1
	Shed Area		0	0		0	500
	Agri stall	25	22	23	13	15	10
	Non-agri	15	16	14	16	14	20
		School, Mosque	Tube well, Toilet	Tube well, Mosque	Post office, Tube well, School	Tube well & Toilet	Post office, Electricity, Tube well.
		Highway, Pucca road, Semi pucca road and Earthen road	Pucca, Semi pucca and earthen road	Water way & Semi pucca road	Water way, Pucca and Semi pucca road	Highway, Semi pucca road & water way	Water way, Pucca and Semi pucca road

Source: DAM & KII

i. Major Markets distances from Batiaghata UZ HQ to inside the polder markets and Outside the Polder markets

Sl#	From	To	Distance (Km)	Remarks
1	Batiaghata	Sonadanga	12 Km	Khulna city
2	Batiaghata	Gollamari	12 Km	Khulna city
3	Batiaghata	Baro bazaar	15 Km	Khulna city
4	Batiaghata	Rupsa	15 Km	Khulna city
5	Batiaghata	Newmarket	13 Km	Khulna city
6	Batiaghata	Koiya bazaar	14 Km	Outside Polder 22
7	Batiaghata	Boronpara	15 Km	Inside Polder 22
8	Batiaghata	Katiyanagla	13 Km	Inside Polder 22
9	Batiaghata	Amtola	10 Km	Inside Polder 22
9	Katiyanangla	Ganger par	5 Km	Inside Polder 22
10	Batiaghata	Boyervanga	10 Km	Inside Polder 22
11	Batiaghata	Badamtola	4 Km(2km from Boyervanga)	Inside Polder 22
12	Batiaghata	Mailmara	7 km	Inside Polder 22
13	Batiaghata	Gaoghora	11 Km	Outside Polder 22
14	Batiaghata	Titukhali	8 km	Inside Polder 22
15	Batiaghata	Bot tola	6 Km	Inside Polder 22

j. Market Location Map

k. Average HH Picture

Sl.#	Income source	Large Farmer	Income	Marginal Farmer	Income
1	Land size (Ha)	4.31	10000	0.80	2000
2	Vegetable garden (Dec)	5	1000	2	400
3	Pond size (Dec)	25	6000	5	200
4	Scavenging bird/Poultry farm	200-300	8000	4-5	200
5	Others				2200
	Total		25000		5000

Source:KII

3.3 General information

A. Agriculture

a) Input Market Information

Sl. #	Crop	Number of Input Seller					Remarks
		Batiaghata	**Sukdara**	**Mailmara**	**Katiyangla**	**Titukhali**	
1	Rice	3	3	2	1	1	
2	Sesame	3	1	1	0	1	
3	Mung been	3	3	2	1	1	
4	Vegetables	12	2	2	1	1	

Source: KII

b) Production situation

i) Major Crops (Cereals)

T. Aman: HYV (80-85%), LIV (15-20%) and Aromatic in a minor percentage of land. Varieties grown are HYV (BR-32,33,52,49,23 etc) LIV (Marij Shail, Zoto Balam , Chap Shail , Kumra goir ,Shada Mota etc) Aromatic (Benapol , Rani Slute , Chini Kanai etc).

T. Aus: grown in negligible area of land with fish. Land is not mentionable.

Boro: HYV (80-85%), LIV (15-20%)
Spices: Onion, Garlic, Chili, Ginger, Turmeric etc.
Oil Crops: Major Sesame, Mustard, Sunflower etc.
Pulses Crops: Major Mugh, Khesari etc.
Tuber Crops: Potato, Turnip, Radish etc.
Fruits: Water Melon, Banana, Jujube, Papaya etc

ii) Major Crops(Vegetables)

Vegetables: Besides different types winter and summer vegetables are grown in the Polder namely

Winter: Okra, Kohlrabi, Country Bean, Amaranthus, Brinjal, cabbage, Sweet Gourd, String Bean, Bottle Gourd, Cauliflower, Tomato, Spinach, Ridge Gourd, White Gourd, Bitter Gourd, Cucumber, etc

Summer: Elephant Foot, Indian Spinach, Dram stick etc mainly in the homestead.

iii) Major Cropping Pattern

Sl.#	Cropping Pattern	Total Net Area(ha)	%NCA
1	Sesame –Fallow- T-Aman		164.04%
2	Boro -Fallow - T-Aman		96.47
3	Mung bean- Fallow- T-Aman		94.44%
3	Okra gourd –Fallow- T-Aman		8.95%
4	Watermelon- Fallow- T-Aman		94.77%
5	Potato- Fallow- T Aman		2.06%
6	Sweet gourd –Fallow- T-Aman		8.95%

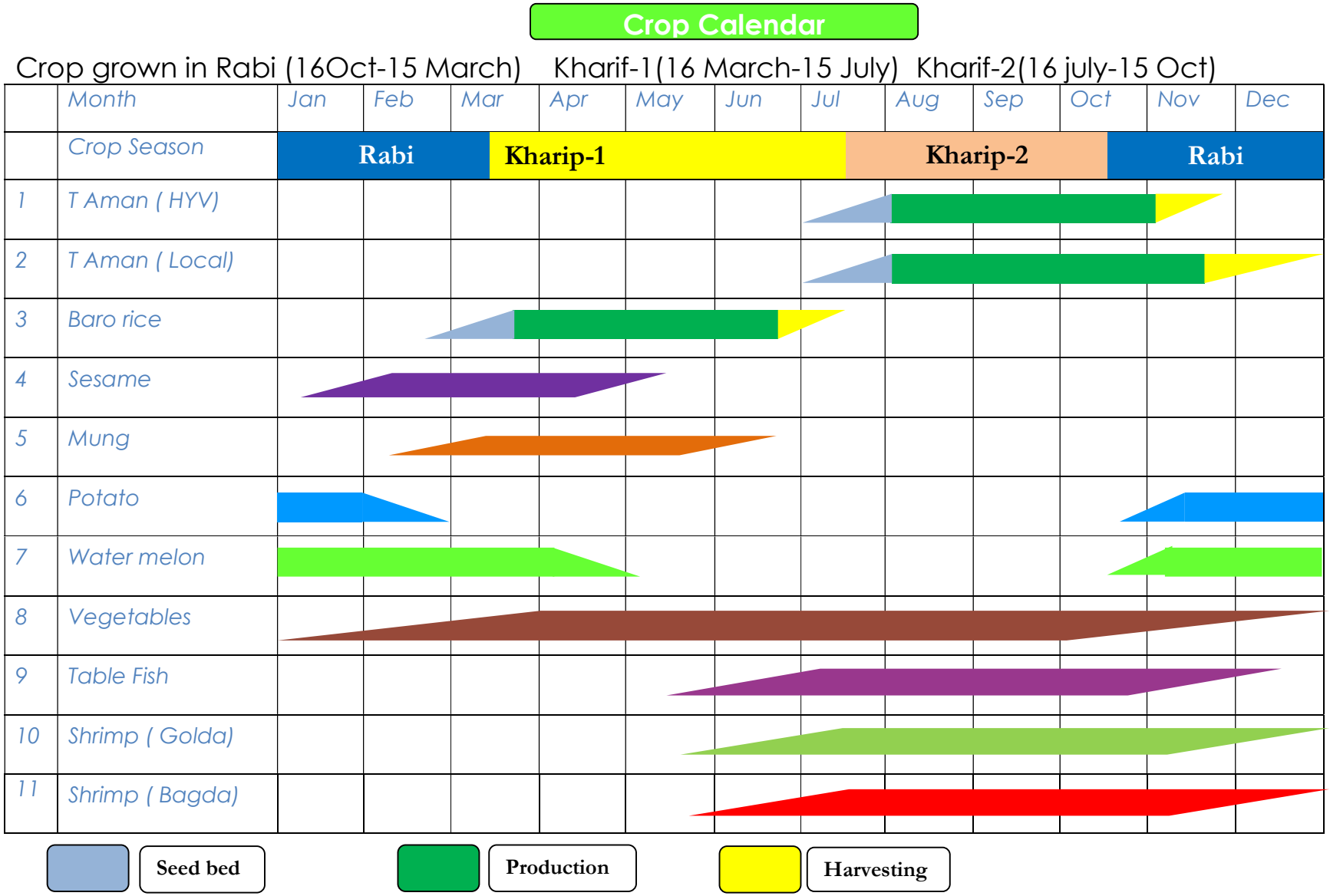
Source: Componant-2 Cropping pattern and Irrigation Water Requirement Report

iv. Average Land Use Type

Land Use Type	Average Decimal	Total Decimal
Household land	117	1063846
Homestead & Fruit Garden	13.7	124475.9
Pond & Ditch	9.3	84293.04
Cultivable land	94.0	855076.7

Source: Component -1 HH Survey Report

iv) Crop Calendar



v) Farmers Category

Type	%	Farmers No.
Land less Farmer(0-0.02ha)	36.6	3332
Marginal Farmer(0.02-0.2ha)	18.4	1676
Small farmer(0.2-1ha)	34.7	3154
Medium Farmer(1-3 ha)	8.8	797
Large Farmer(<3ha)	1.5	136

Source: DAE

vi) Household Income from Agri. Activity

Sl.#	Source of Income	%	Remarks
1	Rice	30	
2	Sesame	35	
3	Mung	18	
4	Vegetables	10	
5	Fish	4	
6	Egg/ Meat	3	
7	Others		

Source: KII & FGD

vii) Production Area

1. Field Crops:

Sl.#	Crop	Area (ac)	Area (ha)
1	T-Aman	9410 ac	3809.72
2	Sesame	6992.35 ac	2830.91
3	Mung	717.23 ac	290.38
4	Water Melon	65.16 ac	26.32
5	Boro	236.22 ac	95.66
6	Sunflower	164.95 ac	66.78

Source: Componant-2 Cropping pattern and Irrigation Water Requirement Report

2. Vegetables:

Sl.#	Crop	Area (ac)	Area (ha)
1	Okra	61.50 ac	24.89
2	Chili	32.99 ac	13.35
3	Shalgam	10.58 ac	4.28
4	Cabbage	21.99 ac	8.90
5	Bitter Gourd	56.20 ac	22.75
6	Tomato	21.58 ac	8.73
7	Pumkin	204.86 ac	82.94
8	Spinach	25.65 ac	10.38
9	Potato	34.21 ac	13.85
10	Other Veg.	4.07 ac	1.64
11	Amaranthus	1.22 ac	
12	Cauliflower	12.21 ac	4.94
13	Kholrobi	28.51 ac	11.54
14	Snake Gourd	12.21 ac	4.94
15	Ridge Gourd	89.19 ac	36.11
16	Tussle Gourd	0.81 ac	
17	Palong	6.10 ac	
18	Kat Kachu	4.07 ac	
19	Brinjal	41.13 ac	16.65

20	Bangi	27.69 ac	11.21
21	Onion	4.07 ac	
22	Long Yard Bean	12.21 ac	4.94
23	Country Bean	5.70 ac	2.05
24	Papaya	2.44 ac	
25	Bottle Gourd	0.40 ac	
26	Mukhi Kachu	0.81 ac	
27	White Gourd	0.40 ac	

Source: Componant-2 Cropping pattern and Irrigation Water Requirement Report

viii) Average Production and Gap

Sl.#	Crops	Yield (Ton/ Ha)		Yield (Gap Ton/Ha)
		Present Yield	Good Farmer Yield	
1	Rice	4.790	5.5	0.71
2	Sesame	0.958	1.376	0.418
3	Mung	0.958	1.376	0.418
4	Sweet gourd	14.38	20	5.62
5	Okra	8.5	14	5.50
6	Brinjal	15.9	50	34.10
7	Chilli	1.37	4	2.63
8	Bittergourd	9.87	20	9.56
9	Tomoto	9.87	60	41.06

Source: KII

c) Output market information

i) Use of Market : There are Eleven market/ haat/ bazaars in the polder area, 9 Markets are formal and two markets Yet not Formal.

1. Batiaghata
2. Sukdara
3. Katiyanangla
4. Boyervanga
5. Badamtola
6. Mailemara
7. Titukhali
8. Amtola[Counsil math]
9. Amtola[Ganger goda]
10. Boron para [Informal]
12. Bot tola[Informal]

- Batiaghata hat is famous for Sesame. Rice, Vegetables, Mung, Fish and other crops and commodities are sales here.
- Sukdara is second big market in polder area. Rice, Vegetables, Mung, Fish and other crops and commodities are sales here.
- Boyervanga also a big market in polder area. This market is famous for Rice, Mung and watermelon. All type commodities also sales here.
- Badamtola Hat hat a medium size hat. Rice, vegetables, Fish and other commodities sell here.
- Mailmara hat a medium size hat. Rice, vegetables, Fish and other commodities sell here.

- Katiyanagla hat a medium size hat. Rice, vegetables, Fish and other commodities sell here.

- Titukhali, Amtola[Counsil math], Amtola[Ganger goda] are small market in polder area. Only Vegetables, Fish and other necessary commodities sell here.

- Boron para [Informal] and Bot tola[Informal] are informal market in polder area. Only Vegetables, Fish and other necessary commodities sell here.

ii) Presence of Fariya, Bapari and Agent

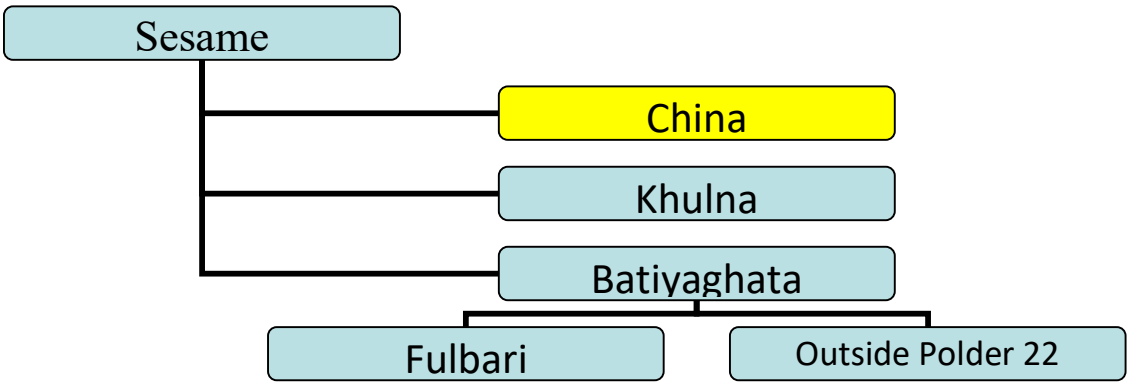
Sl.#	Crop	Market actors Number					Remarks
		Batiaghata	Sukdara	Boyervanga	Badamtola	Mailmara	
1	Rice	20	12	15	8	14	Faria/ Bepari/ Agent
2	Sesame	35	0	0	0	0	Faria/ Bepari/ Agent
3	Vegetables	45	12	10	10	15	Faria/ Bepari
4	Fish	30	10	5	4	7	Sub Depot
5	Poultry	10	4	3	3	4	Faria/ Bepari

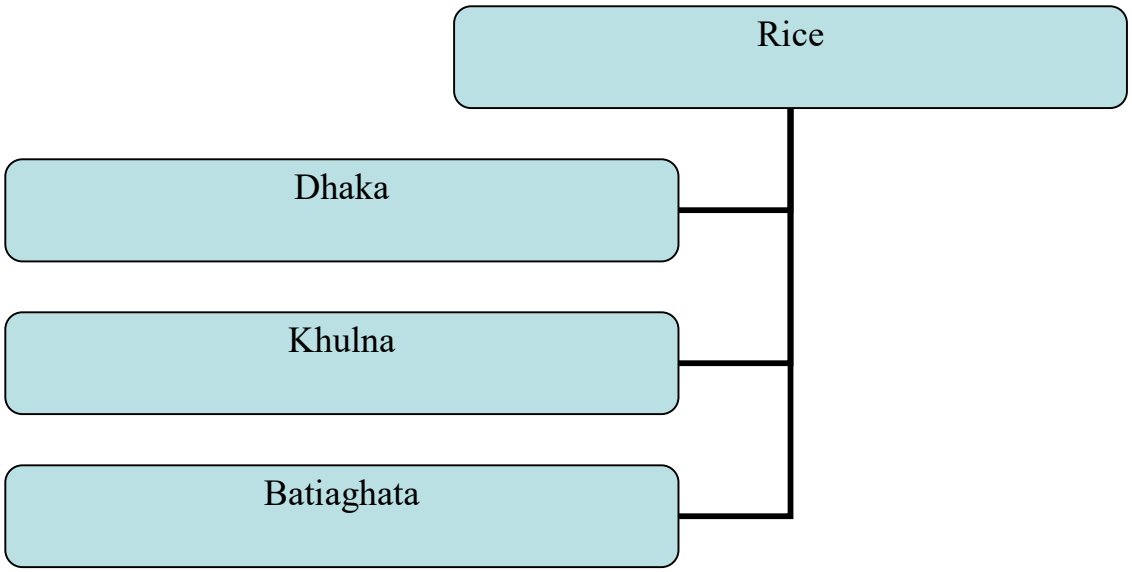
Source-KII

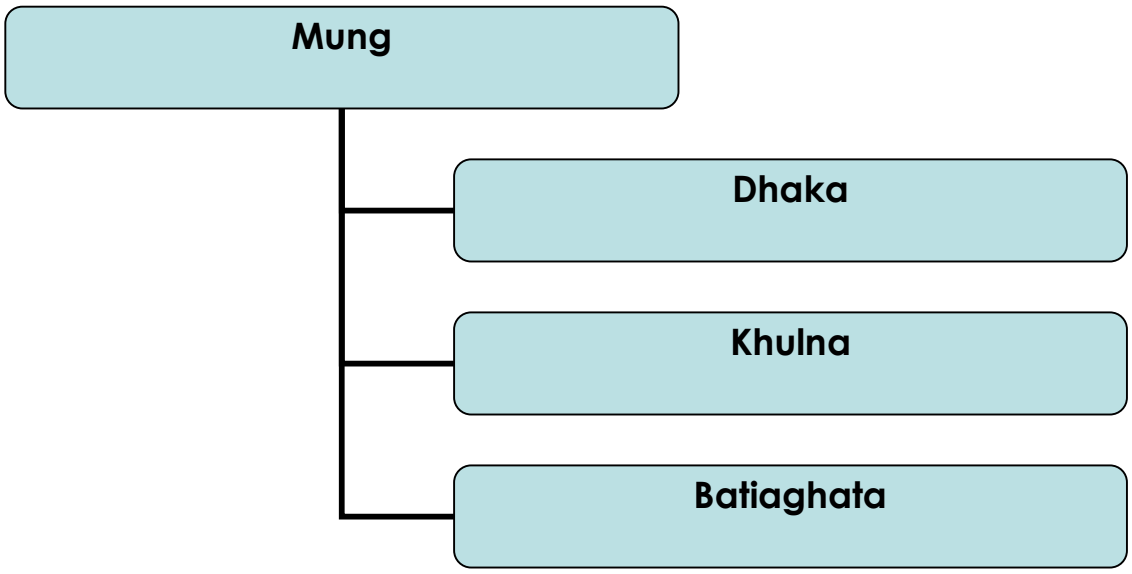
iii) Price Difference

Sl.#	Product	At Batiyaghata	At Khulna	Gross Margine
1	Rice	700 Tk/Mound	730 Tk/Mound	30 Tk/ Mound
2	Egg	6.20 Tk/Piece	6.80 Tk/ Piece	0.60 Tk/ Piece
3	Sesame	1800 Tk/ Mound	1850 Tk/ Mound	50 Tk/ Mound
4	Drumstick	45 Tk/ kg	55 Tk/Kg	10 Tk/Kg
5	Sweet gourd	12 Tk/ kg	15 k/Kg	3 Tk/Kg

iv) Market Hierarch




Rice
Dhaka
Khulna
Batiaghata


Mung
Dhaka
Khulna
Batiaghata

v) Product Sold in Polder markets

Sl.#	Product	Batiyaghata bazar	Sukdara	Boyervanga	Mailmara	Badamtola	Katiyanagla	Titukhali	Amtola
1	Rice	50%	20%	15%	5%	5%	5%	0	0
2	Sesame	100%	0	0	0	0	0	0	0
3	Egg	20%	2%	2%	2%	2%	2%	2%	2%
4	Drum Stick	20%	2%	2%	2%	2%	2%	2%	2%
5	Leafy Vegetables	15%	5%	5%	5%	5%	5%	5%	5%
6	Fish	20%	10%	5%	10%	5%	5 %	5%	5%

3.3. B. Livestock & Poultry

Bangladesh is rich in farm animal (cattle, buffalo goat, sheep, horse, pig, chicken, duck, geese & pigeon) genetic resources. The proportion of improved cattle in the country is still found less than 3% and the number of is also very low. Goat, sheep and poultry farm was established at the district level for producing improved breed and the supply of these to the farm level. The number was found still insignificant. In polder area there is a high degree of inequality for land holdings, but a low degree of inequality for livestock holdings. The distribution of indigenous breed is less unequal than the distribution of improved breeds. There is a possibility of improvement in rural income distribution with an increase in investment for indigenous livestock development. The landless and small farm holdings own the highest percentage of poultry; sheep and goats. While the medium and large farms possess significant percentage of cattle and the improved breeds of poultry. Thus, the investment in

small ruminant and poultry species will greatly help generate employment and income for the rural poor and thus improve livelihood.

Poultry:

Poultry (e.g. chickens, ducks, turkeys) rearing at the household level plays an important role in income generation and poverty reduction, particularly for poor rural women or where people lack land for crop cultivation or formal skills to participate in income earning activities. Poultry scavenge in and around farmers' homesteads, meeting most of their feed requirements in this way. Poultry contributes to household nutrition and provides income to buy food.

Moreover, backyard poultry is mostly owned and managed, and sometime traded, by women, and therefore has high potential to advance women's socioeconomic empowerment.

Understanding the poultry value chain, and the value of poultry to owners and traders, is a starting point for understanding how small-scale poultry development can contribute to household income and wellbeing. Poultry value chains describe the processes through which birds and other inputs pass during the production process, including information on the place each process occurs and on the people involved.

These value chains are affected by

(i) Reactions to market shocks, or long term trends in supply and consumer preferences

(ii) Price variations (short or longer term)

(iii) Access to knowledge and emerging technologies

(iv) Lobbies and other groups that can directly influence the dynamics of the value chain.

Other constraints:

(i) Lack of processing and preservation techniques for the extended storage life of eggs and poultry meat and for innovative value added poultry products.

(ii) Non availability of quality feed.

(iii) High cost of Feed, medicine and vaccine (generally in the

hands of the private sector) and lack of disease control facilities.

(iv) Lack of access to markets for small and marginal poultry farmers in the remote regions. And

(v) Poor quality of finished products (e.g. packaging, standards).

A growing need for protein from poultry for an increasing population, and their festivals and marriage ceremonies has led to a greater potential for poultry business in Bangladesh. Fortunately, the introduction and fast growth of broiler chicken has effectively met this increasing demand. The growing demand has been noticed particularly in the urban and semi-urban areas where people have developed their habits of eating fast foods, some of which are made from the poultry pieces. As a result, chicken, which earlier was an expensive source of protein, became adequately available at a cheaper price within the means of people from different classes. In this regard, poultry farming are considered as a profitable business to meet a huge demand of the increasing population of Bangladesh.

Outreach

This sector has also generated good employment, thus providing a means to solve the unemployment problem of the polder area. These reasons and the potential for growth have made poultry an important sector. Currently there are 200 farms in Polder 30 .

This sector has also generated good employment, thus providing a means to solve the unemployment problem of the area.

Crosscutting Issues

This sector has generated considerable employment, thus providing a means to solve the local unemployment problem. These reasons and the potential for growth have made poultry an important sector requiring careful attention and meaningful intervention. This sector has some negative influence on the environment like spread of bad smell and thus polluting the surrounding air. Hence poultry farms should be set up outside

localities. The wastes are used as fish feed achieving economy and solving the waste disposal problem simultaneously. A significant number of women are engaged in this sector, while no child labour is engaged.

Infrastructure Facilities

Except power supply, all other infrastructure facilities are adequate. Electricity is the critical factor input that remains largely unstable in Polder 30. The growth of Chicks and their survival depends on electricity and are directly hit by power cuts and failures. Road transport system is excellent for the movement of both factor inputs and final goods.

Market Description

The main target group comprises of middle, upper-middle and rich class consumers who mostly live in urban areas. Hotels, restaurants and fast food corners also comprise a major consumer segment of poultry.

The poultry sub-sector is more organized than other sectors and price is determined by demand supply mechanism. The suppliers try to form some kind of syndicate and control the market price; however the actual price depends on demand. Many of these growers have their own sales outlets and they have a direct control over supply. However, the demand fluctuates and price varies depending on market forces.

Market Demand and Growth Potential

Factors influencing supply of poultry to the market include insufficient supply of chicks, infectious diseases causing death of chickens, dry and hot weather of the region etc. Increased habituation of consumers to broiler chickens, multiple use of poultry products, substitute of local chickens, need for protein food, spread of unknown fatal diseases that causes human death (like 'Bird Flu') and rumors are the factors that influence the market demand.

High market demand and good profit margin has made this sector attractive for investors and new entrepreneurs. The high demand exists due to increased urban population consumers' need for protein, particularly chicken, depletion of other protein sources, and a change of food habit that buys broiler. The market demand is high but local production and supply is inadequate, leading to some shortages. Export potential for poultry products exists, but is not feasible at the moment due to high local demand.

The growth trend in poultry business is upward. Unless infected by unwarranted diseases, productivity and profitability are generally high. High profit margin has attracted many entrepreneurs to invest in the poultry sector.

Productivity and Profitability Measures

The growth trend in poultry business is very promising and uplifting. Unless infected by unwarranted diseases, productivity and profitability are generally high. High profit margin has attracted many entrepreneurs to invest in the poultry sector.

Value Chain

In the backward linkage of the value chain are the chicks and poultry feed suppliers and suppliers of other production inputs. The chickens are grown in poultry farms under controlled environment. Wholesale distributors and exclusive retail poultry shops are the distribution chain actors while the common consumers who buy broiler constitute the end user. There exists a clear diversity among the various actors and they play distinctive roles in the value chain.

Leadership

The poultry businessmen are more organized than other sectors and together they exercise control over the market. Many of these producers have their own sales outlets and they have a direct control over supply. However, the demand fluctuates and price varies depending on market forces. To evade competition and minimize losses as a whole, they fix and charge prices through consensus.

SWOT Analysis

The strengths of the sector include availability of chicks and medicine, availability of technical know-how, price competitiveness. Weaknesses include lack of trained workforce, insufficient supply of poultry feed, lack of investment capital and sudden deaths and unexpected spread of diseases. A number of opportunities exist for poultry including ready market for poultry products, increasing demand, change in consumer taste and preference, low investment requirement (depending on size), and high price of substitute products. In addition the sector has received support from the government as a priority sector. Threats include dependence on imported feed, frequent power failure and load shedding. Comparatively high market demand and a reasonably good price have made this business quite profitable.

i) Input Market Information

Sl. #	Product	Input Seller			
		Batiaghata	Mailmara	Sukdara	Katiyanangla
1	Poultry Feed	5	3	2	4
2	Day Old Check	5	2	2	3
3	Medicine	5	2	1	1

ii) Production Situation

❑ Poultry

Sl.#	Poultry Bird	Number	%
1	Scavenging bird folk size	1-5	15
2	Scavenging bird folk size	6-10	15.1
3	Scavenging bird folk size	11-15	6.9
4	Scavenging bird folk size	16-20	2.9
5	Scavenging bird folk size	21-25	0.9
6	Scavenging bird folk size	26-50	1.0
7	Scavenging bird folk size	51-100	0
8	Scavenging bird folk size	100+	0.8
9	No Poultry	0	57.2

Source: Component-1 HH Survey Report

❑ Livestock Owned Goat & Sheep :

Sl.#	No. of Cattle	Number	%
1	No. of Cattle	1	2.3
2	No. of Cattle	2	1.8
3	No. of Cattle	3	1.2
4	No. of Cattle	4	1.2
5	No. of Cattle	5	0.8
6	No. of Cattle	6	1.0
7	No. of Cattle	None	91.8

Source: Component-1 HH Survey

❑ Commercial Farms information

Sl. #	Subject	Number	Remarks
1	No. Of Commercial Poultry Farmer	300	
2	Average Egg Production	300	
4	Average Scavenging bird Folk size	5-6	
5	Paravet	15	

Source: KII & FGD

✠ Large Animal

		Polder	
		22	
		n	%
Big animal (Dairy & Meat)	1 big animal	669	7.4
	2 big animals	900	9.9
	3 big animals	688	7.6
	4 big animals	517	5.7
	5 big animals	338	3.7
	6+ big animals	367	4.0
	No big animal	5616	61.7
	Total	9095	100

iii) Output Market Information

Marketing channels are composed mainly of the private marketing intermediaries, virtually without any government regulations, who handle the marketing system of livestock and livestock products in Polder area. Many middlemen/traders are involved in the process of livestock marketing. The marketing of livestock and livestock products are characterized by poor and unhygienic market places, unorganized traders, absence of grading, and lack of information, seasonality in demand and price variation. The marketing of livestock products has remained underdeveloped

for a long time.

The small holders in polder 22 rear livestock produce livestock products and sell them in the weekly local markets and also district markets and bapari. Milk and egg marketing is mostly carried out in an unorganized manner. Polder dwellers sell their eggs in the weekly local markets and also district markets and bapari from inside and outside polder.

Sl.#	**Product**		**Market actor**		**Remarks**
		Batiaghata	Katianangla	Sukdara	
1.	Egg	8	3	1	Fariya / Bapari

iv) Local Paravet:

Due to the limited resources of DLS, their reach among the marginal level poultry rearing households is negligible. In polder 30 there are around 15 Paravet doing their business. Usually they are very interest in large animal but they are not interest in poultry vaccination. Government has a project name NATP. NATP has 3 trained vaccinator in polder 30. All type of vaccines are available in polder area but vaccination is not followed in an effective schedule, as a result of which, mortality due to diseases is severe among the birds.

3.3 C. Aquaculture (Fishery and Shrimp)

i. Introduction

Due to cultural heritage and lifestyle, fish has been the main source of protein for Bangladeshi people. But the ever-increasing population, gradual destruction of many water bodies and drying up of rivers (due to man-made interventions at the upstream) this major source of protein has been greatly disturbed and depleting alarmingly. In the past, most fishes were grown naturally with little human effort. However, with scarcity of supply and higher demand, fish farming is becoming a profitable industry. In Khulna fishes are cultivated mainly in ponds.

Shrimp is a very popular food item for all people in all ages in Bangladesh. The increasing purchasing power or growing population and their changing preference for shrimp have driven many entrepreneurs to get into shrimp cultivation. Furthermore, they were compelled to increase its production to serve the international market demand for shrimp. Bangladesh has succeeded in earning foreign exchanges by exporting shrimps in Europe, America and Middle East. The following analysis will explain the true potential that the SMEs who are engaged in the production of fish and shrimp.

Problems and causes:

Although the pond fish culture is a profitable venture for poor households in many areas, due to constraints like low productivity, low sales price and low investment, the table fish farmers in Batiaghata are not getting the benefits from the subsector in full. Underlying causes for these constraints are detailed in the next sections.

Problems - Pond Fish

- Low productivity
- Inferior quality fries
- High fry mortality rate
- Traditional cultivation technique followed by the farmers

- Low sales price
- Limited market access and information
- Inconvenient Quantity of Products for Sell
- Low investment
- Lack of appropriate financial package for fish farmers
- Lack of information regarding existing financial packages

Inferior Quality Fries:

The fries nursed in the nurseries of Batiaghata and the adjacent places are not off highest quality, mainly due to improper nursing technique followed. Nursery owners, sometimes, do not use proper feed and other inputs, which results in low growth of the fingerlings. The spawns they use to rear fries and fingerling are also sometimes off inferior quality. To reduce the cost of spawn, nursery owners sometimes purchase spawns produced from inbreed or from immature brood fish, resulting in slow growth rate and mortality of fries.

High Fry Mortality Rate:

A severe problem with the fries in the area is the higher mortality rate compared fish farming in other areas like Jessore. The prime reason for such problems is the inappropriate transportation of fries by the fry traders (Patilwalas). Patilwalas, due to unavailability in locality, collect fries from distant areas like Chanchra, Jessore. However, proper fry transportation technique is not followed in most of the cases. Hence, the fries become weak due to low oxygen level and die when released to the pond. At the same time, the fries are required to be habituated with the new condition for at least half a day. However, the Patilwalas, to get their payment quickly, advise the fish farmers to release the fries as soon as possible. This also results in extended mortality of fries.

Traditional Cultivation Technique Followed by the Farmers:

Fish farmers in Batiaghata have not yet adopted with the commercial cultivation techniques. Hence, with their traditional knowledge, they try to stock as many fries as possible from different species in the pond without knowing the proper stocking density and culture method. They also do not feed the fries adequate amount and quality of feed. Usage of proper aeration technique is also not done. Fries are not properly groomed before releasing to the pond. The utilization of aquachemicals is done at the minimum level. A cumulative impact results in low growth rate of fish cultured in the pond.

Limited Market Access and Information:

Table fish farmers have very little information on market, profitable customer segments and their specific demands. They do not have the link with high end market segments; rather, they sell their products to the local traders at a lower price.

Inconvenient Quantity of Products for Sell:

Apart from information, the other reason for which the fish farmers in Batiaghata are not in touch with high end market is because of their inconvenient production quantity. As mentioned earlier, the individual production is small, which is not attractive enough for high end marketing intermediaries to source fish directly from the producer. The local intermediaries accumulate smaller quantities from large number of producers, cost of which is adjusted with the price, resulting into a lower price.

Lack of Appropriate Financial Package for fish farmers:

There are some formal financial packages available for the fish farmers, e.g. packages of Bangladesh Krishi Bank (BKB). But the package is extremely inconvenient for the producers due to long

processing period and excessive formalities, avoiding which will incur under-table arrangements, resulting in increasing financial cost at availing loan. There are informal money lenders (locally known as dadonder) who offer loan for a season but farmers have to pay a high interest rate. Micro Finance Institutes (MFI) have different schemes targeting poor producers but the weekly repayment schedule creates extra pressure on poor farmers since they do not have regular weekly income. Thus, they tend to invest out of their own savings, resulting in limited investment and hence limited profitability.

Lack of Information Regarding Existing Financial Packages:

As mentioned earlier, there are some formal financial packages available for the fish farmers. Although there are problems with these packages, the fish farmers were not found aware of these. Weak linkage of financial institutes with fish farmers might be the reason behind this phenomenon.

Unwillingness of DoF and Nursery Owners to Improve Fry Transportation Technique

of Fry Traders:

Apart from the vertical buying and selling, no other relationship exists between Nurseries and fry traders. Fry traders are not willing to improve the transportation technique, and the nursery owners are also unwilling to provide with technology and information regarding improving the mortality rate through efficient transportation process.

The impact of such improvement on their business is, to a large extent, blur at this moment. DoF has the technology on improved fry transportation techniques. However, DoF lacks the resources to reach down to the fry traders regarding dissemination of knowledge on the issue.

Limited Information Passed from the DoF and Input Suppliers:

Since fish is a priority sector in government's development plan, a vital role of DoF is to provide with information regarding improved fish culture. Unfortunately, with the limitation in human resources and budgetary constraints, DoF is unable to reach with the root level fish farmers with the knowledge and information. Private hatchery owners have the required technology and resources; however, as the linkage of hatcheries is very weak with the table fish farmers, the dissemination does not take place. Input suppliers like aquachemical sellers also do not have strong linkage with the table fish farmers, as farmers are not regular customers of them.

Fish Farmers are catering only the Local Buyers and not linked with High End Customers:

Because of the inconvenient production volume and the distance, fish farmers in Batiaghata are not linked with high end market at national level. As a result, they are

selling the production to the local buyers at a much lower price. At the same time, there is no information service provider available in the locality to provide insights about profitable market segments or distribution channels. Similarly, the national market traders also are not aware of the production capacity and quality of the fish produced in Batiaghata. Hence, there is a significant gap between the local fish farmers with the national fish market.

No Facilitation Service Provider to instigate Group Formation:

As indicated, the volume produced by individual fish farmer is neither profitable enough for the producer to take it to the higher market, nor convenient for the higher market to collect directly from the producers. Formation of fish farmers groups might serve the purpose of accumulating smaller quantities into a significant volume;

however, no initiative was seen from any facilitation service provider in this regard.

Financial Service Providers Yet to Introduce Appropriate Financial Package for the

Fish Farmers:

The available packages from the FIs and MFIs are not convenient for the

small scale fish farmers. Poor producers desire a loan package for a season and to be

repaid after the harvest. However, financial institutes (FIs) do not usually consider them as creditworthy, and the MFIs want repayments in every week right after the disbursement.

ii. Outreach

Fishermen catch fish in natural water bodies during the rainy reason. Beside the traditional fishermen, commoners tend to do pond fishery in owned pond or in the ponds that are leased out to them. The annual total catch of fisheries from rivers was 6767 tons, from beel 113 tons, from flood lands 18295 tons and from ponds was 23565 tons (source: Statistical Yearbook 2000). Total number of employee including household and industrial sector of fishery for this district is 37,818 with monthly wage rate Taka 1750/month. The total production of fish was 50,914 MT, 45,326 MT and 40,306 MT for the year 2003, 2002 and 2001 respectively. However in 2002 a total number of 33,667 persons were found engaged in this sector including the household and industrial, this number was 29,939 in 2001. Hence we obviously can say that this sector is flourishing gradually.

Shrimp farm owners tend to cultivate shrimp in their own farms and sometimes in the leased farms. The total production of shrimp culture

was 71,960 MT, 74,572 MT and 77,006 MT for the year 2001,2002 and 2003 respectively. However in 2003 a total number of 4,406 persons were found engaged in this sector including the household and industrial, this number was 789 in 2002 and 763 in 2001.

Cross Cutting Issues

Fishery farms have no negative impact on the environment. The business is socially responsible. It generates employment and adds value to society in the form of supplying protein and creating profit. The workers engaged in fishery are 100% male, i.e., it is male dominated sector with no or little scope for women participation. Consequently there arises no question of wage differential.

Shrimp cultivation contributes immensely by providing people with employment opportunity in the society. The sector has no adversaries except in causing a little water pollution, which may not be regarded harmful to its people and its environment. The business is socially responsible in generating employment and providing financial support to its people. Both men and women can get actively involved in this cultivation and ensuring an equal wage for both of them.

iii. Demand Supply Analysis

Sub-Sector	Factors Influencing Supply	Factors Influencing Demand
Fishery	• High price of fish feed • Intense competition • Inadequate preservation facilities • Non availability of medicine and vaccines • Inadequate financial support	• Growing population • Increasing purchasing power • Change of preferences and taste • Availability of imported fish • Demand in overseas markets

iv. Total Production of Fish and Shrimp in Greater Khulna

Area	Production (MT)		
	2000-2001	2001-2002	2002-2003
Fish (pond) - (*Greater Khulna)*	27471	33683	40804
Shrimp -*(Greater Khulna)*	71960	74572	77006
Bangladesh			
Fish (pond)	561050	685107	NA
Shrimp	92448	97605	NA

4. Value chain :

Potential Value Chain List for Polder 30

- Sesame Value Chain
- Mung been Value Chain
- Backyard Poultry egg Value Chain
- Commercial Poultry egg Value Chain
- Broiler meat egg value chain
- Drum stick Value Chain
- Rice Value Chain
- Sweet gourd Value Chain
- Okra Value Chain
- Watermelon Value Chain
- Crab Value Chain

4.1 VC identification

Blue Gold Program
Matrix for Value Chain Selection
Component-04

Criteria →	Indicate market level (Local, District, Regional, National, International)	Growth Potential (32)					Impact (32)						Structure of the Industry (15)				Gender & Employment		Collective Action(	Risk	Total Weighted Value	Rank
Crop↓		Market Size	Unmet market demand	Potential productivity improvement	Expansion of area / capacity	Value adding to raw materials	Current production	Number of households involved	Contribution to HH income and wealth	Short or longer production/harvesting season	Food Security	Nutrition	Forward / backward linkages conducive to market based approach	Existence of service providers	Favourable business environment	Other programme interests	Involvement of women	Employment generation	Collective Action Opportunities	Major risks (No,High,Medium, Low)		
Weight →		7%	6%	6%	7%	6%	5%	5%	6%	5%	6%	5%	5%	4%	4%	2%	9%	8%	4%		100%	
Food																						
T Aman	**National**	**5**	**1**	**3**	**0**	**1**	**5**	**5**	**3**	**3**	**5**	**1**	**3**	**5**	**5**	**3**	**3**	**5**	**3**		**3.23**	**4**
Til (Sesame)	**National/International**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**3**	**1**	**3**	**5**	**3**	**3**	**3**	**3**	**1**	**5**		**3.86**	**1**
Mung bean	**National**	**3**	**5**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**5**	**5**	**3**	**1**	**3**	**3**	**3**		**3.26**	**3**
Drum stick	**Regional**	**3**	**5**	**3**	**5**	**1**	**5**	**5**	**3**	**1**	**1**	**5**	**3**	**3**	**3**	**1**	**5**	**0**	**3**		**3.12**	**5**
Golda	**District**	**3**	**5**	**3**	**3**	**3**	**3**	**3**	**5**	**1**	**3**	**3**	**5**	**3**	**3**	**3**	**1**	**3**	**3**		**3.06**	**6**
Table Fish	**National**	**1**	**3**	**3**	**1**	**3**	**1**	**3**	**1**	**3**	**3**	**3**	**1**	**1**	**3**	**3**	**1**	**1**	**3**		**1.98**	**14**
Sweetgourd	**District**	**3**	**3**	**3**	**3**	**1**	**1**	**3**	**3**	**3**	**3**	**3**	**1**	**1**	**3**	**3**	**3**	**1**	**3**		**2.44**	**11**
Okra	**District**	**3**	**3**	**3**	**3**	**1**	**1**	**3**	**3**	**3**	**3**	**3**	**1**	**1**	**3**	**3**	**3**	**1**	**3**		**2.44**	**10**
Poultry (Egg)	**District**	**3**	**3**	**3**	**3**	**0**	**1**	**0**	**3**	**5**	**3**	**5**	**3**	**5**	**5**	**1**	**3**	**3**	**3**		**2.89**	**9**
Backyard poultry Egg	**Regional**	**1**	**3**	**3**	**5**	**0**	**3**	**5**	**3**	**5**	**3**	**5**	**3**	**3**	**3**	**1**	**5**	**3**	**3**		**3.26**	**2**
Broilar	**Regional**	**5**	**3**	**3**	**5**	**1**	**0**	**1**	**3**	**3**	**3**	**5**	**3**	**3**	**3**	**0**	**3**	**3**	**3**		**2.95**	7
Bagda	**National/International**	**5**	**5**	**3**	**1**	**3**	**1**	**1**	**5**	**3**	**1**	**3**	**3**	**3**	**3**	**3**	**0**	**1**	**3**		**2.49**	12
Watermelon	**National**	**3**	**3**	**3**	**3**	**3**	**1**	**1**	**3**	**3**	**1**	**3**	**1**	**3**	**3**	**0**	**0**	**1**	**3**		**2.09**	13
Baro Rice	**National**	**5**	**1**	**3**	**3**	**1**	**1**	**3**	**3**	**3**	**5**	**1**	**3**	**5**	**3**	**3**	**3**	**3**	**3**		**2.90**	8

4.2. VC selection scoring information

A. Growth Potential (32):

1. Present Market size (7)
2. Unmet market demand (6)
3. Productivity Improvement (6)
4. Expansion of areas/capacity (7)
5. Value Addition (6)

1.Present Market Size 7			
Weight level maintain criteria (0-5)	♣ Local, regional, national, or international level of envisaged end-market has been defined, ♣ consider volume, or value of the market to compare, cereals are usually large volumes & values = 5, but scavenging eggs are low volume & value in comparison = 1,		
Score 5	Score 3	Score 1	Score 0
Sesame & T-Aman, Bagda, Baro rice	Broiler meat, Drum Stick, Mung and Golda, Watermelon, Sweet gourd, Okra	Backyard Poultry egg, Poultry Egg, and table fish	

Key information against the criteria:

- ♣ Sesame has a potential International market.
- ♣ Sesame exporters yet not fulfill foreign buyer demand.
- ♣ T- Aman has a potential national market.
- ♣ Baro has also a potential national market.
- ♣ Surplus production of Paddy in Polder 30.
- ♣ Bagda has also national and international market demand.
- ♣ Backyard poultry bird egg has local and regional market demand.
- ♣ Per house hold egg production volume is around 8 to 10 per week for sale.
- ♣ Broiler meat has local, Regional and national market demand.
- ♣ Around 300 boiler farm in polder area.
- ♣ Drumstick has local and regional market demand.
- ♣ Mung has a potential national market.
- ♣ Surplus production of Mung in Polder 30.
- ♣ Sweet gourd and okra has also local and regional market demand.
- ♣ Layer poultry egg has local and regional market demand but in polder 30 layer farm around 100 nos.
- ♣ Per farm average egg production 250 to 300 egg per day.

2. Unmet market demand (6)	
Weight level maintain criteria (0-5)	♣ Is the demand trend increasing, does the market growth by a high %? ♣ Do you recognize any potential for quick expansion; do buyers clearly seek more than the supply available? than we score this 5, ♣ Markets who only grow on the basis of population growth get 1, and market demand that is decreasing, some products get out of our diet or are replaced by substitutes =0

Score 5	Score 3	Score 1	Score 0
Sesame, Drum Stick, Mung and Golda	Backyard Poultry Egg, Sweet gourd, Okra, Broiler and Table Fish	T-Aman, Baro Rice and Water melon	

Key information against the criteria:

- ♣ Only 50% demand of sesame can meet up.
- ♣ Buyers always seek more than the supply available.
- ♣ Buyers interest in new verity (Black sesame).
- ♣ Opportunity to increase market demand by improving quality of sesame.
- ♣ India and China are major sesame export country and also Japan.
- ♣ Market growth is always high and backyard poultry egg price is higher than commercial poultry egg.
- ♣ Buyers always seek more than the supply available of backyard poultry.
- ♣ Always exist an opportunity to increase size and volume of egg.
- ♣ Egg market growth is high and demand is increasing.
- ♣ Broiler meat market growth is high and exist an opportunity to increase production.
- ♣ Polder 30 and Khulna City (Huge consumer) communication is very good and easy transportation system is available here.
- ♣ Buyers seek more than the supply available.
- ♣ Opportunity to increase market demand by improving quality of Rice.
- ♣ Rice market growth is high and demand is increasing.
- ♣ Buyers seek more than the supply available of Drumstick.
- ♣ Opportunity to increase market demand by improving quality of Mung.

- ♣ Golda & Bagda has national and international market demand.
- ♣ Watermelon has national market demand.

3. Productivity Improvement (6)			
Weight level maintain criteria (0-5)	♣ do we know of accessible technological (broad sense) improvements? ♣ If no potential to improve productivity, score =0, ♣ very limited potential (<10%)=1, ♣ Medium potential(10-19%) = 3, High potential to increase productivity (≥20%)=5		
Score 5	Score 3	Score 1	Score 0
Sesame	Backyard Poultry Egg, Layer Poultry Egg, T-Aman, Drum stick, Mung, Golda, Sweet gourd, Okra, Broiler, Baro rice, Watermelonand Table Fish		

Key information against the criteria:

- ♣ Farmers use local seeds but if they use BARI-Til-4 or BINA Til-2(Black) sesame seeds they will get 50% extra production.
- ♣ Farmers are not enough aware of fertilizer application if they use proper fertilizer application they can get 25% more yield.

- ♣ Medium potential for improve productivity. Production can be increased up to 30%.
- ♣ Producer rarely uses supplementary feed to backyard poultry but if they use supplementary feed there is an opportunity to increase productivity.
- ♣ Medium potential for improve productivity of mung. Production can be increased up to 20%
- ♣ Farmers use HYV and Local seeds but if they use certified BADC mung seeds they will get 15% extra production.
- ♣ Farmers are not enough aware of fertilizer application if they use proper fertilizer application they can get 5% more yield of mung.
- ♣ Potential for improve productivity. Production can be increased up to 50%.
- ♣ Still now farmers use to local rice verity but if they use HYV seed, there is an opportunity to increase production 40%.
- ♣ Medium potential for improved productivity of Layer egg and Broiler meat.
- ♣ Sweet gourd, okra and watermelon have also medium opportunity for improve productivity.

4. Expansion of areas/capacity (7)			
Weight level maintain criteria (0-5)	♣ If no scope to expand, e.g. T. Amman rice score =0, ♣ very limited scope (<10%) =1, ♣ Medium scope (10-20%)= 3, High potential (≥20%) e.g. winter crops where cropping intensity is still very low due to infrastructure constraints=5		
Score 5	Score 3	Score 1	Score 0
Sesame, Backyard	Poultry egg,	Table fish and	T- Aman

Poultry egg ,Broiler and Drum stick	Mung, Golda, Sweet gourd, Okra, Water melon and Baro rice	Bagda	

Key information against the criteria:

- ♣ 50% area under sesame cultivation.
- ♣ Opportunity to increase sesame cultivation land
- ♣ Around 60 % Household involved in egg production business. There is a high potential for expand due to low investment and easy to rear of backyard poultry.
- ♣ High potential for expand commercial broiler because all services and business enabling environments are available here.
- ♣ Medium potential for expand commercial poultry because all services and business enabling environments are available here.
- ♣ Need investment but services are available in Polder area.
- ♣ Need limited or no investment. 15 % area under Mung cultivation.
- ♣ High potential for expand drumstick production.
- ♣ Medium potential for expand baro and watermelon cultivation.
- ♣ Medium low potential for commercial table fish production and social and natural constrain for bagda expansion.
- ♣ 100% area under T-Aman cultivation.

5. Value Addition (6)	
Weight level maintain criteria (0-5)	♣ The potential for farmers or small or micro enterprises to add value and increase earnings locally would score 5, ♣ If it requires a much larger investment by a processor at regional level =3 or even 1, ♣ When technically there is no value addition possible =0.

	If no value addition possible, score =0, very limited chance =1 (<10%), Medium potential (10-19%)= 3, High potential (≥20%)=5		
Score 5	Score 3	Score 1	Score 0
Sesame	Mung, Golda, Table Fish, Watermelon and Bagda	T-Aman, Sweet gourd, Okra, Broiler and Baro rice	Native poultry Egg, Commercial Poultry egg and Drum stick

Key information against the criteria:

- ♣ Farmers usually dry sesame on soil floor. If they dry sesame on blue net or Pucca floor they can get 50 to 100 taka more in 40 kg sesame.
- ♣ Price of blue net is easily affordable for farmers.
- ♣ Farmers use water for sesame fermentation due to lack of Knowledge. If they aware right fermentation process they can get more prices.
- ♣ Limited opportunity for value adding in egg production.
- ♣ Opportunity for value adding in mung been.
- ♣ Opportunity for value adding in Golda, table fish, Watermelon and Bagda.
- ♣ Rice Seed production a good idea for value addition.
- ♣ Limited opportunity for value adding in sweet gourd, Okra, Broiler meat and Baro Rice.
- ♣ Very Limited opportunity for value adding in drumstick and egg.

B. Impact(32)

1. Current production(5)
2. No. of HH Involved (5)

3. Contribution to HH income(6)
4. Seasonality-Short or long harvesting season(5)
5. Food Security (6):
6. Nutrition -potential of increasing Nutrition intake (5)

1. Current production			
Weight level maintain criteria (0-5)	♣ The % of the land presently under cultivation of this crop, or ♣ The present scale (scavenging versus large broiler farms) or volume of production sets the foundation for the level of impact that can be expected. ♣ T. Aman is produced on nearly 100% of the area available =5, ♣ a crop that only commands a very small percentage of the area =1 and a crop that still needs to be introduced =0, If a crop is produced on say around 50% of land then score=3		
Score 5	Score 3	Score 1	Score 0
T-Aman	Sesame, Native Poultry egg, Commercial Poultry egg, Golda, Sweet gourd, Okra and Table Fish	Drum stick and Mung	

Key information against the criteria:

- ♣ Sesame current production only 50% land of total polder
- ♣ Opportunity to increase current production. Farmers use two chambered sesame seed variety. If they use 4 chambered sesame seed they can get 50% extra production.
- ♣ Only 56% HH rear backyard poultry and there is an opportunity to increase egg production, folk size improvement and no. of House hold.
- ♣ Around 100 HH rear commercial poultry and there is an opportunity to increase house hold and No. of Poultry.
- ♣ T-Aman current production around 100% land of total polder
- ♣ Opportunity to increase current production.
- ♣ Around 80% HH has Drum stick plant and there is an opportunity to increase No. of Plant.
- ♣ But per household production average production around 40 kg.Current production 8% land of total polder

2. Number of households involved			
Weight level maintain criteria (0-5)	♣ If less than <5% HH Involved, score =0, ♣ involvement by (5-20%) =1, ♣ by (20-60%)= 3, High potential (>60%)=5 (explanations are similar as above)		
Score 5	Score 3	Score 1	Score 0
Sesame, T-Aman , Backyard poultry egg and Drum stick	Mung, Golda, Table Fish, Sweet gourd and okra.	Watermelon , Baro rice, Broiler meat and Table fish	Commercial(Layer) Poultry Egg

Key information against the criteria:

- ♣ Around 70% household involve in sesame production.

- ♣ Small and Marginal farmers also cultivate sesame on their lease land.
- ♣ Around 65% household involve in backyard poultry egg production.
- ♣ Around 45% household involve in Sweet gourd and Okra production.
- ♣ Around 35% household involve in Mung production.
- ♣ Around 15 % household involve in Mung production.
- ♣ Around 15 % household involve in Table Fish production.
- ♣ Around 15% household involve in Golda production
- ♣ Around 1% household involve in commercial egg production.
- ♣ Around 5 % household involve in Broiler meat production.
- ♣ Around 4 % household involve in Watermelon production.

<table>
<tr><td colspan="4">3. Contribution to HH income and wealth</td></tr>
<tr><td>Weight level maintain criteria (0-5)</td><td colspan="3">♣ Consider the present versus potential contribution to HH income (contribution to yearly income as %),
♣ Score =0 (only loss making produce),
♣ very limited potential to contribution (>5%) =1 (a produce which will always be low in volume, and value despite productivity improvements),
♣ Medium potential (6-25%)= 3,
♣ High potential (>25%)=5,</td></tr>
<tr><td>Score 5</td><td>Score 3</td><td>Score 1</td><td>Score 0</td></tr>
<tr><td>Sesame and Bagda</td><td>Native Poultry Egg, Commercial Poultry Egg, T-Aman, Drum</td><td>Table Fish</td><td></td></tr>
</table>

	stick, Mung,Golda, Sweet gourd and Okra		

Key information against the criteria:

- ♣ Sesame is high potential for HH income
- ♣ HH income can be increased more than 25 % by sesame production.
- ♣ HH income can be increased more than 30% by Bagda production.
- ♣ High potential for HH income by backyard poultry egg.
- ♣ Limited income for per household but it comes regularly.
- ♣ Commercial poultry egg is high potential for HH income.
- ♣ It can be a main income source of a house hold
- ♣ T-Aman is the main source of HH income
- ♣ HH income can be increased more than 10 % by Improved T-Aman cultivation.
- ♣ Drum stick is a high potential crop for HH income.
- ♣ Sweet gourd and Okra is also potential for household income. It can be increased HH income up to 5 to 10 %.
- ♣ Mung is a cash crop. HH income can be increased more than 10 %
- ♣ HH income can be increased more than 30% by Golda production.
- ♣ HH income can be increased more than 20% by Watermelon production.

4. Short or longer production/harvesting season	
Weight level maintain criteria (0-5)	Short peak harvesting window, in combination or not of being perishable or yearlong production with regular income makes a big difference to HH

	financial situation. A product with a short critical harvesting window, moreover being a perishable product having to be sold rapidly score =0, if short harvesting period but not perishable =1, while a crop with a lengthy harvesting period say milk =3, while the permanent production like betel leaf =5		
Score 5	Score 3	Score 1	Score 0
Commercial (Layer) Poultry Egg and Backyard Poultry Egg	Sesame, T-Aman, Mung, Sweet gourd Okra, Baro Rice, watermelon and Table Fish	Drum stick, Golda, Bagda and Broiler	

Key information against the criteria:

- ♣ Sesame is not being perishable and could be store year round and farmers can sale when they want or year round.
- ♣ Backyard poultry has year round harvesting period and year round regular income.
- ♣ Commercial poultry egg has also opportunity to year round harvesting period and year round regular income
- ♣ T-Aman has a long harvesting period.
- ♣ Mung has a long harvesting period.
- ♣ Golda, Bagda and Broiler have a short harvesting period.
- ♣ Drum stick has a short harvesting period.
- ♣ Only 30 day's drumsticks are available in polder area.

5. Food Security	
Weight level maintain criteria (0-5)	♣ If no impact on food security as non-food product score =0, ♣ A food product already being produced

	locally in surplus has very limited impact opportunity =1, ♣ Medium potential for impact= 3, a food crop which regularly has to be imported to maintain food security in the area. ♣ Has high potential to impact=5		
Score 5	Score 3	Score 1	Score 0
T-Aman, Baro	Sesame, Backyard Poultry Egg, Commercial poultry egg, Mung, Sweet gourd, okra and Table Fish	Drum Stick , Watermelon ,Bagda and Golda	

Key information against the criteria:

- ♣ T-Aman Rice is mainly for consumption and main food of polder dwellers.
- ♣ Baro Rice is mainly for consumption and also main food of polder dwellers.
- ♣ Sesame mainly export product.
- ♣ Very few people consume sesame oil and its percentage is negligible.
- ♣ But it always creates an opportunity on HH incomes.
- ♣ Farmers purchase other products by selling sesame round the year.
- ♣ Backyard poultry egg production almost regularly and surplus production.
- ♣ Commercial poultry egg has regularly production and surplus production

- ♣ Drum stick production is surplus in polder area.
- ♣ Mung been has a contribution on HH food security. Farmers cultivate mung as cash crop and also surplus in polder 30.
- ♣ Sweet gourd and Okra also surplus in polder and has medium potential impact.
- ♣ Golda and Bagda has limited potential impact and also surplus production.

6. Nutrition			
Weight level maintain criteria (0-5)	Some product which is needed to ensure proper nutritional food intake, e.g. some micro elements usually in shortage should score high; If no impact possible on nutritional intake (e.g. no food crop) , score =0, very limited potential =1, Medium potential = 3, High potential =5 e.g. moringa with recognized high nutritional value.		
Score 5	Score 3	Score 1	Score 0
Backyard Poultry Egg, Commercial Poultry Egg and Drum stick	Sesame, Mung, Golda, Sweet gourd, Okra and Table Fish	T-Aman and Baro rice	

Key information against the criteria:

- ♣ Sesame is a nutritious product also but very few people habituated with sesame consumption.
- ♣ Egg is a very nutritious food. It is important food for child and women.
- ♣ Egg is a very nutritious food. It is important food for child and women.
- ♣ Rice is a main food of polder dwellers. Limited nutritious food.

- ♣ Muringa is a very nutritious food. It is important food for child and women.
- ♣ Mung is medium nutritious food
- ♣ Golda, Bagda, Sweet gourd and Okra medium nutritious food.

C. Structure of the Industry (15)

1. Forward/backward linkage and MD Approach (5)
2. Existence of Service Providers (4)
3. Favorable Business Environment(4)
4. Other program Interest(2)

1. Forward / backward linkages conducive to market based approach			
Weight level maintain criteria (0-5)	♣ Consider existence of lead firms, in either input, processing or marketing, the suitability of these actors and ease of getting them involved, will determine potential. If no potential for Market linkage or development approach, e.g. ♣ due to complete absence score =0, ♣ very limited potential =1, ♣ Medium potential = 3, High potential =5		
Score 5	Score 3	Score 1	Score 0
T-Aman, Baro rice, Sesame and Mung	Backyard Poultry Egg, Commercial Poultry Egg, Drum Stick, Bagda and Golda	Sweet gourd, Okra, watermelon and Table Fish	

Key information against the criteria:

- ♣ Sesame has very high potentiality for linkage with processors.
- ♣ Opportunity to Sesame contract farming with private company and collective sales.
- ♣ High potential for linkage with rice market actors. All types of input companies' services are available in polder area.
- ♣ Opportunity to Contract farming with BADC for rice seed production and collective sales.
- ♣ High potential for linkage with mung processors.
- ♣ Egg has medium potential for linkage with market actors.
- ♣ 3 feed & medicine sellers are available in polder area.
- ♣ 3 local egg collectors are also available in polder area.
- ♣ Potential for linkage with drumstick market actors.
- ♣ Golda and Bagda has limited opportunity to linkage with output market actors.

2. Existence of service providers			
Weight level maintain criteria (0-5)	♣ <u>Similar to above, existence and performance of public and private service providers to the value chain actors.</u> ♣ If no existence for SP, score =0, ♣ Very limited presence (1/2) =1, ♣ Medium presence (2-5)= 3, High existence (>5) =5		
Score 5	Score 3	Score 1	Score 0
Commercial Poultry Egg and T-Aman, Sesame	Native poultry egg, Drum Stick and Golda	Sweet gourd, Okra and Table Fish	

Key information against the criteria:

- ♣ One BADC dealer and 5 sub dealer present in Polder area.

- ♣ Also DAE field staffs Sub assistant agriculture officer present in Polder area.
- ♣ Local Sesame paikars, Bepari, Coiler also available in polder area.
- ♣ Around 12 paravets are present in polder area but they are mainly interest in large ruminant. But medicines are available in polder area. Farmers often get services (vaccination) from some Lead famers.
- ♣ Feed & medicine sellers are available in different markets polder 30, embedded services also available by input seller.
- ♣ DIS upazila Head Quarter situated in polder 30 and DLS field assistant also available in village lebel.

3. Favorable business environment			
Weight level maintain criteria (0-5)	♣ Consider relevant issues in the BEE. Absence of constraints or existence of support measures to doing business scores high, the extent of government involvement distorting the market could be negative. ♣ If business environment is obstructive in several ways score =0, score higher in accordance with the business environment being more developed (e.g. aquaculture standards are available) and supportive (any subsidies, high on government policy priorities) or not.		
Score 5	Score 3	Score 1	Score 0
T-Aman & Baro rice	Sesame, Backyard Poultry Egg, Drum Stick, Mung, Golda, Sweet gourd,		

	Okra , Watermelon and Table Fish		

Key information against the criteria:

- ♣ Farmers can easily sale sesame in Batiyaghata hat(Inside Polder).
- ♣ Farmers can also sale sesame at farm gate. Sometimes Bepari or Processor comes to nearest hat or village and purchase sesame.
- ♣ All types of Business enabling environment are available in polder area. All norms, low and traditions are familiar to backyard poultry , Broiler and Layer rearning.
- ♣ Farmers can easily sale Paddy in Batiaghata, Sukdara, Boyervanga, Mailmara hat etc
- ♣ Farmers can also sale Paddy at farm gate.
- ♣ Khulna city big markets situated only 12 km far way from polder so farmers also easily sales product in Khulna city.
- ♣ All types of vehicles for carrying products are available in polder area.

4. Other programme interests			
Weight level maintain criteria (0-5)	♣ The extent there is opportunities for coordination, complementary action and synergy with other local programmes. ♣ If no NGO/Orgn working in the same sector, score =0, ♣ very limited presence (1-2) =1, ♣ Medium presence (3-5)= 3, High presence (>5)=5		
Score 5	Score 3	Score 1	Score 0
Sesame, T-Aman,	T-Aman,	Backyard	Broiler and

Sweet gourd, Okra, Baro	Bagda, Golda, Sweet gourd, Okra and Table Fish	Poultry Egg, Commercial Poultry Egg, Drum Stick and Mung	Watermelon

Key information against the criteria:

- ♣ IRRI and FAO have working on sesame in polder area.
- ♣ FAO supply seeds and fertilizer but yet not provide training.
- ♣ FAO intervention only for one time and there is no follow up support available by FAO.
- ♣ IRRI and FAO also working on T-Aman and Baro rice.
- ♣ ACDI-VOCA and World Fish also working on vegetables and Table fish production. Especially Sweet gourd, Okra & Telapia.
- ♣ ACDI-VOCA working on backyard poultry.
- ♣ World Fish also working on Golda and Bagda.

D. Gender and Employment (17)

1. Involvement of women (9)
2. Employment Generation (8)

1. Involvement of women	
Weight level maintain criteria (0-5)	Focus is on the contribution to women empowerment, not just more work while they are already overburdened and only would be to the detriment of the family. Aim is to give them for example an opportunity to retain income. ♣ If no women involvement potential, score =0, ♣ Very limited potential =1, ♣ Medium potential = 3,

	♣ High potential =5		
Score 5	Score 3	Score 1	Score 0
Backyard Poultry Egg and Drum Stick	Sesame, Commercial Poultry Egg, Broiler, T-Aman, Baro rice, Sweet gourd and Okra	Mung and Table Fish	Watermelon, Golda and Bagda

Key information against the criteria:

- ♣ Women are mainly involved in Sesame drying, Cleaning and storage.
- ♣ Women are also involved in harvesting sesame but they have medium control on sesame selling money.
- ♣ Poultry rearing manly operating by women, like feeding, housing and egg selling.
- ♣ Incomes get female directly and they use it as their plan.
- ♣ Drumstick is manly operating by women and usually they have sales drumstick at farm gate level.
- ♣ Women are mainly involved in paddy drying, Cleaning and storage.
- ♣ Women also involved in Seed storage.
- ♣ Women are involved in Okra and Sweet gourd harvesting and storage Sweet gourd at Home also.
- ♣ Females involved in Fish feeding and Mung harvesting but they have limited control on money from Mung bean and Table fish.

2. Employment generation			
Weight level maintain criteria (0-5)	Labour intensity of the envisaged intervention (could be area expansion, adding value, productivity increase). Number of employment creation, the type (quality) of employment and opportune timing thereof. If no potential for employment generation, score =0, very limited potential (<5%)=1, Medium potential (5-10%)= 3, High potential (>10%)=5		
Score 5	Score 3	Score 1	Score 0
T-Aman and Baro	Backyard Poultry Egg, Poultry Egg, Broiler and Mung	Sesame, Golda, Bagda, Sweet gourd, Okra, Watermelon and Table Fish	Drum stick

Key information against the criteria:

- ♣ Usually farmers harvest their sesame by themselves and they hire labor rarely.
- ♣ Only they hire power tiller or tractor for tillage.
- ♣ Poultry rearing is Women friendly and women can easily operating this egg business.
- ♣ Backyard poultry needs low investment.
- ♣ Poor and extreme poor people can also participate in backyard poultry business.
- ♣ Usually farmers harvest their paddy by themselves and they also hire labor.
- ♣ They also hire power tiller or tractor for tillage for rice plantation.
- ♣ During paddy cultivation labor demand increases.

- ♣ Usually women harvest their mung by themselves and they also hire labor.
- ♣ During Golda and Bagda gher preparation labour needed but during harvesting labour demand is very low.
- ♣ Farmers usually produce fish for consumption and they need very limited labour for pond preparation.
- ♣ Watermelon production need labour also for land preparation and irrigation.

E. Collective action opportunities (4):

1. Collective action opportunities			
Weight level maintain criteria (0-5)	♣ Does this product lend itself to Business ideas for cooperatives, on the input or market side, and producer groups benefitting of doing these collectively. ♣ If no opportunities for collective action (working in collaboration/ as cooperatives), score =0, ♣ very limited potential =1, ♣ Medium potential = 3, ♣ High potential =5		
Score 5	Score 3	Score 1	Score 0
Sesame and T-Aman	Native Poultry Egg, Drum stick, Mung and Table Fish	Golda, Bagda, Sweet gourd, Okra, Watermelon,	

F. Risks

Key information against the criteria:

- ♣ High opportunity to collect or purchase sesame inputs collectively.
- ♣ High opportunity to contract farming of sesame.
- ♣ Also opportunity to sale collectively sesame and rice.
- ♣ Medium opportunity to collective action of backyard poultry.
- ♣ Farmers usually sales their egg at farm gate level to local egg collectors.
- ♣ Medium opportunity to collective action of commercial egg.
- ♣ Farmers generally sales their egg at nearest bazaar , some farmers sales at Khulna bazaars.
- ♣ High opportunity to collect or purchase rice inputs collectively.
- ♣ Also opportunity to sale rice collectively.
- ♣ Medium opportunity to collective action. Farmers generally sales their mung at Batiaghata, Boyervanga and Sukdara bazaar or farm gate, some farmers at Khulna
- ♣ Also opportunities to sale drum stick collectively.
- ♣ Golda, Bagda, Sweet gourd, Okra and Watermelon have limited potential for collective action.

♣ Major risks (No, High, Medium, Low)			
Weight level maintain criteria	Consider major risks for this product (the absence of risks will score green, general prevalence of risks orange, but risks with high certainty of occurrence and extremely damaging to the produce should be give red.		
Bagda	Sesame, Broiler, Watermelon, Layer egg, Sweetgourd,		

	Okra, Golda, Backyard poultry egg, Mung and watermelon		

4.3. . Opportunity and Constrains of Selective Value chain

Sesame VC

Sesame is a cash crop (90 to 100days crop) in polder 30. Farmers usually produce Brown (Red) Sesame in Polder 30. But some farmers also produce Black Sesame also. Farmers usually BARI Till-2 and now BARI Til-3 and BARI-4 are also popular. BARI Til-4 is high yielding verity. Sesame grown February to May on summer session. It needs light irrigation.

Household income can increase by sesame cultivation using modern techniques and high yielding verity. BINA Til-2 is a new verity which is similar to BARI Til-4 and its color is black. It has also short water logging tolerance. BINA Til-2 has an opportunity to introduce in polder 30.

During summer sweet water is very precious both for irrigation and also for drinking. For these reason farmers can`t cultivate other crops. Even farmers also avoid T-Aus for harvesting problems and also land preparation problems for T- Aman.

Sunflower, Maize and other field crops need more irrigation and production cost is higher than sesame. So farmers chose easy option like-sesame cultivation.

The Opportunity:

- Tremendous export potential (China & Japan).
- Present production can only meet 25% of the demand.
- Opportunity to increase production by introducing different varieties (Black Sesame, BARI -3, 4) and opportunity for horizontal expansion.
- Farmers can earn Tk 200 more by cultivating Black Sesame instead of Brown sesame per mound.

- Soil salinity tolerant crop.
- Easy to sell round the year.
- Main Cash crop and easy to store.
- Less cost intensive.

The Challenges:

- Poor drainage system and water logging one of the major constrain.
- Limited irrigation facilities.
- Farmers often use their own seeds, for using own seed for long times, seeds are suffering (inbreeding depression).
- Lack of quality seeds availability.
- Lack of Knowledge on Improved production technology , Post harvest technologies (Grading and Packaging).

Rice VC

Rice mean T-Aman(Transplanting Aman) is main crop in Polder 22. Around 100% area under T-Aman cultivation. Farmers usually use high yielding verity like BR-23, BR-28 and BR-29. Farmers also use local variety like- Ghunsi/ Ranifelot/Pattnai balam/ kachra Vutay felot. Local varieties are low yielding but water logging resistance. They are mainly deep water paddy. T-Aman production season June to December. During this season always heavy rainfall occurs. Due to heavy rainfall and temporary water logging (1-2 days) no other crops can be cultivated in polder area field. And also ensuring food for round the year, farmers produce T-Aman.

Opportunity:

- High market demand in national market.
- Main food in Bangladesh.
- Market actors are available.
- High demand of By-product.

The Challenges:

- Farmers usually use their own seeds which is creating inbreeding depression.
- Lack of knowledge and technologies particularly about the use of balanced fertilizer.
- Irrigation and drainage problems
- Pest and disease management problems
- Highly dependent on rain water.
- Unavailability of quality inputs.
- Lack of drying facilities.

Backyard Poultry Egg VC

Scavenging bird (Local duck and hen) are the main sources of protein for polder dwellers. Around 60% house hold has folk (folk size 6-10). There is available water body and land for rearing Scavenging bird. It needs small space for rear in house. And it cost is low. Polder dwellers mainly eat eggs and they also sales some egg also. They also eat Scavenging bird's meat also. This is very popular in polder area because women can earn money directly by selling eggs at farm gate level.

Opportunity:

- High demand of meat and egg.

- Easy to rear and women friendly.
- Comparatively more Disease resistant than commercial birds.
- Low investment.
- Poor people can easily participate in this business.

The Challenges:

- Lack of services for disease control and prevention.
- Malnutrition due to under feeding high cost of feed and lack of quality feed.
- Inadequate knowledge on Improve Production Technologies.
- Week linkage with Department of Livestock
- Natural calamities and intrusion of salinity.

Broiler Meat Value Chain

Broiler meat production is a potential industry in polder 30. Around 300 House hold has Broiler farms and their main income source from meat selling. Due to easy connectivity from polder to nearest big markets at Khulna, broiler industry grows very quickly. All types of inputs and services what a producer needs are available here. But drinking water for broiler are light costly for farmers in some areas.

The Opportunity:

- High demand of meat round the year.
- Nearby high demand zone.
- Existence of production cluster.
- Available Day old Chick Company and feed company retailer.
- Support services are available
- Feeds and Day Old Chicks also available in Credit.

The Challenges:

- Lack of services for disease control and prevention.
- Inadequate knowledge on Improve Production Technologies.
- Week linkage with Department of Livestock
- Natural calamities and intrusion of salinity.
- High price of poultry feed
- High price of pure drinking water for Poultry bird due to salinity problem in polder area.
- In some area Unavailability of Electricity .

Poultry Egg VC

Layer egg production is a potential industry in polder 30. Around 100 House hold has layer farm and their main income source from egg selling. Due to easy connectivity from polder to nearest big markets at Khulna, layer industry grows very quickly. All types of inputs and services what a producer needs are available here. But drinking water for layer are light costly for farmers in some area. Remote area or saline affected areas Layer farm owners always buy water from mobile water supplier, who carries out water from outside the polder.

The Opportunity:

- High demand of Egg round the year.
- Nearby high demand zone.
- Existence of production cluster.
- Available Day old Chick Company and feed company retailer.
- Support services are available
- Feeds and Day Old Chicks also available in Credit.

The Challenges:

- Lack of services for disease control and prevention.
- Inadequate knowledge on Improve Production Technologies.
- Week linkage with Department of Livestock
- Natural calamities and intrusion of salinity.
- High price of poultry feed
- High price of pure drinking water for Poultry bird due to salinity problem in polder area.
- Unavailability of Electricity

Drum stick VC

Drum stick is an important vegetable in polder area. It grows all over the polder. In every house hold has one or two drum stick plant. It is easy to cultivate and harvesting season on March to April. A mature plant can produce 50 to 80 kg. It is a nutritious vegetable. It has medicinal quality. It leaf is also nutritious but polder dwellers only eat its fruits only as vegetable.

The Opportunity:

- High demand in season.
- High nutrition and medicinal value.
- Scope to increase number of trees.
- Production cost near about zero.
- Propagation can be easily done by its cuttings.
- Fellow and roadside land can be utilized.
- Long shelf life.
- Perennial crop.

The Challenges:

- Short duration vegetables only One month selling period.
- Cannot tolerate water logging.
- Low price at farm gate level.

Sweet gourd VC

Opportunity:

- Tremendous unmet demand of Vegetables in Khulna district.
- All types of input seller present in polder area at Batiaghata.
- Opportunity to introduce new varieties and new vegetables.
- Exist huge land.
- High value of vegetables.
- Easy to sell at local and district market round the year.
- Easy market connectivity.

Challenges:

- Poor drainage and irrigation system in Polder area.
- Salinity problem in winter season.
- Lack of Knowledge on Improved production technology of vegetables.
- Numbers of input sellers are very poor in remote markets and embedded service are not always available and sometimes did not fulfill farmer's requirement.
- Lac of knowledge on Post harvest technologies. Grading and Transport, packaging.
- Low ability to investment on vegetables production.
- Unavailability of micro nutrient
- Weak market linkage

Okra VC

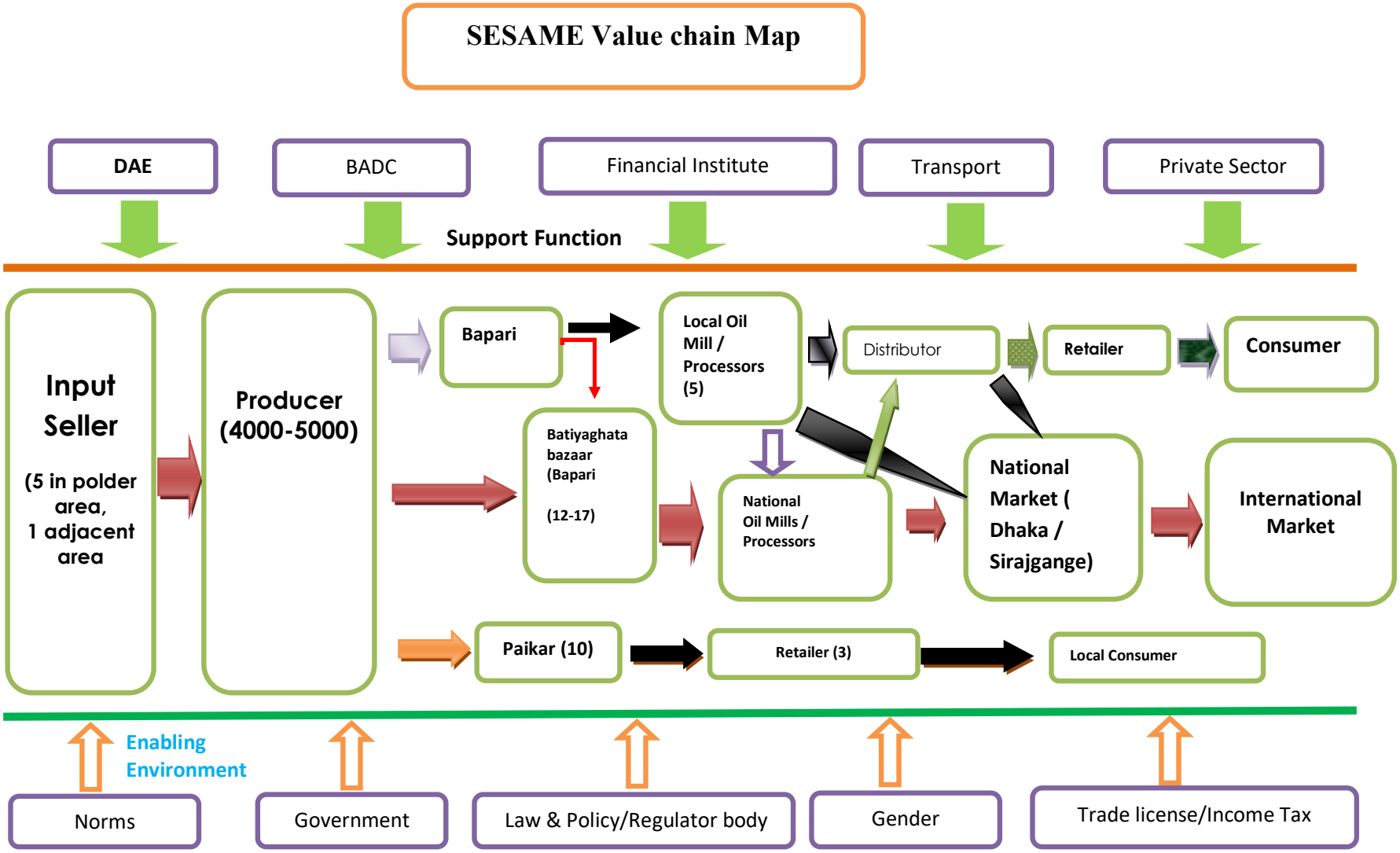
Opportunity:

- Tremendous unmet demand of Vegetables in Khulna district.
- Opportunity to introduce new varieties and new vegetables.
- All types of input seller present in polder area at Batiaghata
- Exist huge land
- High value of vegetables.
- Easy to sell at local and district market round the year.
- Easy market connectivity

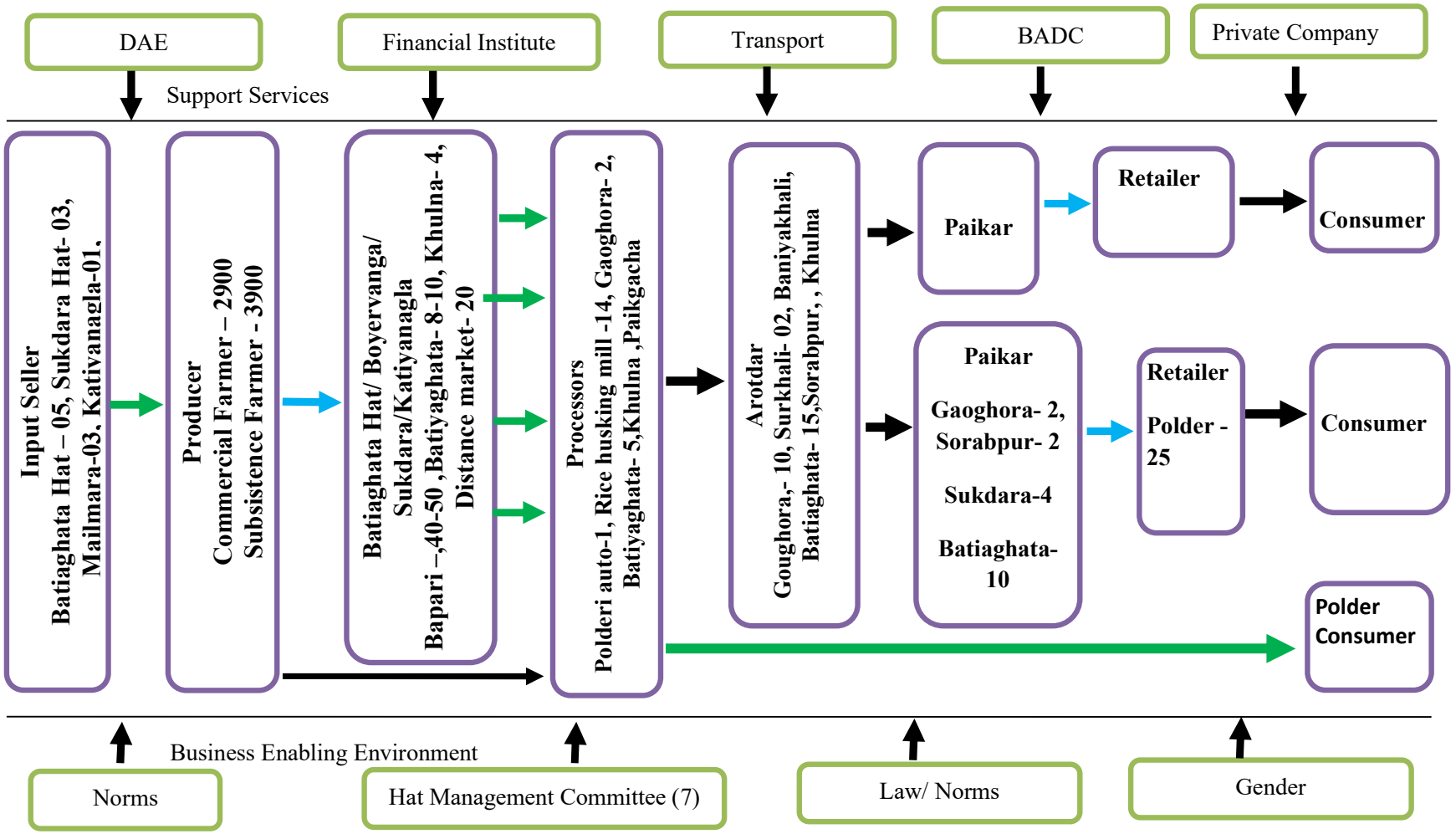
Challenges:

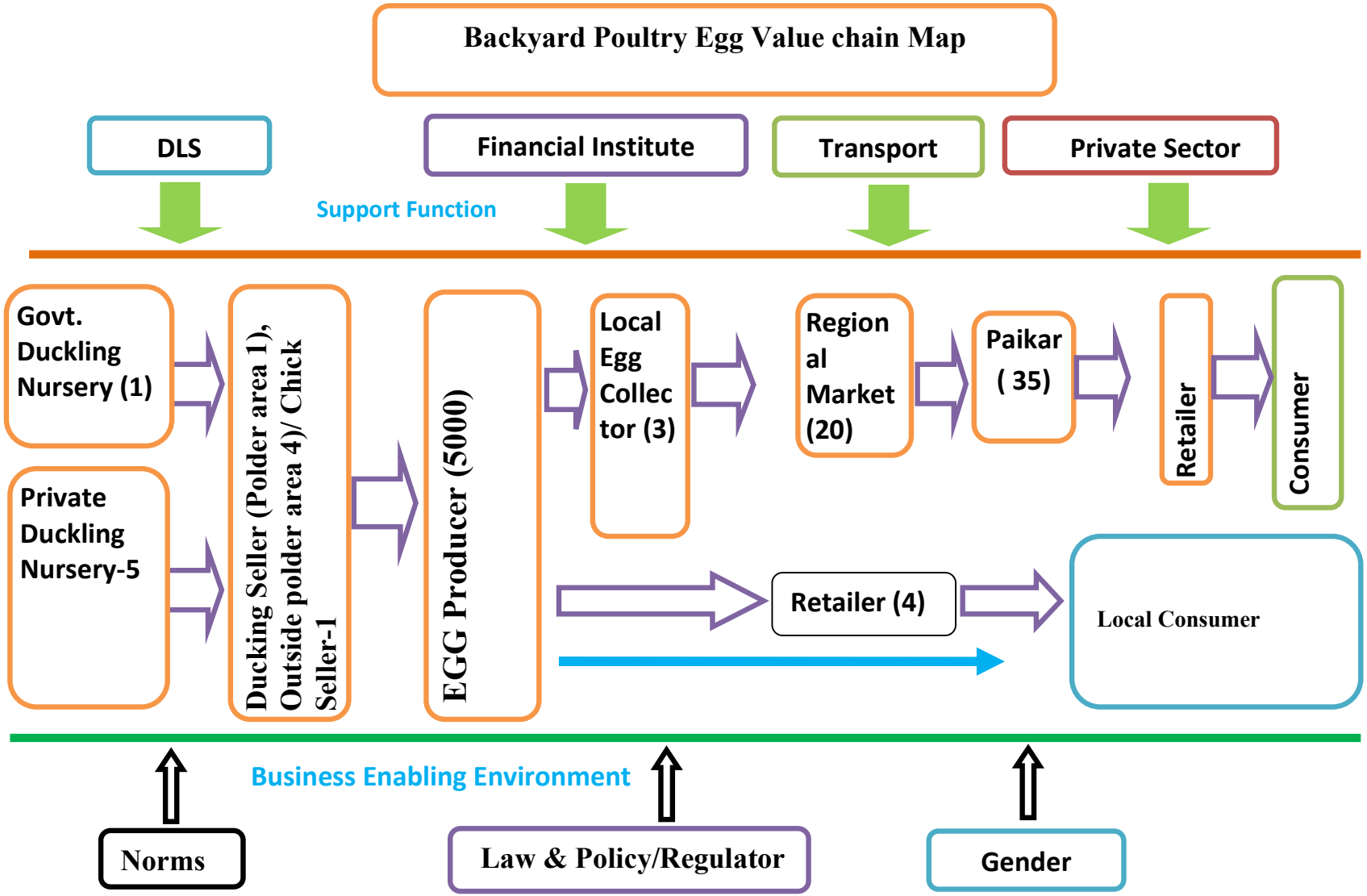
- Poor drainage and irrigation system in Polder area.
- Salinity problem in winter season.
- Unavailability of renown quality vegetables seed like Lal Teer , Metal, A.R Malik, United etc. in remote markets.
- Lack of Knowledge on Improved production technology of vegetables.
- Numbers of input (Seed) sellers are very poor and embedded services are not always available and sometimes did not fulfill farmer's requirement.
- Lac of knowledge on Post harvest technologies. Grading and Transport, packaging.
- Low ability to investment on vegetables production.
- Unavailability of micro nutrient
- Weak market linkage

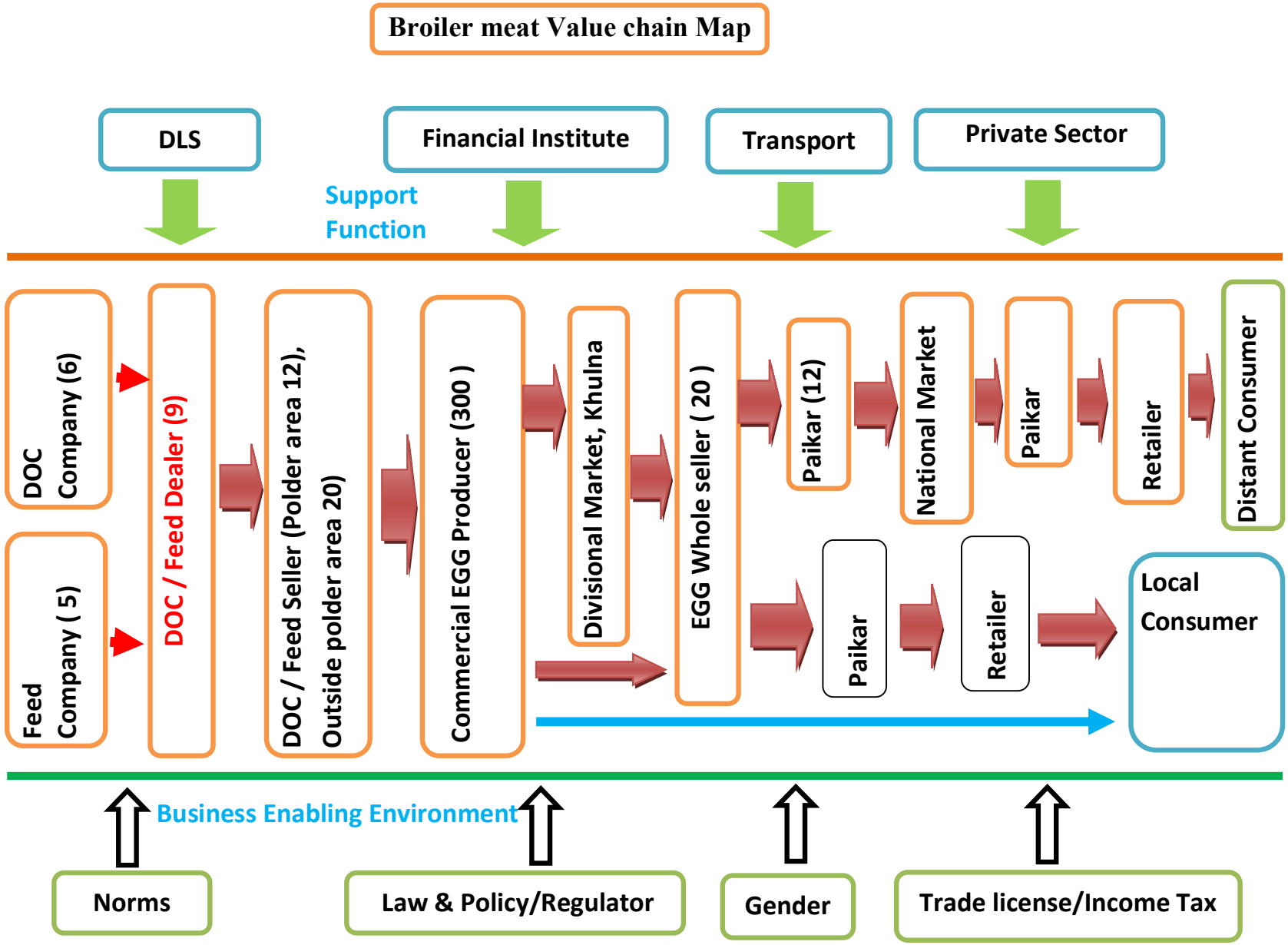
4.4. Potential VC map: For Polder 30 Potential VC map are given below……

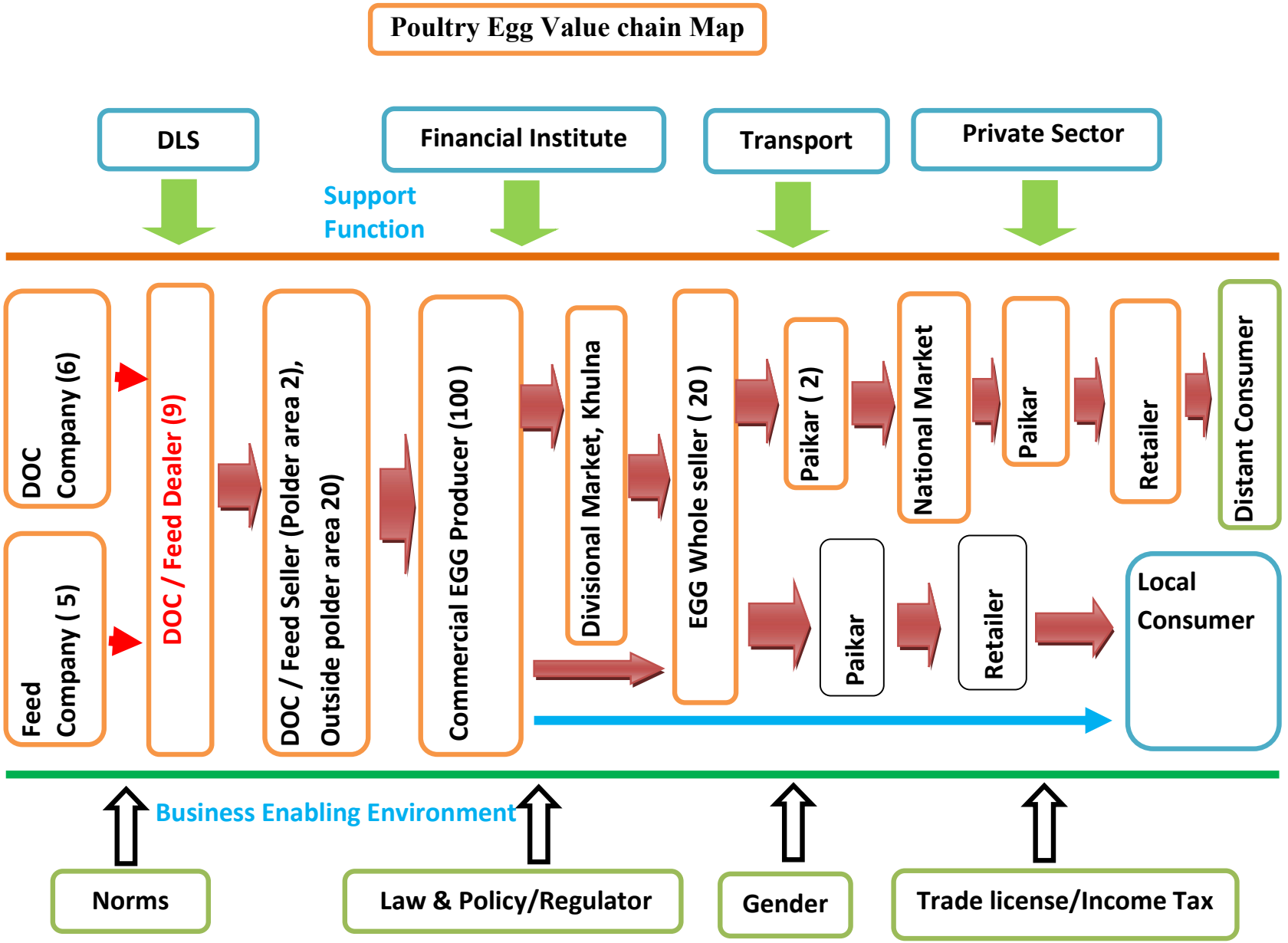


Rice Value Chain Map

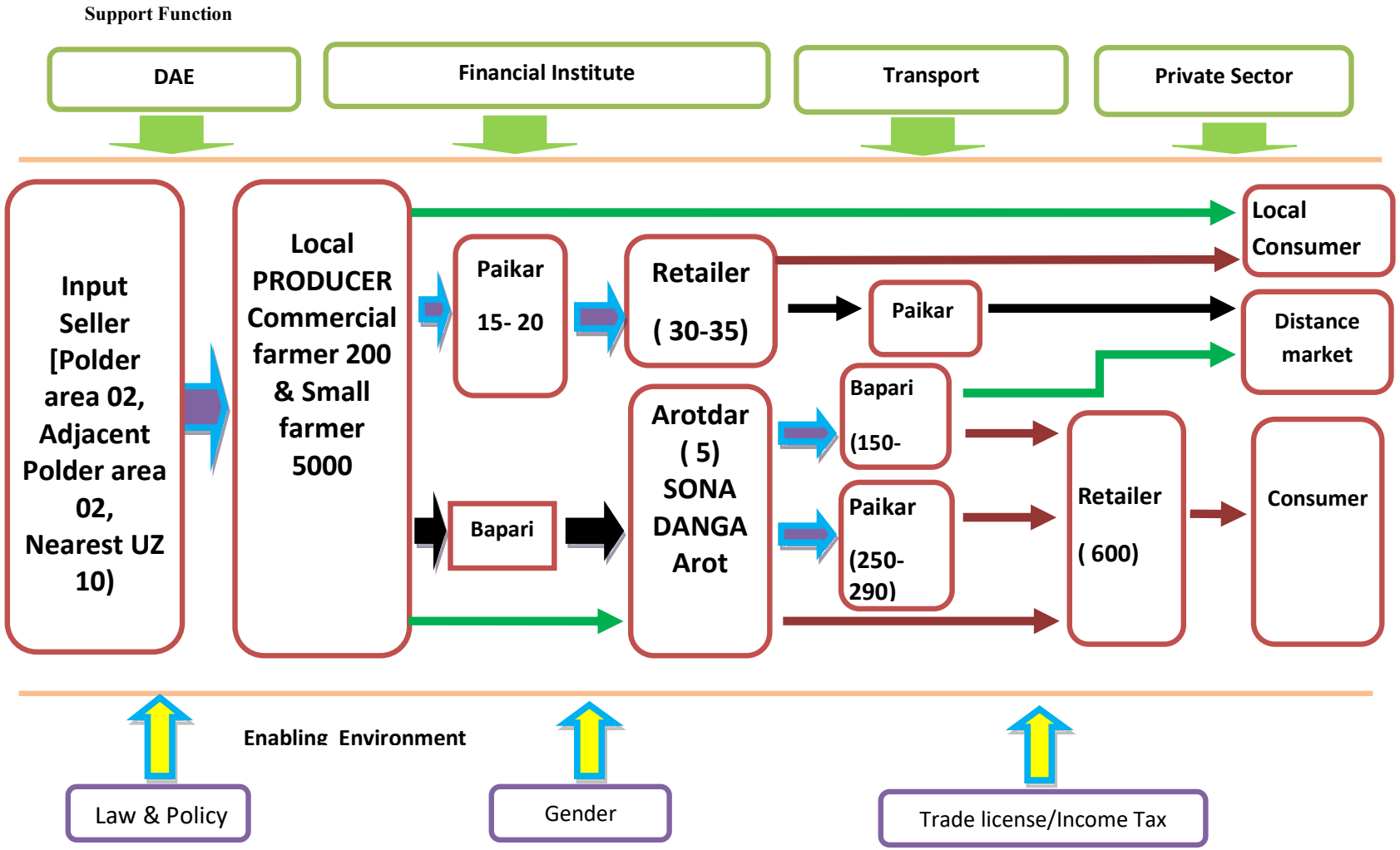


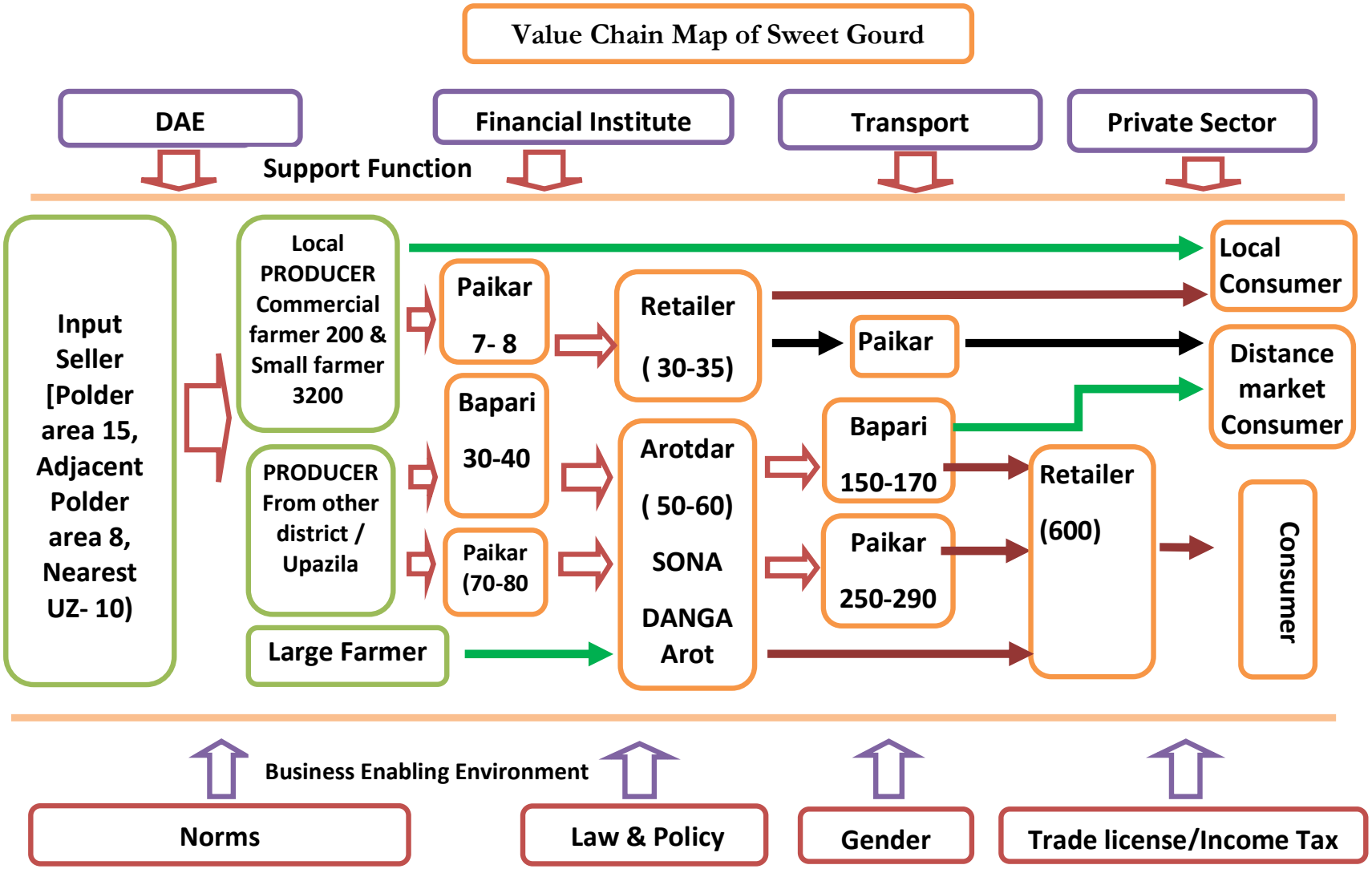

Backyard Poultry Egg Value chain Map
DLS
Financial Institute
Transport
Private Sector
Support Function
Govt. Duckling Nursery (1)
Private Duckling Nursery-5
Ducking Seller (Polder area 1), Outside polder area 4)/ Chick Seller-1
EGG Producer (5000)
Local Egg Collector (3)
Regional Market (20)
Paikar (35)
Retailer
Consumer
Retailer (4)
Local Consumer
Business Enabling Environment
Norms
Law & Policy/Regulator
Gender


Broiler meat Value chain Map
DLS
Financial Institute
Transport
Private Sector
Support Function
DOC Company (6)
Feed Company (5)
DOC / Feed Dealer (9)
DOC / Feed Seller (Polder area 12), Outside polder area 20)
Commercial EGG Producer (300)
Divisional Market, Khulna
EGG Whole seller (20)
Paikar (12)
National Market
Paikar
Retailer
Distant Consumer
Paikar
Retailer
Local Consumer
Business Enabling Environment
Norms
Law & Policy/Regulator
Gender
Trade license/Income Tax

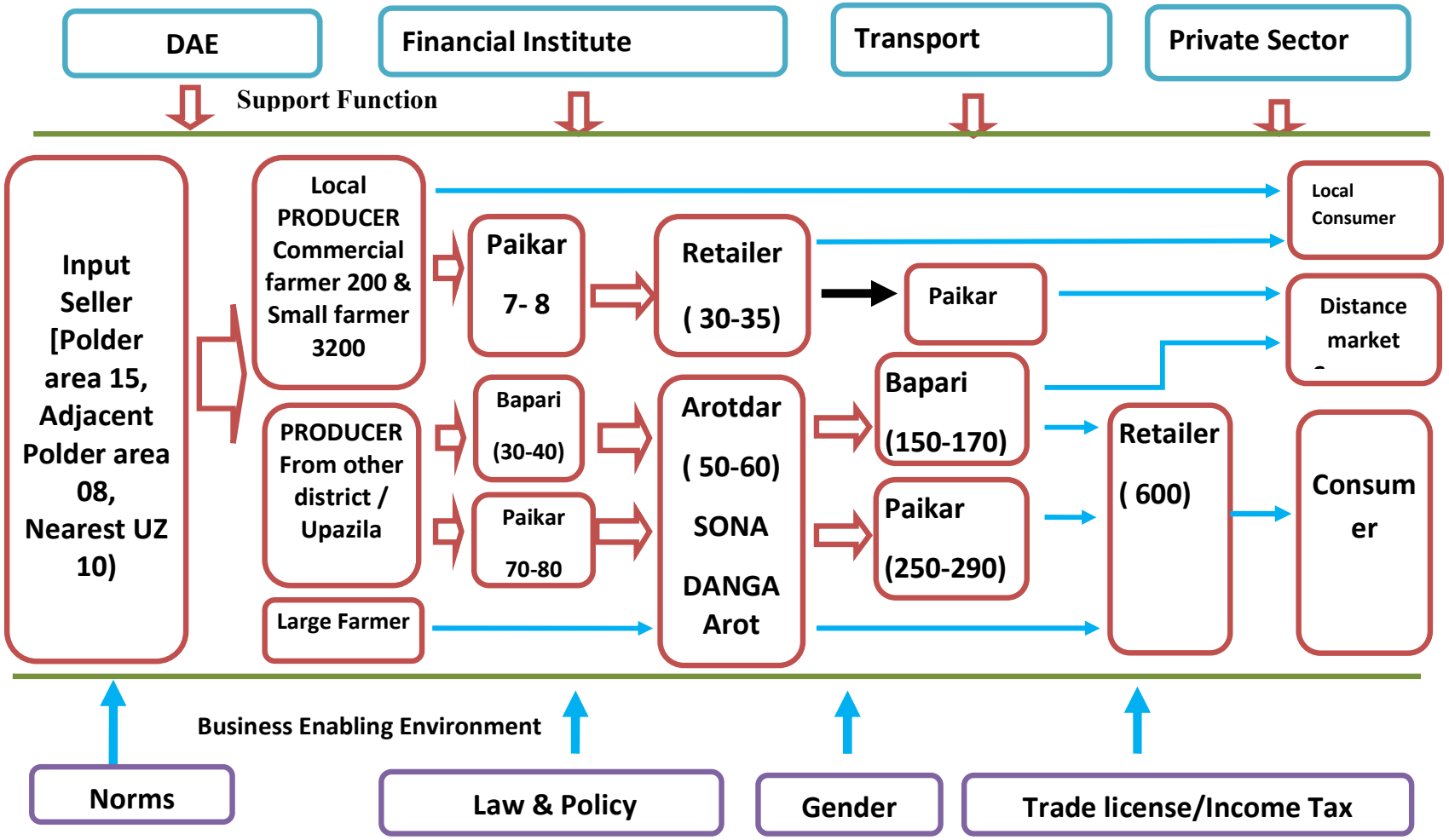

Poultry Egg Value chain Map
DLS
Financial Institute
Transport
Private Sector
Support Function
DOC Company (6)
Feed Company (5)
DOC / Feed Dealer (9)
DOC / Feed Seller (Polder area 2), Outside polder area 20)
Commercial EGG Producer (100)
Divisional Market, Khulna
EGG Whole seller (20)
Paikar (2)
National Market
Paikar
Retailer
Distant Consumer
Paikar
Retailer
Local Consumer
Business Enabling Environment
Norms
Law & Policy/Regulator
Gender
Trade license/Income Tax

Value Chain Map of Moringa Oleifera (Drum Stick)




Value Chain Map of Sweet Gourd
DAE
Financial Institute
Transport
Private Sector
Support Function
Input Seller [Polder area 15, Adjacent Polder area 8, Nearest UZ- 10)
Local PRODUCER Commercial farmer 200 & Small farmer 3200
PRODUCER From other district / Upazila
Large Farmer
Paikar 7- 8
Bapari 30-40
Paikar (70-80
Retailer (30-35)
Arotdar (50-60) SONA DANGA Arot
Paikar
Bapari 150-170
Paikar 250-290
Retailer (600)
Local Consumer
Distance market Consumer
Consumer
Business Enabling Environment
Norms
Law & Policy
Gender
Trade license/Income Tax

Value Chain Map of Okra



5. SWOT analysis of polder (agriculture, livestock and aquaculture)

Strength	Weakness
Unmet demand of Sesame, Poultry egg, Vegetables Easy connectivity to big markets. Many Service Providers are present nearby the polder like - arotder, bepari, Paiker and Commission agents etc. Private actors like seed company, feed company, exporter , processor are also available nearby polder area have shown interest to work with us. Resilience capacity of polder dwellers are high. Presence of MFI`s	Poor drainage and irrigation system. Inadequate knowledge on improve production technology on Rice, Sesame, Poultry rearing, different vegetables. Lack of quality inputs in polder area. Lack of market information and weak market system. Dependency on different relief or input support programs.
Opportunity	**Threat**
Opportunity to increase production, productivity and area coverage. Opportunities to introduce new crop, improve varieties and new techniques. Opportunity to linking with market actors and market systems to ensure better price. Opportunity on collective actions. Presence of WMGs and income from assets. Savings by WMG members for investing in new business.	Disaster porn area. Salinity problem during winter season Landless and marginal HH % are high so adoption of new technologies and practices will be challenging.

6. Connectivity

i. Mode and Cost for Transportation

Sl#	From	To	Mode of Transport	Taka
1	Batiyaghata	Sonadanga	Mahendra	20
			Auto	15
			Van	20
			Motor Cycle	30
2	Batiyaghata	Gollamari	Mahendro	20
			Auto	15
			Van	20
			Motor Cycle	30
3	Batiyaghata	Baro bazaar	Auto	25
			Van	35
4	Batiyaghata	Rupsa	Auto	25
			Van	30
			Motor cycle	75X2=150
5	Batiyaghata	Newmarket	Auto	25
			Van	30
			Motor cycle	75X2=150
6	Batiyaghata	Koiya bazaar	Auto	25
			Van	30
			Motor Cycle	75X2=150
7	Batiyaghata	Katiyanagla	Van	20
			Motor Cycle	35
			Nosimon	12
			Bus	10
8	Batiyaghata	Amtola	Nosimon	15
			Van	25
			Motor Cycle	50X2=100
9	Batiyaghata	Ganger par	Nosimon	20
			Boat	25
			Van	20
			Motor Cycle	60X2=120
10	Batiyaghata	Boyervanga	Nosimon	20

			Van	20
			Motor Cycle	60 X2=120
11	Batiyaghata	Badamtola	Nosimon	10
			Van	10
			Motor Cycle	50
12	Batiyaghata	Mailmara	Nosimon	10
			Auto	15
			Van	15
			Motor Cycle	25
13	Batiyaghata	Gaoghora	Nosimon	15
			Van	20
			Motor Cycle	50 X 2= 100
			Boat	25
			Mahendra	35
14	Batiyaghata	Titukhali	Nosimon	13
			Auto	15
			Van	13
			Motor Cycle	30
15	Batiyaghata	Bottola	Nosimon	15
			Van	15
			Motor Cycle	70
16	Batiyaghata	Sukdara	Nosimon	25
			Mahendra	10
			Van	25
			Motor Cycle	45
17			Easy byke	30
			Engine Boat	20
18	Boron para	Chalna Bazaar	Nosimon	5+10=15
			Van	20
			Motor Cycle	50
19	Mailmara	Sorabpur bazaar	Boat	3
20	Batiyaghata	Boron Para	Motor Cycle	45x2=90
			Nosimon	20
			Bus	15

ii. Mobile Coverage

All Mobile network coverage are available here-

- Grameen Phone
- Robi
- Airtel
- Banglalink
- City cell
- Telitalk

Around 85 % HH use mobile phone

iii. Market Information

- ❑ People contact with Paikar ,Arotdar through Mobile Phone and collect product price.
- ❑ People when visit markets then meet with Local market actors and collect product price.
- ❑ Farmers also ask their neighbors who visit market earlier about different product prices.
- ❑ Farmers also discuses with their relatives about product prices.

iv. E- Money transaction

In Polder area 20 B-Kash transaction centers are available. One Govt. Post office also has E-Money transaction facilities.

Unit	Incoming	Outgoing	Remarks
Daily	Tk 22000	Tk 10000	
Monthly	Tk	Tk	
Yearly	Tk	Tk	

7. Access to finance

Sl.#	Source of Finance	Male%	Femalw%	Remarks
1	WMG	75	25	
2	NGO	0	100	
3	Local MFI	60	40	
4	BCUP	10	90	
5	Bank	95	5	

8. Agril Machinery:
   In Polder 30 there is 75 Power tiller. 25 From Food and Agriculture organization (FAO) and 50 are private. In polder area at Batiaghata Hat there are 5 workshops where light repairing and maintenance services are available. Also 3 workshops at Katiyanangla hat and 02 workshop at Mailmara hat. There are some parts or equipments also available for sale. Usually power tiller light and heavy maintenance has done here but major maintenance like engine overhauling has done in Khulna.

9. Gender
   Criterion VC selection:

   - Number of HH involved
   - Women friendly
   - Women labour based
   - Increase women income
   - Increase women contribution in production and decision making
   - Increase women sales power
   - Increase savings in MFI

9.1 Role of Man & Women in agriculture

At homestead:

- Seed bed preparation
- Fencing
- Seed preservation
- Seed sorting and seed processing for germination
- Seed sowing and seedling collection
- Intercultural operation
- Harvesting, fertilization, irigation, pesticide application
- Marketing

Livestock:

- Hatching arrangement for poultry
- Feeding cattle/poultry
- Rearing and Vaccination
- Goat rearing

Fish:

- Feeding
- Pond cleaning
- Harvesting

Field crop:

- Seedling collection
- Weeding
- Harvesting
- Seed sorting, storing and processing
- Transportation
- Threshing

Men's roles in agriculture:

- Ploughing and related work
- Seed collection, sowing and transplantation and related work
- Intercultural operation
- Harvesting and threshing and related work
- Sales and Marketing related work

- Pond preparation, fish cultivation, harvesting and sales related job
- Finger ling collection, preservation
- Catching fish, transportation, storage, sales
- Poultry farm operation related all work
- Feed , fertilizer, pesticide and medicine collection and use related job

9.2 Potential IGA for Women

- ❑ Poultry rearing, bird and Egg selling
- ❑ Drumstick selling
- ❑ Home stead vegetable production, collection and selling
- ❑ Small Grocery shop operating

10. Collective Action Issue

- ❑ Opportunity for Collective action
  - ➢ Rice-seed collection/ tillage/irrigation/ technology transfer/drying/storage/marketing
  - ➢ Sesame-seed collection/drying/storage/processing/marketing
  - ➢ Moringa -Roadside plantation/management/grading/marketing
  - ➢ Poultry Egg- service receiving/ egg collection/marketing
  - ➢ Sweet gourd-collection/storage/transportation/marketing
- ❑ <u>Benefit of collective Storage/drying/Marketing</u>
  - ➢ Tillage and irrigation can reduce cost.
  - ➢ Input purchase can ensure quality and reduce cost
  - ➢ Intercultural operation leads to higher production.
  - ➢ Easy to ensure support services

- Collective storage for rice can ensure better price
- Collective drying facility can be helpful for polder dwellers to reduce wastage and create opportunity to store for selling in favorable time
- Drying facility helps them in seed preservation and timely threshing
- Dry floor will be helpful for Sesame as it is harvested in rainy season, less sun will be required. Moisture problem will be reduced. Plastic net can be used.

- <u>Benefit of collective Storage/drying/Marketing</u>
  - Reduce transportation cost.
  - Attract the market actors and service providers (Egg collectors, retailers, vaccinators, etc)
  - Collective effort in production, harvesting, grading and marketing can ensure high price for all agriculture product including Moringa.
- <u>Benefit of collective Storage/drying/Marketing</u>
  - Most of polder people drying sesame on soil floor, So that they get price less than others who dried sesame on blue net.
  - Collective effort is possible in packaging vegetables in plastic bags and transporting by mini truck or Nosimon.

11. Available Institutional Support

Sl.#	Support Institute Name	Number	Remarks
1	Community Clinic	2	
2	High School	5	
3	Primary School	18	
4	Madrasa	1	
5	College	2	
6	Bank	5	
7	Post Office	3	
8	Micro Credit Organization	15	Grameen Bank, BRAC, ASA, Uttoron, Shusilon, Nobolok, Ghasphul, Cholontika Yono Society, Nijayra kori, Somaj progoti Songostha, Rular, Share-Bangladesh, Mayer Achol, Bridge and Moon Foundation.
9	B-Kash	20	

Scope of Collaborations:

A. About NATP

Bangladesh has made significant achievement in cereal, particularly in rice production and enhanced total agricultural productivity in the last 4 decades. Although the country is nearly self-sufficient in rice (the major stapple food grain), but there exists huge shortfall in most of the other crops, such as pulses, oilseeds, spices, wheat, etc. The land area and output level of many crops, like pulses, oilseeds and wheat have even declined. On the other hand land resource base is shrinking at the rate of nearly 1% annually due to urbanization,

industrial and new road communication net work development and river errosion. Cultivable land is being shifted from agriculture to non-agricultural uses, like housing, roads, industries, etc. In the recent years, the overall growth of agricultural production in Bangladesh has slowed down as a consequence of several reasons, like degradation of land resources, faulty cultivation practices, improper management of inputs, increased and erratic natural hazards due to climate change, high prices of inputs and energy, and certain policy implications. Thus, the agriculture and agricultural technology system are facing today newly emerged challenges due to changes in internal and global agro-climate, eco-political and trade environment. All these will have long-term negative impact on the livelihood of the people and economy of the country. Under the circumstances, a well thought and conspicuously designed intervention to meet the upcoming issues and challenges is the need of the time. The National Agricultural Technology Project (NATP) is a way towards that.

Bangladesh Agricultural Research Council (BARC) with the support of the Government of Bangladesh (GOB) and with the financial assistance from the World Bank (through IDA credit) and International Fund for Agricultural Development (IFAD) developed and initiated the NATP to address the upcoming issues and emerging challenges. The NATP is the first 5-year phase of a long term (15-years) program to support GOB's strategy to improve national agricultural productivity and farm incomes. Its focus is on revitalizing the agricultural technology system (including agricultural research, extension and development of supply chain) and increasing agricultural productivity in Bangladesh. The total budget for the 1st phase is Tk. 6220.9 million of which World Bank will finance 74%, IFAD 23% and GOB 3%.

As per the Development Project Proposal (DPP) provision, the project activities were planned to start from July 2007 but the World Bank credit effectiveness date was 28 March 2008. As such different components initiated their activities in October 2008 after the release of PA funds. In fact, the year 2008-2009 was a significant year for the project, because most of the project implementation units were established in this year. Though an interim Project Director (PD) worked up to January 14 2009, the PCU was formally functional with the appointment of a full time Project Director on 15 January 2009. The activities conducted by different units of NATP during 2008-09 are summarized in the subsequent sections of this website.

Project Objectives

NATP is a comprehensive project with focus on revitalizing the agricultural technology system (including agricultural research, extension and development of supply chains) and increasing agricultural productivity in Bangladesh.

The project development objective would be achieved by increasing efficiency and effectiveness of agricultural research and extension systems, and by strengthening farmer market linkages. More specifically, the NATP will support:

High priority, pluralistic, participatory and demand-led agricultural research;

Decentralized, participatory, demand-led and knowledge-based approach for agricultural extension;

Improved post-harvest technology and management practices for high value agriculture by promoting farmer-market linkages, as part of the development of selected supply chains.

Agreed reforms for the agricultural research and extension systems, increased public funding for the system and promote public-private partnership in research extension and supply chain development.

Components of NATP

The project has four components: i) agricultural research support, ii) agricultural extension support; iii) development of supply chains; and iv) Project management and coordination support.

i) Agricultural Research Support: The component would have national coverage. Activities of the research component includes i) Competitive Grants Program (CGP), ii) Sponsored Public Goods Research (SPGR), and iii) Enhancing Research Institutional Efficiency (ERIE) of the National Agricultural Research System (NARS).

ii) Agricultural Extension Support (DAE, DLS and DOF): This component aims at establishing a decentralized demand-led extension service, which is knowledge-based with greater accountability and responsiveness to farmers, with a focus on small and marginal farmers. Extension activities covered 120 upazilas in 25 districts by DAE and DLS each in the first year. DOF covered only 95 upazilas in the first year and gradually extend their activities to 120 upazilas

iii) Development of Supply Chains: For increasing and diversifying sources of income for small and marginal farmers, development of supply chains of selected commodities has been planned on a pilot basis in 10 upazilas. The project will finance activities related to i) strengthening farmer-market linkages; and ii) enhancing institutional efficiency.

iv) Project Management and Coordination Support: The project is being implemented jointly by the Ministry of Agriculture (MOA) and the Ministry of Fisheries and Livestock (MOFL). The Project Coordination Unit (PCU) is coordinating and facilitating project implementation in collaboration with the respective Project Implementation Units (PIUs), Krishi Gobeshna Foundation (KGF) and Hortex Foundation. During the year, PCU concentrated its activities in initiating the process of hiring core experts and replenishment of PA fund, establishment of PCU office at BARC Complex, forming different committees, procurement of essential goods & services and arranged coordination meeting to enhance interaction among the components.

Sl.#	Name	Union	Mobile #
1	Kousik Boiragi	Batiaghata	
2	Shankor Prosad Mondal	Gongarampur	
3	Puspen Roy	Surkhali	

B. Agro Input Retailer Network(AIRN) by CNFA

1. Form the Agro-Input Retailers' Network (AIRN)

AIP will establish the AIRN through accredited retailers who are trained and committed to making informed business decisions for efficient and ethical agricultural input retail operations. Ultimately, this network of trusted retailers will improve the supply of of high-quality inputs to farmers throughout Bangladesh's southern delta.

The AIRN and the AIRN Certification will achieve the following:

- Enhance farmer outreach and marketing opportunities
- Link input supply companies and their wholesalers in order to improve the security of their supply chains
- Monitor ongoing activities of certified retailers

2. Develop a Market Information System

To increase awareness of quality input products, their availability, prices and appropriate use, AIP will develop a Geographic Information System (GIS) to analyze and disseminate strategic market information. The system will also map demonstration plots, public and private advisory centers, and other points of interest to both farmers and retailers.

3. Promote Quality Standards & Improve the Regulatory Environment

AIP work will work with industry associations, their members and the Government of Bangladesh to develop industry standards for each of the major crop inputs. Engaging these stakeholders and key partners such as the International Food Policy Research Institute (IFPRI) assists in the transparent resolution of problems such as low-quality seed, improper fertilizer formulation and adulteration of crop protection products.

4. Build Capacity of Local Organizations

AIP is building the capacity of local organizations to better implement activities in support of USAID program objectives. Organizational strengthening and financial assistance will be provided to selected partners along the agricultural inputs value chain.

Gender

AIP will integrate gender-specific programming into all of its activities, including the following:

- Integration of gender into policy and advocacy initiatives
- Business and technical training for women retailers
- Women-specific demonstration events and field days

Environment

AIP will promote the usage and handling of agricultural inputs in ways that are environmentally responsible and assist in dealing with the negative effects of climate change.

C. AIN

Aquaculture Income and Nutrition project is a five year aquaculture focused project in Barsal, Khulna and Dhaka division. The project contributes to achieving the goal of sustainability reducing poverty and hunger through objectives, each linked to one of four project component-

No.	Project Components	Objectives
1	Fish and shrimp seed	Dissemination of improved quality lines of fish and shrimp seed
2	Household Aquaculture	Improving the nutrition and income status of farm households
3	Commercial aquaculture	Increasing investment, employment and fish production through commercial agriculture
4	Institution and policy	Policy and regulatory reform and institutionally capacity building to support sustainable aquaculture growth.

Component-1

- The project has distributed parent fish(brood stock) of selected strains of Rohu, Catla and Mrigel and also Telapia to selected carp and tilapia hatcheries.
- The project has providing technical training to the owners and staff of partner hatcheries and nurseries.

- 10 tons of carp spawn has been supplied to both project and non project supported nurseries. These nurseries have produced more than 1000 million carp fingerlings.

Component-2

- In the Khulna region, 320 farmer groups were formed, each comprising 25 members of which 99% were female, 64 household demonstration ponds were established for training and knowledge sharing purposes. All 8,000 HH received a package of vegetable seed to support vegetable cultivation on their pond-dikes. The performance of vegetable crops will be assessed during early 2013.

- Mola, a nutrient dense small indigenous fish, was stocked in 4,881 homestead ponds at an average rate of 100 g/dec in order to improve nutritional status of households involved in the project and to assess the effectiveness of stocking of Mola. Awareness about the nutritional benefits of nutrient dense fish (NDF) has been raised by the inclusion of information in regular group meetings with project farmers.

- Dissemination of information on fish production to all target groups is supported by the distribution of leaflets, flip charts and stickers to farmers through small seed traders who purchase quality carp seed from project supported sources. The project has developed five training manuals and provided trainings to staff of WorldFish and PNGO nursery owners and demonstration farmers.

Component-3

- This component focused on stimulating investment, employment and incomes through commercial aquaculture in

the Southern region .Commercial aquaculture of fish and shrimp is supported through several channels. Project staff is stationed at shrimp depots involved in shrimp marketing and distributed throughout the project working area.

- Four Aquaculture Service Centers were set up in Khulna region to provide technical support, business development services, advice and training to farmers.

- A total of 20,012 shrimp farmers were selected from Khulna, Bagerhat and Satkhira districts and 765 farmer groups were formed to facilitate training. Shrimp demonstration ponds were established and 50 shrimp nurseries were selected for nursing shrimp post-larvae of shrimp seed.

- 260 cages managed by 260 farmers organized in 25 groups were established under the commercial aquaculture component. Cages were stocked with mono sex tilapia fingerlings.
- One brackish water hatchery was assisted in producing seed of Tengra, which is situated at Bagerhat district.

Component-4

- A hatchery association formed at Jessore by the hatchery stack holder.
- Private partnership was established with Shrimp depots, carp hatcheries, Shrimp hatcheries and tilapia hatcheries in Khulna and other project areas.

D. CSISA-MI

The five year CSISA-MI project works through three strategic objectives to unlock the potential of farmers in the south to produce more food during the dry season, while conserving that land's ability to produce quality crops in the long-term.

CSISA-MI seeks to transform agriculture in southern Bangladesh by unlocking the potential productivity of the region's farmers during the dry season through surface water irrigation, efficient agricultural machinery and local service provision. CSISA-MI is an initiative of the wider CSISA program in Bangladesh (CSISA-BD), which links CIMMYT and iDE to partnerships with IRRI and WorldFish.

Strategic Objective 1

To sustainably intensify and diversify agricultural production in southern Bangladesh through surface water irrigation to increase household income.

CSISA-MI promotes Axial Flow Pumps (AFPs), highly efficient irrigation machines, into local markets by building public-private partnerships that address key components of the supply chain.

- ***Agri-machinery importers*** are encouraged and equipped to make AFPs available in the Feed the Future (FtF) zones.
- ***Local machinery dealers*** are linked with government and private agricultural services to stock and service the equipment independently.
- ***Local Service Providers (LSPs)*** are local entrepreneurs who purchase the equipment and provide services to farmers; they are trained to use and market the technology to local farmers.

CSISA-MI also partners with the Government of Bangladesh and the International Water Modeling Institute to identify priority fallow areas, so that both supply and demand interventions are based on accurate crop and technology information.

Improving irrigation with Axial Flow Pumps (AFP): The AFP is an inexpensive surface water irrigation technology that reduces fuel

consumption – and thus irrigation costs – by up to 60%. Mounted on a two-wheeled tractor (2WT), AFPs give 2WT owners increased business opportunities during the dry season.

Strategic Objective 2

To sustainably transform agriculture in southern Bangladesh through broad-based access to agricultural mechanization services.

Following the same comprehensive supply chain approach as in Strategic Objective 1, CSISA-MI harnesses the power of private sector investment to introduce efficient technologies that enable farmers to cultivate successful dry season crops. CSISA-MI further supports the supply chain for agricultural mechanization products by facilitating the development of targeted financial services, and by working with local dealers and manufacturers to make sure that farmers who would benefit most from the technologies know where and how to purchase them.

Strategic Objective 3

Conservation agriculture principles and best agronomic practices adopted by farmers through access to resource-conserving agricultural machinery services.

To assure the durability of strategic objectives 1 and 2, CSISA-MI works with public and private sector partners to promote their familiarity with machinery engineering, manufacturing, sales, distribution and use in the field. CSISA-MI works with key government stakeholders such as the Bangladesh Agricultural Research Council (BARC), the Bangladesh Agricultural Development Corporation (BADC) and the Department of Agricultural Extension (DAE).

Through these partnerships, farm business advisors and DAE sub-assistant agricultural officers, both respected local agricultural resource persons, are trained on operation, maintenance and benefits of the improved technologies. Mechanics and their workshops are outfitted to handle maintenance and repairs, and are certified through BADC-approved certification schemes.

Driving conservation agriculture through precision equipment

Each of the following technologies helps boost yields through maximizing the productive use of soil moisture, fertilizer, and seed, while saving farmers' time, labor, and money.

- **Seeder Drills** till, plant, and fertilize simultaneously and with greater precision.
- **Bed-planters** form fields into beds and furrows, for more efficient dry season irrigation, while decreasing the crop's risk of arsenic contamination.
- **Reapers** allow farmers to clear fields cheaply and on time without waiting for scarce and expensive manual labor, while freeing up women's time for other productive activities.

Collectively, the interventions will result in 90,000 hectares of land placed under surface water irrigation and/or best-bet, resource-conserving agricultural machinery services supplied by 11,000 LSPs. The activities will benefit more than 450,000 households, and $12 million of private sector investment will be mobilized to support these aims.

CSISA-MI and CSISA-BD

CSISA-MI builds on lessons learnt and opportunities identified by the pre-existing USAID-funded CSISA project in Bangladesh. While CSISA focuses on adaptive technology testing, deploying new crop varieties, training farmers, and facilitating output markets, CSISA-MI goes beyond this to focus on upstream market interventions to ensure that technologies needed for agricultural intensification are sustainably available through local markets.

CSISA-MI is implemented by CIMMYT and iDE.

12. Conclusion:

13. Glossary

Actor / participant:

smallholder, input supplier and output market players directly participating the value chain

Arotdar:

Service provider to Bepari and Pikers in wholesale markets. Facilitates the buy/sell process. May provide purchase negotiation assistance, storage space, selling space, short term and seasonal credit, and arrange truck transport of goods purchased by Bepari to markets

Bepari:

Key wholesaler in the supply chain. Moves goods between markets buying in source markets and selling in destination markets. Exerts the main influence on price earned by farmers

Business service:

Service that is sustainable through private sector transactions and that improves the performance of the value chain, its access to markets, and its ability to compete

Competitiveness: The ability of a firm or value chain to achieve or maintain an edge over market rivals

Consumer:

User or buyer of service products offered by business service providers

Cost effectiveness:

The impact of a program intervention compared to its cost. A program is cost-effective if the ratio of benefits to costs is high

Demand:

The quantity and type of goods or services that buyers wish to purchase at any conceivable price

Donor:

The funding agency that pays for development activities

Enabling environment:

Provision of law, rules, policies, procedures favorable for the value chain to operate and grow

Facilitator:

International or local institutions, usually funded by governments or donors, that aim to expand and improve a value chain by enhancing capacity of smallholders and integrating them into quality input supply system and high value output markets

Governance:

Description of the dynamic distribution of power, learning, and benefits among participants in a value chain

Impact:

Sometimes called "effectiveness", this is the effect a service has on the SE client performance (i.e., that which can be attributed to the service itself, not to outside factors), or it is the broader economic and/or social effect of the intervention

Intervention:

The temporary, facilitative mechanism by which donors and facilitators try to effect change (typically a project or a program)

Market development based:

Activities that try to make the interaction between demand and supply more effective

Market transaction:

The exchange between demand and supply is at full market price (the price at which suppliers are prepared to sell and consumers are prepared to buy, in an unsubsidised situation) Market: a set of arrangements by which buyers and sellers are in contact to exchange goods or services—the interaction of demand and supply.

15. Annexure

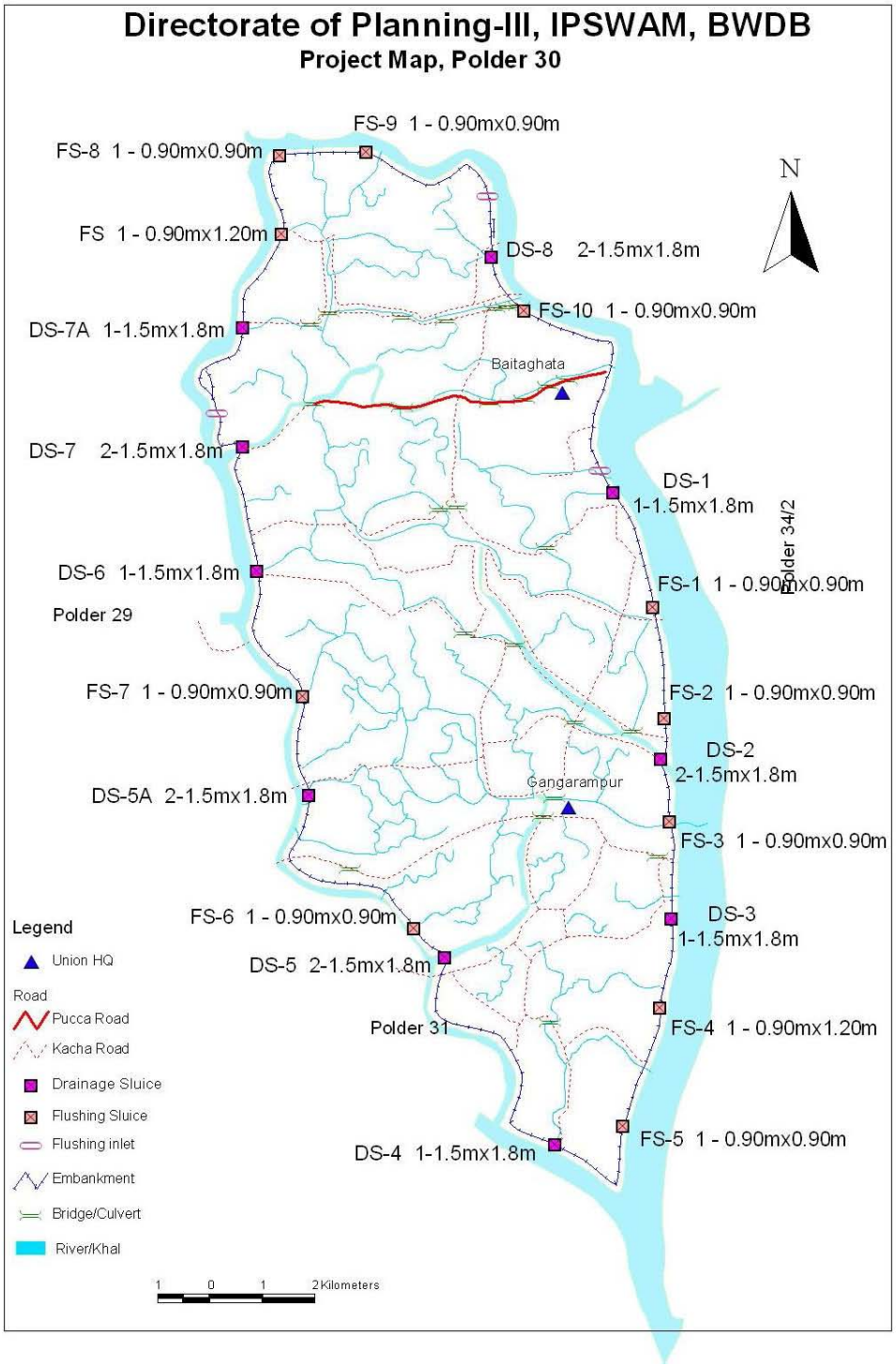
a. Different actors from Polder 30

Sl.#	Name	Type	Address	Mobile #
1	Bismilla Oil Mill	Processor	Goborchaka	
2	Akhter Oil Mill	Processor	Bosu para	
3	Shorifan Oil Mill	Processor	Golla mari	
4	Rob Oil Mil-Abdur Rob Hawlader	Processor	Goborchaka	01912 536227
5	Natural Agro Processing- Habib Akon	Processor	Koiya bazar	01711 950258
6	Anika Enterprize- Md. Alamgir Hosen, Poultry & Fish Feed	Feed Seller	Batiyaghata	01190 962078
7	M/S Shawon Traders	Input Retailer	Batiyaghata	01827 199224
8	Afjal Hosen	Input Retailer	Dumuria	01943505131
9	Md. Mokter Shek	Input Retailer	Jolma	
10	Md. Hafijur Rahaman	Input Retailer	Araji, Dumuria	01734 761452

	Shek			
11	Kartik Das	Input Retailer	Dumuria	
12	Guru Das	Input Retailer	Dumuria	
13	Pritish Mondal- IR	Input Retailer	Bolabunia, Batiaghata	01923 942798
14	Volanath Das-IR	Input Retailer	Kalikapur,Korappur, Dumuria	
15	Mohadeb Adikhari	Input Retailer	Dumuria, Dumuria	01925 677539
16	Shushanto Biswass	IR	Titukhali	01710 119765
17	Shekor Sarkar	IR	Andharia	01715 743556
18	Birendra Nath Shill	IR	Batiaghata Hat	01716 770567
19	Sonjoy Mondal	Samin Poultry Lt	Batiaghata	01917 876713
20	Alamgir Hosen	Poultry feed seller	Batiaghata	01190 962078
21	Ful Mia	Veg Paiker	Batiaghata	01923 983772
22	Monoronjon Mondal	Poultry feed seller		01935 209065
21	Alok Sarker	Poultry feed seller	Katiyanangla	01714 352510
22	Sobinoy Golder	Poultry feed seller		01918 611281
23	Ahamed Ali Gazi	Fry Hawkers	Satkhira	01981 282657
24	Debobroto Bachar	Fry Hawkers	Batiaghata	01936 287686
25	Sadek Sarder	IR	Gaoghora	01947 275164
25	Alokesh Roy	Mechanic	Mailmara Bazaar	01917 862241
26	Ajoy Kumar Roy	IR	Mailmara Bazaar	01917 182526
27	Puspo Mondal	IR	Mailmara Bazaar	
28	Kangalu Mondal	Veg Aggregator	Mailmara Bazaar	
29	Anupom Biswass	Lead Farmer	Hogolbunia	01718 324233
30	Subroto Bachar	Lead Farmer	Batiaghata	
31	Sudipto Sarker	EF	Katianangla	01713 255112
32	Bikash Sarker	EF	Surkhali	
33	Sopna Mondal	Input Retailer	Sukdara	01850 336225
34	Ronendranath Roy	Lead Farmer	Sukdara	01816 155609
35	Abdus Sattar	Fish Arotdar	Gollamari	01718 778803
36	Sheikh Faridul Islam	Fish Arotdar	Gollamari	01858 842928
37	Atiyar Rahaman	Fish Arotdar	Gollamari	
38	Chironjeet Mollick	Fry Hawkers	Bennabunia	
39	Harichad Mondal	Fry Hawkers	Mait vanga	
40	Niloy Roy	Input Retailer	Batiaghata	01713 868866
41	Alim Industries	Mechanic	Batiaghata	01714 809674

42	Beauty Biswass	Input Retailer		01711 959177
43	Shibuddin Ahammed	Feed Seller	Katiyanagla	01944 747064
44	Amin Joyarder	Feed Seller	Katiyanagla	01718 256694
45	Bivass Shill	Input Retailer	Katiyanagla	01720 500240
46	Merry Tread	Feed Seller	Katiyanagla	01717 251188
47	Ajmol Gazi	Feed Seller	Katiyanagla	01937 702042
48				
49	Nitish Gain	Milk Collector		01913 097172
50	Sobita Gain	Vegetable Aggregator	Hatbari	
51	Laki Gain	Vegetable Aggregator	Kolsibunia	

b. Some Map of Polder 30



Ganges Basin Development Challenge G3: Water Governance and Community-Based Management of Water Resources, Polder 30