

Master File
On
Polder 26
Blue Gold Program
Khulna

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1. Background:

1.1 Introduction: The Blue Gold program has a clear focus is to improve the livelihood condition of the communities that are living in the polders. The entry point is improved water resources management by enhancing social development, after that increase agriculture productivity and ensure the marketing facilities through developing the sub sector/value chain in the program area. The program covers many aspects of polder development which concentrate around five component; Community Mobilization and Institutional Strengthening, Integrated Water Resources Management, Food Security and Agricultural Development, Business Development and Private Sector Involvement, Cross Cutting Issues that is Gender, Governance, Innovation, Climate Change and DRR.

1.2 Project Brief:

Program objective: The overall objective of the Blue Gold Program is *“to reduce poverty for 150,000 households living on 160,000 ha of selected coastal polders by creating a healthy living environment and a sustainable socio-economic development”*.

The specific objectives of Blue Gold are:

- i. To protect the communities and their land located in polders against floods from river and sea (climate change adaptation) and to optimize the use of water resources for their productive sectors.
- ii. To organize the communities in water management organizations and/or cooperatives which will be the driving force for the natural resources based development (agriculture, fisheries and livestock), whereby environment, gender and good governance are effectively addressed.
- iii. To increase the household income derived from the productive sectors.
- iv. To strengthen the institutional framework for sustained water resources development and related development services in the SW/SC coastal zones.

Program Components:

- Community Mobilization and Institutional Strengthening:
- Integrated Water Resources Management:
- Food Security and Agricultural Development:
- Business Development and Private Sector Involvement:

(Sources; Inception Report)

1.3. About Master file:

Master file is an official document of Blue Gold program, which contain the sources of information about inside and outside of the polder 29. Everyone can use it for makes a common understanding about the Polder 29 as well as overall concept of Blue Gold program of commanding area.

The master file provide the sound understanding about the geographical location, physical infrastructure, institutional structure, different economic activities, livelihoods, socio-economic statue of population, culture, and communication system in the polder area.

The master file also provide the information on Agricultural activities in relation to Agriculture products & production, land productivity, cropping system, cropping intensity, different opportunities & existing practice, adoptable technique & technology, fish culture, livestock development and any other off-farm activities in the polder area.

This master file can help to business development component by providing necessary information on input-output market, different actor and their function, private sectors, local marketing system, sources of services, constraint & opportunities in market so that they can design the polder development plan (PDP) and value chain development activities.

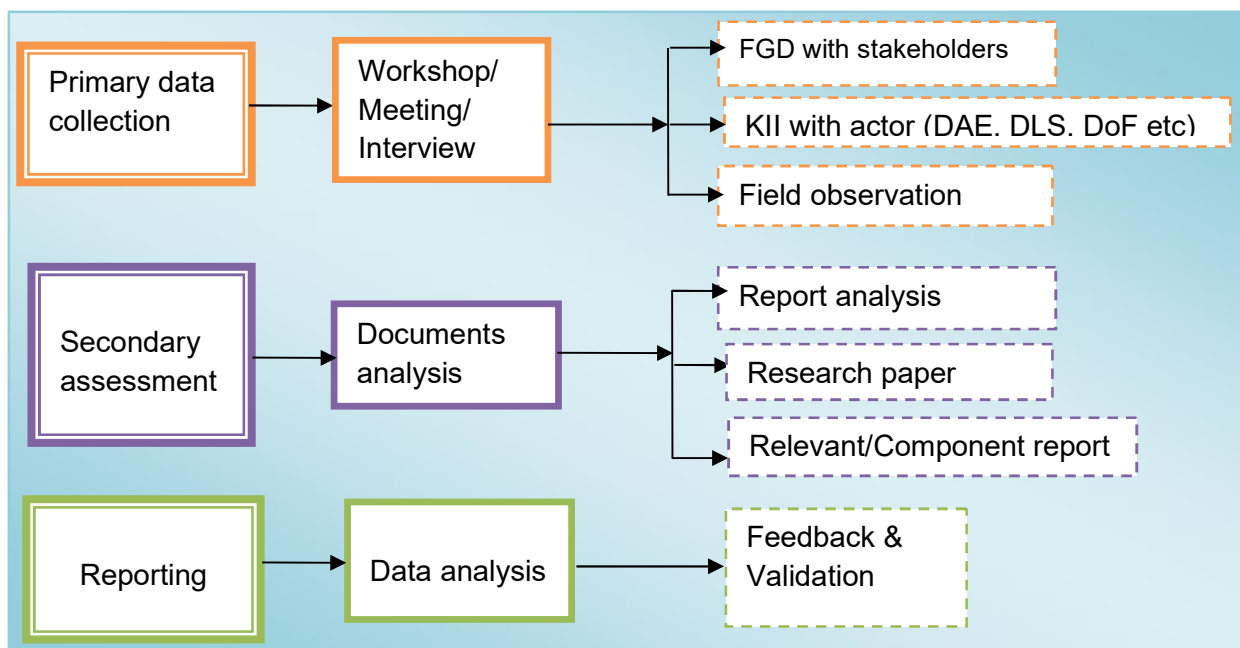
Therefore, this master file also helps to other component of Blue Gold program for use as a effective tools to know theoverall situation of livelihoods status, Agril production, marketing and local context in polder area.

Objective of Master file:

- To use master file as a source of information
- To makes a common understanding about component -4 of their overall objective, intervention as well as activities.
- To improve the knowledge and skill of staff so that they can manage the program by independently.
- To use it as a base line data which help to monitor and measure the program activities accordingly.

1.4 Methodology:

The master file has prepared by use different methodology, firstly primary data collection by conducting meeting, workshop, face to face discussion, interview with key informant, focus group discussion with different level of stakeholder, and overall field observation. Secondly report and documents analysis in order to cross check and validation of all collected information. And lastly master file has developed by accumulating all type of analytical data, put point specific explanation against field information and observation, and submitted to all concern staff for giving the valuable feedback and suggestion. Different tools and methods use for accomplished the task those are given bellow;



Primary data collection; This step is very important and essential to write up any documents. By this step, we effectively apply the different PRA tools/methodologies like; FGD, KII, face to face discussion, and transect walk or field visit for knowing the common observation about the polder 26. All implemented methods carried the different information especially on basic data, local context, livelihood status, agriculture production, and market situation and for capturing the information we used the different type of data collection format. These processes also ensure to gather new concept, learning, challenge, limitation and idea which help to develop the master file.

Secondary assessment; Different type of project documents like; project inception report, planning study report, project documents, annual plan of operation, polder area maps analysis and project progress report were kept and analysis in order to gathered the inside knowledge and idea about the polder area. It has also used as a primary data sources for prepared the master file report.

2. About Polder

2.1 What is Polder?

In briefly **Polder** is 'An area of low land that has been reclaimed from sea and river and it is protected by dikes'. A **Polder** is a low laying tract of land enclosed by embankments (barriers) known as dikes that forms an artificial hydrological entity, meaning it has no connection with outside water other than through manually operated devices.

An area of low-lying land, that has been reclaimed from a body of water and is protected by dikes. Water enters the low-lying polder through water pressure of groundwater, or rainfall, or transport of water by rivers and canals. This usually means that the polder has an excess of water, which is pumped out or drained by opening sluices at low tide.

In generally, Tract of lowland reclaimed from a body of water, often the sea, by the construction of dikes roughly parallel to the shoreline, followed by drainage of the area between the dikes and the natural coastline. Where the land surface is above low-tide level, the water may be drained off through tide gates, which discharge water into the sea at low tide and automatically close to prevent re-entry of seawater at high tide. To reclaim lands that are below low-tide level, the water must be pumped over the dikes. If a sediment-laden stream can be diverted into the polder area, the sediment may serve to build up the polder bottom to a higher level, thus facilitating drainage.

(Source:<http://en.wikipedia.org/wiki/Polder>)

2.2 Type of Polder;

The polder is a Dutch term. The Netherland is frequently associated with polders. This is illustrated by the English saying; "God created the world but the Dutch created Holland". The Dutch have a long history of reclamation of marshes and fenland, resulting in some 3000 polder in nationwide. About half of the total surface area of polders in north-west Europe is in the Netherlands. The first embankments in Europe were constructed in Roman times. The polders were constructed in the 11th century.

(Sources;http://en.wikipedia.org/wiki/Polder#Polders_and_the_Netherlands)

There are three type polders;

1. **Land reclaimed**; from a body of water, such as a lake or the sea bed.
2. **Flood plains**; separated from the sea or river by dike.
3. **Marshes**; separated from the surrounding water by dike and subsequently drained.

Bangladesh has 123 polders, of which 49 are sea-facing. (Source; <http://en.wikipedia.org/w/index.php?title=Polder&action=edit§ion=3>) These were constructed by Bangladesh Water Development Board (BWDB) since 1960s in the 14 coastal districts of Bangladesh (Khulna, Satkhira, Bagerhat, Jessore, Pirojpur, Barguna, Patuakhali, Barisal, Bhola, Noakhali, Laxmipur, Feni, Chittagong & Cox's Bazar) to protect the coastline from tidal flooding and reduce salinity. It was implemented the Coastal Embankment Project (1961-1978) and its subsequent extensions into newly accreted areas. There are about 6,000 km of embankments that protect 1.2 million ha of agricultural lands in the country. Unlike flooding and tidal surge, recent cyclones including the most recent *Sidr* in 2007 and *Aila* in 2009 brought substantial damage to these embankments. In response, BWDB re-focused its strategy on protecting against cyclones and developing early warning systems. [source: Social management and resettlement policy framework (SMRPF), coastal embankment improvement project, phase-I (CEIP-I), April 11, 2013]

2.3 Purpose of Polder formation:

Bangladesh is also ranked as being at “high-risk” of multiple devastating hazards. Bangladesh will be among the most affected countries in South Asia, with rising sea levels and more extreme heat and more intense cyclones threatening food production, livelihoods and infrastructure. Instrumental in the region’s agriculture development, they have also played a key role in mitigating the loss of life and damage during tidal surges.

In fact, in many areas, siltation has raised the river or other water channel bed to such levels that the polder region itself effectively lies below the water level. As a result, when sluice gates are opened, instead of water running from the polder lands, outside water rushes in, resulting in long-lasting water logging and flooding.

Many of the polders were created to increase the safety of the people living in the or near the sea and rivers. People build dikes around the sea or river to protect themselves.

“Polders play a crucial role in avoiding water logging from tidal surges. The recent Cyclone Mahasen was low in intensity, but the damage could have been significant from the resultant tidal surges and flooding. But the polder networks allowed the water to run off, avoiding long-term flooding,” said Delwar Hossain, executive engineer of the Bangladesh Water and Development Board which maintains an extensive database of coastal polders, including their length, location, construction year and cost.

3. Geographical Description of Polder:

3.1 Physical features and Topography:

Polder 26 lies between Latitude 22° 38'00" and 22° 49'00" North and Longitude 89° 23'00" and 89° 28'00" East. The gross area of the polder is about 2696 ha, with a net cultivable area of 2100. It is roughly shaped in the form of a triangle. As geometric analysis of Polder map, it is observe that south part is 45 degree angle and north part is roughly street from east to west and top of the north-east and north-west part is also 45 degree angle.

3.2 Geographical location of Polder

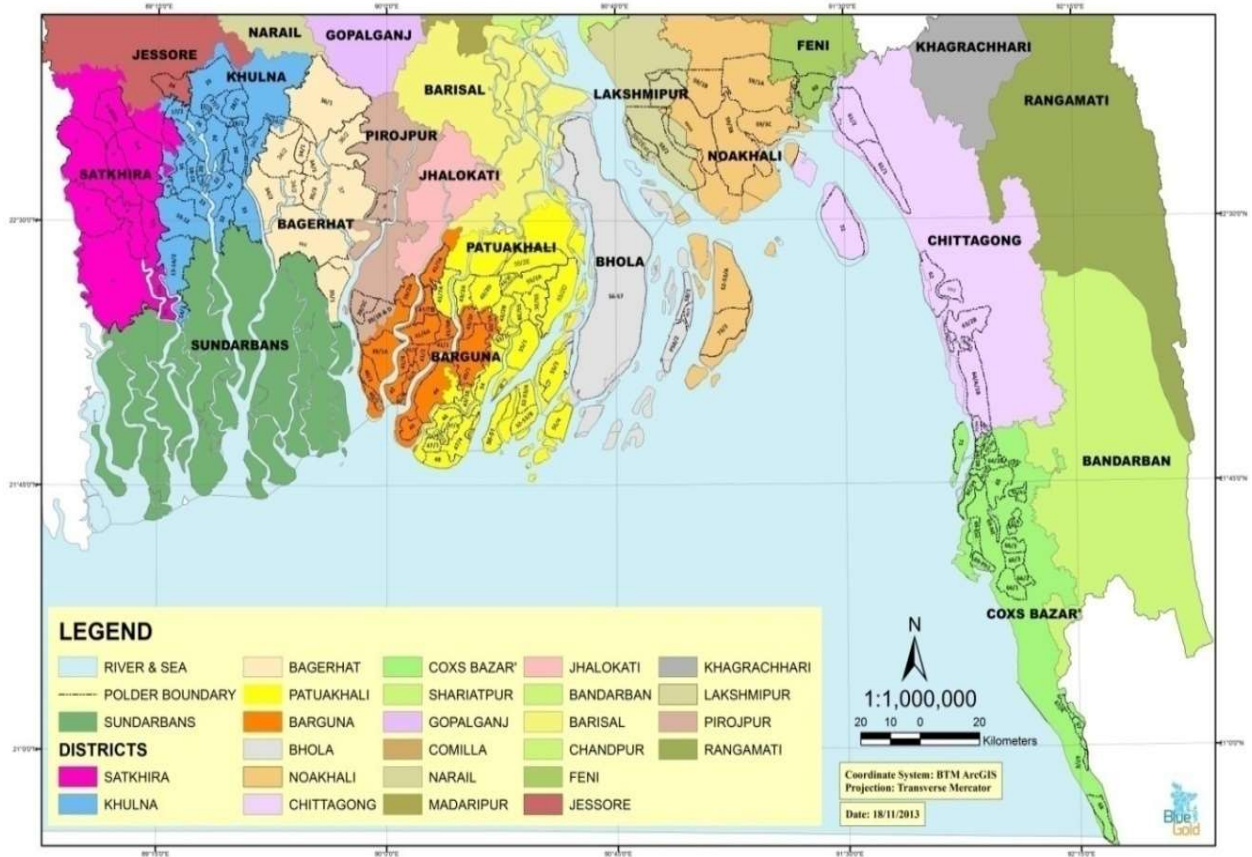
Polder 26 consists of 15 mouzas under Sobhna union of Dumuria Upazila of Khulna district. Starting point of Polder 26 is very adjacent from Upazila head quarter and 15 km distance from District head quarter. The Polder 26 only limits in the Sobhna union but not cover the 100% area. Specifically the south part located 3 mouzas of the union are not included within the Polder area its separated by the Bhadra river from the Polder 26.

The location of Polder 26 is east part surrounded by polder 29 and also flow the Mora Bhadra River which separated the both polder, southwest part surrounded by Gangrail River and polder 17/1, northwest part surrounded by Teligati River and polder 17/2, and north part surrounded by polder 25 it is also separated by Satkhira-Khulna high way road.

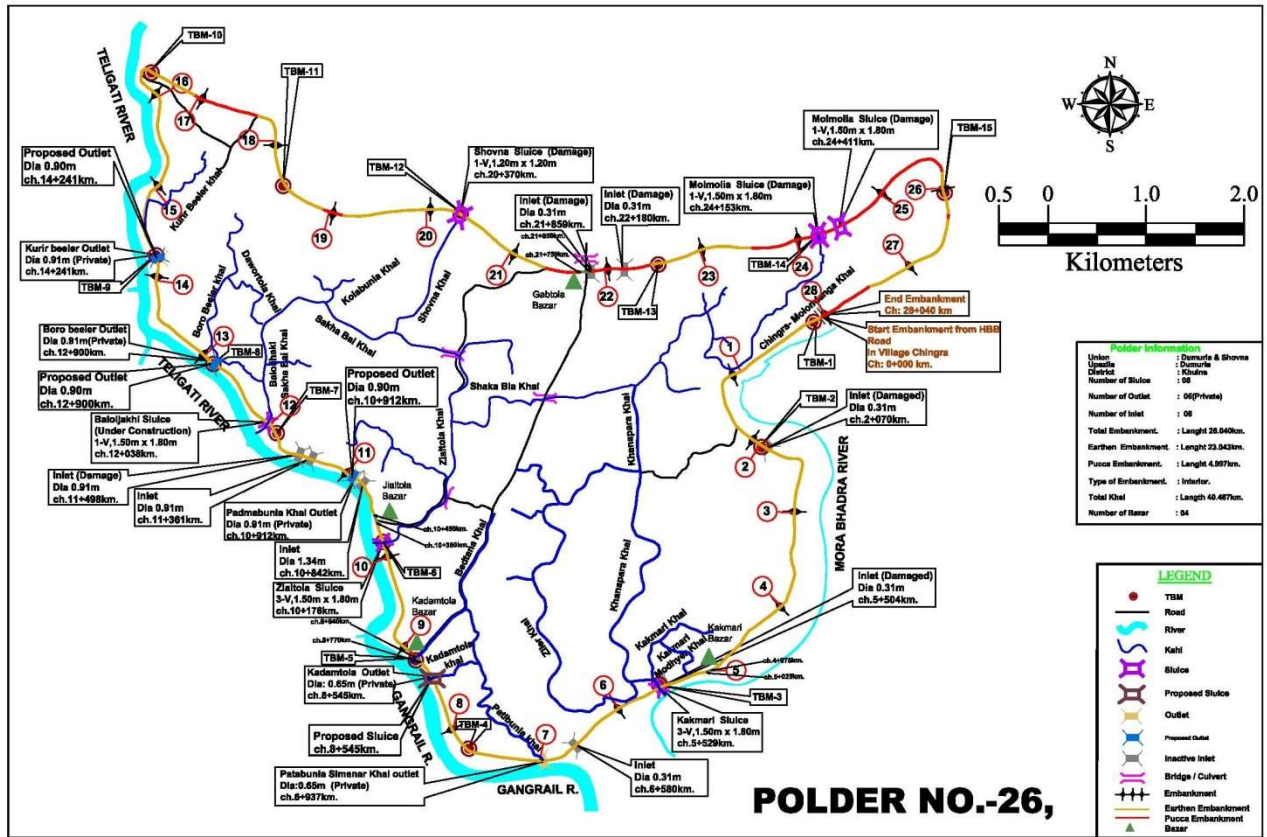
3.3 Weather & Climate

Polder 26 is humid during summer and pleasant in winter. Polder 26 has an annual average temperature of 26.3 °C (79.4 °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 is 1809.4 millimeters (71.2 in). Approximately 87% of the annual average rainfall occurs between May and October.

3.4 Map of Bangladesh costal Polders



3.5 Map of Polder 26



4. Present situation of Polder:

Polder 26 is one of the smallest Polders in the program area of Khulna. This Polder covered only 11 villages by formed 15 WMGs and 2 WMA. This polder started from the upazila head quarter and north part of Polder are touching the Khulna-Satkhira high way road. One-third polder dwellers are getting the modern citizen facilities like electricity, water supply, and available transportation facilities like motor cycle, van, Auto bike, bus etc.

Table-01: General statistics of Polder 26:

# Uz	# Union	# Mouza	Village	population	Area (ha)	No. OF WMA	No. Of WMG	Regulator/ WCS	River	Khal (km)	Embankment (km)	Inlet-outlet	Bridge/ culvert
1	1	15	11	22605	2500	2	15	4	3	18	28.6	7	

4.1. General Description of the Sobhna Union/Polder:

Sobhna Union is comprised of 18 Mouzas and 16 villages, out of them 15 mouzas and 11 villages are in Polder areas. Total area of 4504 ha of which net cultivable area 2710 ha, temporary fallow land 115 ha. The number of farmer family 4735 where only about 5 % share cropper and different farmer's categories is landless 473, marginal 1375, small 1763, medium 710 and large 414 respectively. The area under irrigation is about 45% which indicate that agriculture practices under irrigated condition are not dominant in the union. Boro rice (HYV/LIV) and winter vegetable is the irrigated crop intensively cultivated using mainly surface water. The local people of the union were reporting that optimal yield of Boro and other crop could be achieved if more irrigation facilities and necessary inputs like; quality seed, fertilizer pesticide, bio pesticide, agricultural machineries and sufficient agricultural credits are timely ensured and unplanned use of land could be controlled by introducing land zoning system in the union.

4.2. Water Management Group (WMG):

Blue Gold program have formed 15 WMG by addressed of specific village name. By this reporting time, Component 1 already has formed 14 WMG and another one under the formation process. They have also plan to from 2 WMA as a platform of WMA.

SI no	Village name	WMG name	WMG members		
			Male	Female	Total
1	Kakmari	Kakmari WMG			
2	Kadomtala	Kadomtala WMG	135	100	235
3	Jialtala	Jialtala WMG	214	176	
4	Patibunia	Patibunia WMG			
5	Boabunia Gopalnagar	Boabunia Gopalnagar WMG			
6	Shibpur Badurgacha	Shibpur Badurgacha	195	146	341
7	West Shovna North para	West Shovna North para			
8	West Shovna south para	West Shovna south para			

9	Middle Shovna west para	Middle Shovna west para	162	62	224
10	Middle Shovna east para	Middle Shovna east para	153	71	224
11	East shovna east para	East shovna east para			
12	East shovna west para	East shovna west para	322	240	
13	South Chingra	South Chingra			
14	North Chingra	North Chingra			
15	Molmolia	Molmolia	200	161	

4.3 Main income sources and livelihoods:

In the polder area most of the household depend on more than one sources of income for maintaining their livelihoods. We conducted FGD with 3 WMG out of 15 WMG from where we got a data by discussion with members but not cross check house to house visit. Considering in our polder area, Agriculture is the main income source for the majority people; while 31% of households are depends agriculture as their major sources of income, 22% households selling labor in agriculture, 8% households selling labor in non agricultural sector and 15% of households are depends in fish culture activities as their major sources of income. A good numbers (12%) of households are involved in business as their major sources of income, here business means a whole range of business from the 'petty trading' of poor people to large scale business of rich people. Business enterprises of the polder area included buying and selling fish, running shops (grocery/sweetmeat/poultry feed/cloth), renting machineries (tractor/power tiller/), running tea stall, poultry farming, mobile phone recharge etc. (sources; FGD with 3 WMG where total HHs is 841)

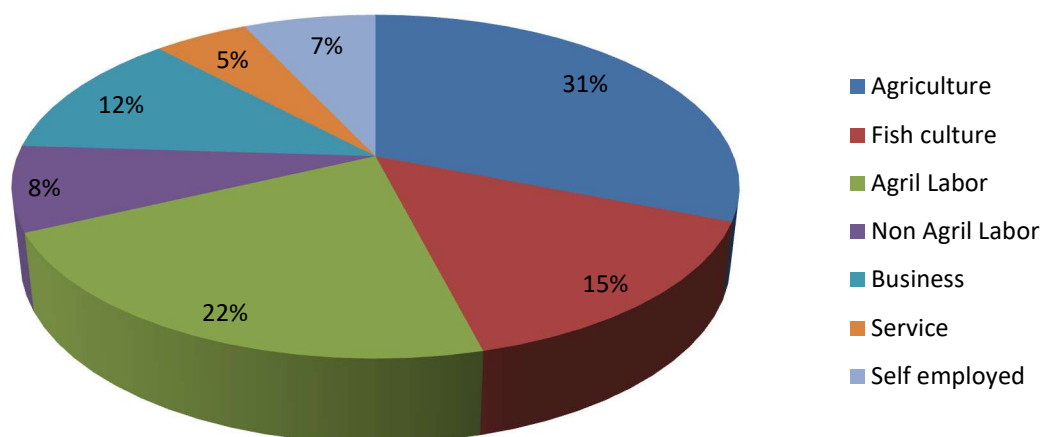
A large number of female-headed households are depending on selling households labor. The female laborers usually get engaged in wage laboring mostly in harvest and post harvest activities. They also get involve in earth work (road/gher construction and maintenance of rural infrastructure). They receive a lower wage rate than the males even if they perform the same work.

Table -02: Major income sources of People

Name of Union	Total No of HHs	Distribution of HHs according to their major income sources							
		Agric ulture	Fish culture	Agril Labor	Non Agril Labor	Business /trading	Service	Self-employed	
No	841	1326	250	639	919	483	239	137	
%		31	15	22	8	12	5	7	

(Sources; FGD with WMGs)

Chart 01: Major sources of incomes



4.4 Socio economic status:

Without house to house survey, it was difficult to measure the actual socio economic status of every people. Besides, it has not completed the household's survey report for categories on well being status of households in polder 26 as the task of component -1. But it is more required to know the people's socio economic status which indicates the overall scenario of communities. During assessment period, we followed different data collection process by conducting FGD with WMG, individual interview with community's peoples, KII with Union Parishad representative, and sometime over discussion with WMG's president and secretary for get the more information about this issues. Just we set some of criteria to distinguish well being status in four categories. During data collection time it has observed that major percentage people have been continuing their livelihoods by involved in agricultural occupation like; field crop cultivation, fish culture and selling agriculture labor so that most of the peoples are bellow to poor (Extreme poor and poor) some of people are medium rich (Motamuty sachchal) and negligible numbers of people are rich (sachchal). The bellows criteria follows to categories the well being status;-

Extreme poor (Ati Garib)

- These people who living by hand to mouth.
- They do not take 3 meals in a day with cannot take nutritional valued any food.
- Some time these people take 1 or 2 meals in a day.
- Cannot buy sufficient clothes.
- Children & women always faced the nutritional deficiency.

- Children deprived from education facilities and involved in selling child labor.
- Early marriage rate is high in households.
- Women from such families have to work as day labor.
- Some of them are living by begging.
- Always these people are in the back in health care facilities or do not get the treatment support in a timely and sufficient manner.
- Numbers of family members are always more than the numbers of earning members that is dependence on members is always high.
- They are landless and have no fixed assets and always live on government land or land owned by donors.

Poor (Garib)

- These people sell physical labor throughout the year both in agricultural and non-agricultural fields.
- They do not have any cultivable land, only have their own homestead.
- Some times they are involved in agricultural production as a contract farming system.
- Their expenditure always appears to be more than their income.
- They take 2-3 meals a day but the nutritional value of the food is questionable.
- They have no ability to cope with any crisis situation without external help.
- They always live on an unkind loan repayment cycle by receiving money to overcome the crisis.
- They pull cycle-rickshaws, rickshaws and any other man-driven vehicles.
- Some of them are engaged in petty trade.
- They make their living from catching fish and crabs.
- Some of them go outside the area to sell labor and do some odd jobs.

Medium rich (motamuti sachchal)

- They earn enough to lead a moderate life-style though they have to work hard for it.
- They do not suffer from want of food and clothes; they can also afford some luxury items.
- They can afford to educate their children.
- They do not face problems in the treatment of minor ailments of family members.
- They have some cultivable land; they cultivate their land themselves and share cropping some more land.
- From their own agricultural production they are able to supply food for their own consumption up to 8-10 months in a year.
- They have *ghers* (shrimp-fields) and ponds.
- They have medium-category businesses.
- Some family members have salaried jobs (in educational institutions, NGO offices, police department, armed forces).
- They sometimes own power-tillers and shallow tube-wells.

Rich (Sachchal)

- They have their own land.
- The harvested food grains are sufficient for their households and even they sell the surplus.
- A certain percentage owns land and ponds and give the lease to other persons for continuing agricultural production.
- Always hire agricultural labor throughout the year.

- They have big business enterprises; some of them have more than one.
- They have own *ghers* (shrimp fields).
- They have nice houses with orchards, some of them have buildings.
- Household members have good jobs (GO/NGO).
- They have own power-tillers and shallow tube-wells.
- They have no difficulties to educate their children or to obtain good treatment for ailing members of their families.
- They can easily cope with crises with no serious difficulties.
- They can afford luxury items for their household members.

Table-03: Well being categories of households

Name of union	No of HHs	% of HHs			
		Extreme poor	Poor	Medium rich	Rich
	4735				
		8	50	30	12

4.5 Daily wage rate:

Wage rate are not the same for both of male and female in different type of work causes behind for that female are physically less capable of work than the male and another causes is female get flexibility in time or never done comparatively hard work in the field. It is not equal in wage rate in rural area and urban area, urban area (Dumuria) wage rate always higher than the union or village area. Wage rate also differentiated considering the nature of work, like earth work or construction related work wage rate always higher than the agricultural work. Again in considering the agricultural sector, wage rate in fish culture (prawn culture) is always higher than the field work. It is the normal phenomenon in our country context that wage rate always fluctuated by considering the season.

Table 4: Male-Female wage rate

Type of work	Male	Female
Earth work in road construction	300	250
Earth work in <i>gher</i> construction	300	250
Paddy Harvesting	400	300
Paddy Threshing	400	300
Bed/land preparation of vegetables field	300	220
Intercultural operation in vegetable field	300	220
Shrimp and Prawn Harvesting	300	250
Cleaning shrimp and prawn for sale	300	250
Labor (rajmistri)	400	330

(Sources: KII with WMG)

4.6 Drainage facilities:

Drainage facilities are fully hampered due to siltation of surrounding river. Most of the inlet-outlets are not effectively works. Different water management infrastructure like; 3 outlet, 4 inlet and 7 sluice gate are available in the polder areas of which all outlet are damaged and 2 are proposed for repairing, 2 inlet are damaged and 3 sluice gate are fully damaged. Outlets facilities are fully closed due to raised the river bed and on the other side maximum channel (18km) are controlled by some people of many purposes (fishing, rice producing, and housing). Beside three rivers Mora Bhadra, Gangrail and Teligati has run away surrounding the Polder 26. After having those infrastructure, polder is not effectively worked on drainage system and resulting is many areas go through under water and some of area permanently water logged year to year. Bangladesh Water Development Board (BWDB) has constructed polders and associated water management infrastructure for safe guarding huge tract of land from inundation of saline water during high tide as well as from upstream flood water and thereby promoting agricultural production. Water management groups (WVG) try to continue the proper maintenance by their own management so that the all infrastructures performing very well. But it is true that still now they do not get any drainage facilities from those infrastructures. The People are thinks that the re-excavation of khal inside the polder will not help much more to improve the drainage facilities it should require the re-excavation of river, because the all river beds has been raised through siltation and salinity of river water has been increased and resulting is local rain water as well as upstream flood water during rainy season cannot drain out efficiently.

4.7. Water supply, sanitation and health facilities:

The coastal area of Bangladesh is endowed with both fresh and salty water resources. The country as well as coastal area receive enormous amount of fresh water during monsoon while during winter there is a scarcity of fresh water. The water salinity is normally flushed during monsoon but cannot fully remove the soil salinity. There is a scarcity of good drinking water in the polder area especially in the dry season; In the Polder areas have 9 km of water line are available by which supply safe water for the people. Every village have deep tube-well for supply the safe water but not sufficient for total people. So people of such villages have to go to other villages to collect drinking water. The problem of getting good drinking water becomes intense during the rainy season. People also harvest rain-water for drinking purpose; but it requires a certain capability, which most poor people are not able.

DPHE has achieved 100% sanitation coverage at the upazila. During data collection period when discussed with WVG we found that, in rural area a good numbers of peoples (80%) are used healthy & hygienic sanitary latrine (water-seal), It is mainly the poor people (20%)

due to their lack of awareness they did not set up the sanitary slabs (not water-seal) just they digging the soil and constructed a bamboo made house in surrounding the excavate soil and in some cases it is questionable as healthy point of view but never people go to the open field to use the latrine.

There are 01 upazila health complex, 03 hospital, and 12 health and family welfare centers at the upazila. (Sources; upazila website). But in polder area 03 community health clinic or family welfare center have been continuing the health related service to the community level.

4.8. Physical infrastructure:

Dumuria Upazila is covered 454.23 sq km of land, out of which 6.93 sk km is designated as urban are (BBS 2001 community series data base) Compare the physical infrastructure, Dumuria upazila is one of the developed upazila specially in road communication facilities from union to upazila level, upazila to district level also inter linked road within the union boundary. Khulna-Satkhira road has passed through meddle of Dumuria Upazila. In the polder areas branching road are available like; bituminous road is 11 km, break soling 25 km and Kacha road (Soil made road) 74.5 km. Those facilities help to people for easily access to ensure the other facilities like; education, marketing, health service and fulfill the other basic and minor need.

4.9. Government office:

Government managed total of 30 different specialized office (DAE, DLS, DoF, land office, social welfare, cooperative department, Health & family planning, BWDB, LGED, Education office, Youth development, DPHE etc) and institutions have been working and provide their specialized service to the peoples. Total of 315 educational institutions have been continuing educational service to the people for make an educated and independent nation. 373 holy place are established for all religious people for completed the religious activities in the upazila boundary. The polder 26 is very adjacent from the upazila, so people already have got access different service from those specialized departments.

Table 5: Government service providing institution and office at Upazila

SI No	Institution/office	Number
1	Government primary school	110
2	Registered primary school	92
3	High school	63
4	College	12
5	Madrasha	30
6	Community school	05
7	NGO's managed school	03
8	Mosque	237

9	Temple	132
10	Charge (Girja)	04
11	Clinic & hospital	03
12	Health & family planning center	12
13	Orphan center	12
14	Hat-Bazer	42
15	Bank	11
16	Government office	30

(Source: Upazila website)

4.10 Non Government office (NGOs):

A number of local, national and international development and credit orientated Non Government Organization (NGOs) are have been working in the area. Different micro credit organization like; BRAC (general micro credit and BCUP credit), ASA, Grameen Bank, Nijera Kori, PROSHIKA, Projukti Pith, PKSF, Palli Unnayon Sangista, CARITAS, CCDA, Buro Bangladesh, HEED Bangladesh, RRD, Ashroy Foundation, Shusilon, Rupantor are active in the polder area for providing financial support as credit including provide service on education, awareness, and in some cases volunteer support where necessary. Some of them are also active to implement the development program by the technical and financial support of government, donor and national organization. It is quite striking to see that more than 50% of households have their members linked with NGOs or some local organizations in most cases, extreme poor & poor people (Garib) and medium rich (Maddhyam) categories of households are members of these organizations. Despite a high concentration of NGO activities in the area and equally high enrolment in NGO program, non-members do not always hold a high opinion of NGOs and their activities. Some of the complaints regarding NGOs and their activities are; they are doing business in the guise of social work; they have set up a money-lending business; they are working with foreign funds and their activities are taking people away from religious.

Table 6: NGOs and their services

Name of NGOs	Type of service
BRAC	Micro credit, BCUP loan, food security program, education and health program
ASA	Micro credit
Grameen Bank	Micro credit
Nijera Kori	Micro credit and development program
PROSHIKA	Micro credit
HEED Bangladesh	Micro credit
Ashroy foundation	Micro credit and development program
Shusilon	Micro credit and development program
Rupantor	Micro credit and development program

BRAC- BCUP program:

BRAC has started its Borga Chashi Unnayan Prokalpo (BCUP) in our polder 26 to increase the agriculture production by ensuring Agriculture loan, quality seed and modern agriculture technology to reduce poverty of rural poor, specially for marginal and land less farmers. Also to increase share croppers access to agricultural credit at rural and hard to reach areas and capacity development of the rural farmers through providing training and technological supports thus enable them to maximize their resource utilization. WMG members are involved in different IGA especially in Agriculture, Fisheries, Livestock and other activities. To execute IGA, generally most of the WMG members are receiving their business capital from different microfinance institutions (MFIs) with higher rate of interest. BCUP of BRAC is also working in coastal areas, so intention is to explore how WMG members can get financial opportunity from BCUP to implement their IGA as interest rate minimum comparatively than other MFIs/MFBs. In our Polder area, they already formed 15 village organizations (VOs) and those are also having relation with our WMG. Every VOs formed by consist of 25-35 members and by this way they working with approximately 460 members in our polder area. From the information of BCUP personnel, at least 70% members come from the WMG. As their loan policy, they have disbursed BDT.15000 to BDT. 70000 for each members depends the loan demands as well as nature of income generating activities. Loan amount gradually increase by the satisfactory repayment of 1st loan.

4.11 Market infrastructure:

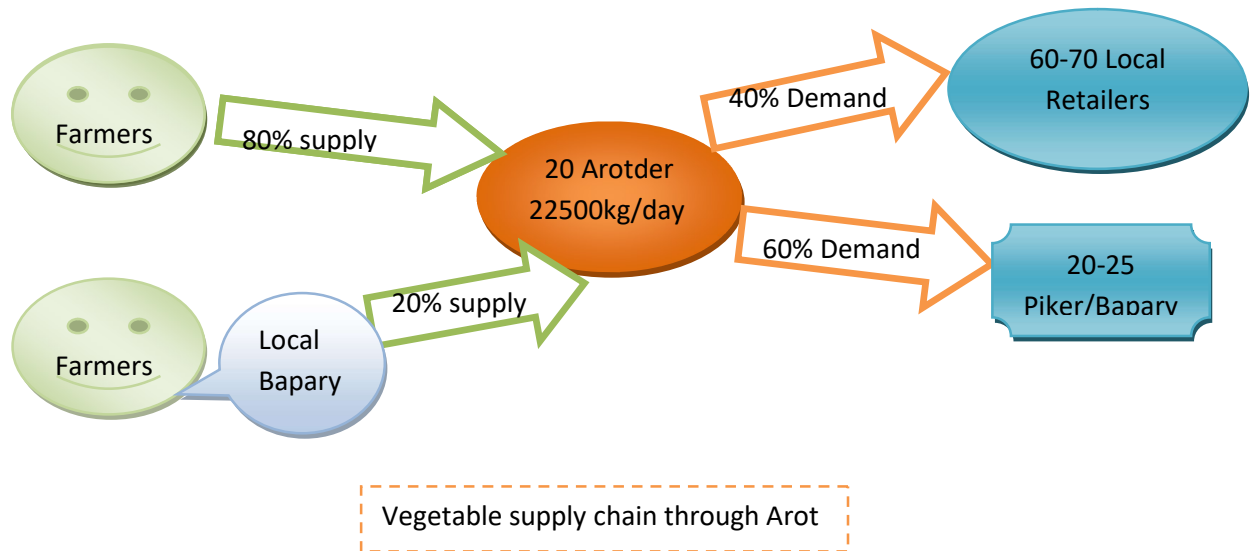
4.11. a Permanent Market: Upazila administration managed and listed total of 42 markets place (hat-bazer) are established in the Uapazila boundary and in Polder area total of 6 markets place are situated. The roof of the permanent markets is constructed by tin-shed and floor are carpeting by brick and in some cases concrete carpeting. In the market, some of shops are fully secured by separated small cottage and it this type shop leased to the grocery shop owner and they continue the business start from early in the morning and end up to midnight. Other space in markets are open and there are no any boundary in terms of security circumstance but place separated specifically for leased owner and this place are mostly use for vegetable, fish, and cereal crop marketing. This type of constructed market have been continuing the business activities every day but particular day in a week here sited the specialized market by the name of local hat where all level of customer and different piker come from distance place. In the Polder area Gabtala hat, Kauncil hat, Kamer hat, Zialtala hat, Kadamtala hat, and Madertala hat etc sited in particular day and people have got marketing facilities in every day by round the week. Hasem ali Kacha maler Arot (fresh vegetable and fish Arot) is the biggest and famous market are situated outside of the polder but very nearest and well accessible for all. The people also goes to other market which are situated outside of the polder like; Dumuria bazer, Shahapur hat, Kharnia hat, Chulnagar hat, and Khulna bazer. The big pikers come in this wholesale market from Outside, particularly from Dhaka, Khulna, Jasohor and Barisal. So this market creates an opportunity especially for vegetable and fish producers.

4.11.b Temporary Market: Approximately temporary basis 120 market (hat-bazer) have been running in the upazila boundary, generally this unrecognized market is situated in the center of the village or roadside. Among these markets some of seasonal which are mostly focused by specific product based and sited one or two days in a week. On the other hand some of markets are sited very short time in a day specially focused for selling and buying specific products like; fresh vegetable, fish, milk, egg and poultry etc where nearest villager come in the market for exchange the products. Here markets are splits with different segments like fish, vegetable, rice, sapling etc. Usually poor producer have got the opportunity to sale their surplus product (vegetable, fish, milk, egg, and poultry) and 10-15 different type of retailer (depends on market size) have running the business by collecting the products from outside area.

4.11.c. Over view of Hasem Ali Kacha Maler Arot:

It is very great opportunity of polder dweller that Hasem Ali kacha maler (vegetable & fish) Arot are situated in this area and give the very good contribution especially in operate the vegetable & fish business. It is very adjacent to upazila head quarter. This market are situated by the touching of three connecting road so very easy to road communication, one road go to connecting the Khulna-Satkhira high way road just distance is 200 meter, one road go to the Dumuria bazer (Upzila HQ, town) and another road go for connecting with other union like Sahos, Bhanderpara, Sarafpur and Surkhali (part). Well decorated infrastructure in this market also drainage facilities, electricity, load-unload facilities, and transportation vehicle parking facilities is very good. Vegetable and fish Arot are fully separated by two segments and each segments divided by two rows and every rows is longest shape as like a veranda/gallery but splitting by 8 shop/room/Arot so almost 32 arot in this market. Here have a 7 membership strong management committee and they play very good responsibility for directly price negotiation between piker and farmers.

In this Arot every day approximately 20-25 pikers come from Dhaka, Barisal, Pabna and Khulna, 60-70 local level retailer come from different hat/bazer and 150-200 producers have got opportunity to selling their vegetable. A total of 20 Arotder have provided the marketing facilities and their calculation is each Arotder have transected or exchanged 1500kg vegetable per day in peak season. Mainly this Arot are fully depends on the farmer's vegetable and all categories farmer get the facilities to selling the very low to big amount vegetables. On the other hand 000 fish piker come from Khulna and Dhaka also 80 local retailers come from different local level hat/bazer. Every day approximately 30 culture fisher, 75 open water fisher, and 25 shrimp culture fisher got the fish marketing facilities.



4.12 Environmental Hazards:

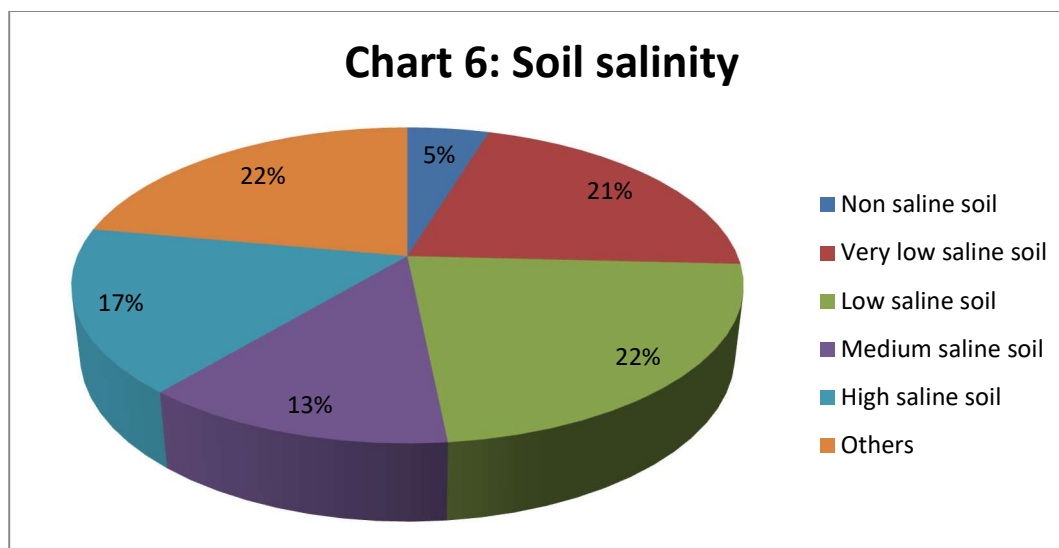
4.12. a. Soil salinity;

The coastal area of Bangladesh is contributed both the fresh and saline water. The country receives huge amount of fresh water during monsoon while during winter there is a scarcity of fresh water especially in coastal area. It is true that saline water is one of the major natural resource in Bangladesh which from helps to produced the salt and marine fish (shrimp culture) and it is contribute to earn the foreign money. We are known that saline water improved the marine fish culture activities but other hand day by day decrease the soil fertility and ultimately field crop productivity going to zero where saline water flooded the crop land, so it is the major concern in terms agriculture production. But it is possible to flushed water salinity during monsoon in particularly drinking purpose and used it in agriculture sector for irrigation purpose but it is difficult to remove the soil salinity if at least one time affected by saline water. Crop cultivation is fully interrupted when saline water come off from Bay of Bengal and saline water flooded the crop field spontaneously. As a result, all type of cereals crop like; rice, wheat, maize and vegetable like; sweet gourd, pumpkin, bean, radish, arum and different homestead fruit like; papaya, banana, guava, pomegranate, lemon etc have lost their yielding capacity due to the soil nutrients cannot work efficiently. However the impact of soil salinity still remains countable in this area but in our polder area it is measurable and remains up to controlled.

Table 7: Saline affected area in the Upazila

Soil salinity	Covered area (ha)	Percentage (%)
Non saline soil	2100	4.7
Very low saline soil	9468	21.1
Low saline soil	10100	22.6
Medium saline soil	5710	12.7
High saline soil	7500	16.8
others	9911	22.1

(Sources;DAE)



Sources; DAE

4.12.b. Siltation:

Siltation is also one of the major problems which directly affected the waterlogged situation in the Polder areas and resulting; river bed is higher than canal bed (khal) or low land. When up & down streaming flood are happens that time enormous amount of sand are storage on the river bed and resulting is river silted up and connection of the river mouth are raised rapidly and disrupted the connectivity between river and low land areas. There have been significant changes in the physical feature and the ecology of the beels, khal, floodplains and rivers due to siltation, which caused adverse impact on the resource base and the livelihoods of the people. The different type of construction like road, culvert, regulator and many others developments activities have not functioning properly. Some of area are faced the severe problem from year to year if any year happened the heavy rainfall it has create a very extreme problem. Some of area are faced the moderate level of water logging problem it also depending the rainfall situation in the year and up & down streaming flood. The Mora Bhadra,Gangrail and Teligati river already raised by siltation and that's why created the water logging in the polder areas.

4.12.c. Water logging:

Water logging is the major problem of Dumuria upazila. Siltation is one of the main causes of water logging. All the year most of the outlet of the water canals that are supposed to drain out the water have been raised much higher than low land or beels, floodplains etc. Water logging does not happen only the geographical position rather human intervention like different construction also the major constrain for water logging. If any year happened the heavy rainfall it has create a very extreme problem. Some of area are faced the moderate level of water logging problem it also depending the rainfall situation in the year and up & down streaming flood. June to December is the water logging time but some of areas are waterlogged round the year. But farmers faced the severe problem in the period of mid July to August causes behind it is the time of seedling and land preparation of T-Aman rice cultivation. Water logging create the various problem like damage the agricultural crop, drainage blockage affect transportation system, polluted the surface water which is the responsible for water born disease and create other health hazards. The total communication systems in the submerged area are completely damage during water logging period and boat is the only way to overcoming the transportation problem in the locality.

Siltation is one of the main causes of water logging and resulting river bed is higher than canal bed. All the year most of the outlets of the water canals that are supposed to drain out the water have been raised much higher than low land or beels, floodplains etc.

This time also people have no any ability to maintain a minimum level of hygiene. And this time happen the seasonal migration to seeking the work or earning sources. Other indirect impacts on livelihoods are the impact on education and marketing. Many schools in the affected areas are inundated (as seen on the cover on the report), and during peak flood periods roads and trading areas are covered. Many households need to make repairs to their homes after mud foundations have been inundated with water for months on end. People seeking work need to travel further to find opportunities. There is an overall trend of increasing migration out of the area.

Impact and key finding of Water logging:

- Reduced income
- Reduced dietary diversity
- Lower consumption of nutritionally diverse food such as meat, eggs vegetable and fruits
- Reduced expenditure on long term productive investments such as schooling and health.

- Increased amount of days of labour worked
- Seasonal migration

Observation and Possible solution to reduce Water-logging:

- The people of the polder areas think that re-excavation of khals inside the polder will not help much more in reducing water-logging in the polder area. The local people strongly suggest for re-excavation of the surrounded rivers.
- In some areas, river bank and channel (khal) connecting point is closed due to build the permanent house on the embankment. The people think, if we can open this type of connecting point for free the water flow it helps to easily reduce the water logging problem in the polder.
- In some cases, channel are illegally occupied and controlled by some muselman and it disrupted the water flow system extremely. The people think, if we can release or free channel from their controlling and after that suggest for re-excavation of those channel.

4.12.d. Cyclone and tidal surge:

Everyone known that the coastal belt of Khulna severely affected by natural disaster like cyclone and tidal surge forming in the Bay of Bengal. Due to geographical location Dumuria upazila is more vulnerable to cyclone and tidal surge. Wind speed (240km per hours) accompanied extreme rain and tidal inundation up to 6 to 7 meters hits the coastal area by maintain the uncertainty but as a normal phenomenon in nearest of sea area. People become helpless, fisherman are lost or died due to lack of or absence or ignore the weather forecasting or not having the life saving appliance. Apart from the loss of lives, there is a high economic loss like properties, settlement, infrastructures, forest, field crops, livestock etc. There is an evidence that the devastating cyclone Aila on 25th May 2009 caused damage to the life and properties of this upazila.

4.13. Crisis Period In the area:

Considering the well being situation of the people in the polder area 58% people under the poor (poor & extreme poor) and all are not have a “surplus food saving” through year. Most of them are living hand to mouth by doing hard work and always searching the new income sources. It is true that no work may even mean no food for some of them. So a period is regarded as ‘good time’ when income opportunities are available for people. Agriculture sector is the major income sources for the most of the people. ‘Good time’ means when agricultural activities are at the peak season while the agricultural lean months are regarded

as crisis periods. In the Polder area there are very limited agricultural activities during the months of Aswin, Karlik and first half of Agrahayan (mid September to mid November), besides, very little income opportunities are there in other sectors. Poor people adopt different strategies to cope with crisis. Some of them go out of the area in search of work, some go for pulling rickshaw/van; some take up petty businesses, many take loans from money-lenders and NGOs, or buy goods from shops on credit; many take advances from potential employers, and almost all of them cut down the number of meals per day and amount of food per meal. And very few number of medium rich people (maddhyam) category sell their assets (trees, domestic animals, ornaments, land), they borrow money from relatives, bank or money lenders, sometimes by mortgaging land and ornaments, they use less inputs in paddy fields, they buy commodities from shops on credit; and they minimize the amount of meals a day.

The following table gives a picture of the overall situation of the majority of people with reference to crisis.

Table 8: Cope the situation during crisis period

Well being category	To cope with the situation
Extreme poor & poor	<ul style="list-style-type: none"> • Migrate to other area to search of work. • Change the occupation to pulling <i>rickshaw/van</i>, petty businesses. • Take loans from money-lenders and NGOs. • Buy goods from shops on credit. • Take advances from employers. • Most of them cut down the number of meals per day and amount of food per meal.
Medium rich	<ul style="list-style-type: none"> • Sell their assets (trees, domestic animals, ornaments, land), • Take borrow money from relatives, bank or money lenders. • Mortgaging land and ornaments. • Less inputs in paddy fields and reduce investment in business. • Buy commodities from shops on credit. • Minimize the amount of meals in a day. • Some of savings the surplus food specific for crisis period.
Rich	Rich man always savings the surplus money and food for provide to other for copping the situation

5. Economic sector:

The rural economy of Polder 26 is predominantly agricultural. In this areas farmer have been produced varieties of crops, namely, local and HYV rice, vegetables, some essential spices, pulse and others minor crops. Fruits available in the district are banana, jack-fruits, papaya, guava, olive in the homestead area etc. Besides crops, fishery and forestry are other sources of household income. Shrimp and Prawn is one of the most important economic activities in the coastal area main, the Polder 26 is also focused as prawn cultured area.

But in our Polder area particularly 60% land use for agricultural production mostly rice and vegetable production. And 5% land is fully wetland which only used for culture fish and capture fish. Beside most of agricultural land are also used for prawn culture but it does not calculate in wetland its included in agricultural land. Out of total agricultural land roughly 45% land are used for prawn culture by our field observation and discussion with WMG members.

By considering the income sources, 31% people are fully involved in agricultural production, 15% in fish culture especially prawn culture, 22% in agricultural labor selling, 12% in small business, 7% involve in self employment.

5.1 Agriculture

5.1.a. General Description:

Dumuria Upazilais comprised of 14 unions, 206 mouzas, 226 villages, 30 blocks, having a total of 307644 populations (male-155361, female-152280). The total land area is 45423 ha of which total cultivable land is 30860 ha, net cultivable land is 30500 and fallow land 14443 ha. The numbers of Agril family is 62150 where about 18% are share croppers and different farmer's categories are landless farmer 6836, marginal 22995, small 21753, medium 8080, and large 2486 respectively. The land of Dumuria upazila of Khulna district is intensively used for agriculture, housing and settlement with homestead forest, shrimp or prawn culture, table fish culture and mixed cultivation (fisheries with rice). The major crop cultivation in this upazilla are Boro rice, Aus, T-Aman (HYV/LIV), wheat, cash crop (jute, betel nut, sugarcane), oil crop (mustard, sesame, sunflower), spices (onion, garlic, green chili, ginger, turmeric), pulses crop (lentil, muge bean), vegetable (potato, bottle gourd, wax gourd, bitter gourd, cabbage, cauliflower, tomato, country bean) and different homestead fruits. This diversified uses of land giving the financial benefit in one hand and other hand create a scope for employment generation. Agricultural land is the most valuable resource among all

the natural resources of a country which provides us food, clothes, shelters, and even life savings elements for our survival.

Rice production is the main livelihoods option of this Polder. Rice is the main crop for both food and cash purposes of this polder but then also most of the lands are used only one time for rice cultivation (Boro rice). The adopted agriculture practice is; the farmer utilize their lands both in rice and fish culture activities, after harvesting the rice, farmers goes to started prawn fish culture in the same lands. Boro covered the major percentage area but T-Aman is cultivated that area where land are free from water logging or that place where water rapidly go away.

Physiographical and Agro ecologically maps indicate that the Polder 26 is the crossover area of the Ganges Flood plan and Ganges Tidal fold plains. The area is part of and has been formed by an active delta system. The soil are relatively fertile and allowing for medium to high level intensified agriculture-multiple crop types, cultivated throughout the year in three seasons. Very insignificant numbers of others minor crops are presently cultivate in the Polder area such as pulses, wheat, potatoes, mustard, sunflower etc.

Many types of vegetable and several fruits are produced in this polder. These include cauliflower, cabbage, beans, radish are cultivated in the north part of the polder (high land of the polder area) and various gourd, okra, egg plant, pumpkin are cultivated in gher area (embank on the ponds). Mango, banana, jackfruit and guava are also common fruit.

5.1.b Land ownership:

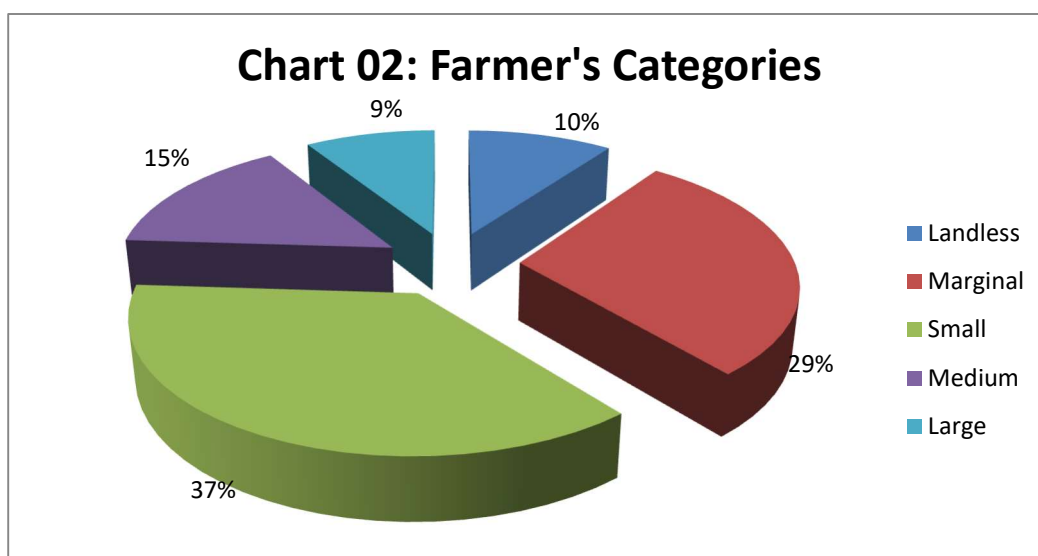
Land is measured in bigha which is equivalent to 0.33 of an acre (0.135 Hectare). A bigha is further divided into 33 decimals (1 decimal is equal to roughly 40m²). Land is one of the most important assets in rural society. In a village context, not only use it have financial importance, it also carries some social value. Though other assets like education and business are getting prominence, land still adds to the social position of a household in rural area. Department of Agricultural Extension (DAE) classified the household's wealth categories in the village areas. **Landless farmers**; it refer to those farmers who are at the bottom of the wealth line which are primarily composed of landless labor as well as van/rickshaw pullers etc and they have no any productive and non productive asset just have a mobile or some have bicycle/van. **Marginal farmers**; those households who have some productive land (Up to 0.2 ha land) that they cultivate for need to supplement own consumption and some have non productive asset with income from labour and other sources. **Small and Medium farmers**; they have a productive land amount of up to 1 ha and

3 ha respectively, this households are fully depends on income sources of agricultural sector (rice, vegetable, fish etc), some of them are involve in agribusiness, they have all kind of non productive assets, some of them have Agri machineries . **Large farmers**; it refer to those farmer who recognized as a land lord in the areas. They are not only cultivate the rice and vegetable also they take a challenge with have ability cultivate the all kind of minor crop like, mustard, jute, sugarcane etc. They also give their surplus land to others farmers as lease and share cropping system. They have cattle ownership and rearing is the most lucrative livestock. They have all kind of productive and non productive asset.

Table 09: Ownership of Agricultural land in the Polder:

Land less Farmer(0-0.02ha)		Marginal Farmer(0.02-0.2ha)		Small farmer(0.2-1ha)		Medium Farmer(1-3 ha)		Large Farmer(<3ha)		Total	
HHs	%	HHs	%	HHs	%	HHs	%	HHs	%	HHs	%
473	10%	1375	29%	1763	37%	710	15%	414	9%	4735	100%

(Sources: Union Website)



5.1.c. Land use:

In the polder area average intensity of land use is 60% where cultivated the different agricultural crop and cropping intensity is 174%. Cropping intensity in this area is 178%, it is low considering the crop production. But it does not mean land are not productive, main reason is most of the land where only cultivated the Boro rice after that land are used for Prawn culture, this are not calculated as cropping intensity.

Table 10: Land use in different purpose (in ha)

Homestead or settlement		Agricultural land		Wetland		Temporary Fallow land		Fruit orchard		Total
Area	%	Area	%	Area	%	Area	%	Area	%	
1494	33	2710	60	240	5	115		55	1.22	4504 ha

(Sources; Union website)

Table-11: Land use in Polder area

Description	Sobhana	
	Area	%
Total area	4504	
Single Cropped Area	945	
Double Cropped Area	1245	
Triple cropped area	420	
Four Cropped area	0	
Net cropped area (NCA)	2710	
Cropping Intensity	174%	
Intensity of Land use	60%	

5.1.d. Land type and classification

Land type is the dominant factor guiding choices of crop cultivation and cropping patterns of any area. Selection of crops/cropping pattern largely depends on the topographic position of land in relation to seasonal inundation depth and its duration. The area is almost level and broken up by numerous tidal creeks along which there are narrow strips standing 0.5 meter to 0.6 meter higher than the flat areas. Most of the areas are seasonally flooded in the rainy season and the depth of flooding rises to a maximum of 90 cm. The tidal deposits are more or less uniform in texture. The soils are slightly saline in the dry season but not harmful for agricultural production. The most of the land area are medium high land and suitable for Boro rice and very negligible area are activate for T-Aman (HYV/LIV) rice cultivation and vegetable cultivation.

By considering and analyzing the overall Land type and classes, the Polder area is High land 19%, medium high land 49%, medium low land is 30% and low land is 2%. High to medium high land used for vegetable and rice (both T-Aman and Boro) cultivation, medium low land used for fish culture (Prawn). The farmers as well as DAE are practiced and cultivated the agricultural crop considering the land type of the areas. As considering soil texture (soil classes) 1090 ha & 300 ha land under clay soil to clay loam soil and this type land is very fertile and suitable for rice production, beside 770 ha & 550 ha land under loamy soil to Sandy loam soil which land is suitable for vegetable production and also fruit and spices production. (Table 00).

Table-12: Land type and soil classification

Land type	Soil classes					Total	
	Clay	Clay loam	Loamy soil	Sandy soil	Sandy loam	area	%
High land	225	100	130		50	505	19
Medium high land	350	100	490		400	1340	49
Medium low land	515	100	150		50	815	30
Low land					50	50	2
Total	1090	300	770	0	550	2710	

Sources; DAE

Table 13: Soil characteristics in Polder area

Characteristics	Union wais soil type				
	Soil pH	Soil texture	Soil condition	Soil color	Soil moisture
	5.5-7.5	Clay loam to clay	Low saline	Grey to dark grey	Moderate to high

Sources; Land Zoning Report: Dumuria Upazila-2011

5.1.e. Major Agricultural crops:

Rice is the main staple food in Bangladesh that's why country wide most of areas are covered by rice cultivation, there is no any alternative or change In Dumuria upazila. Although, this polder is recognized as a coastal area and suitable for fish culture activities and maintenance their livelihoods in this sector. But then also this area is also focused in vegetable cultivation area and so many businesses have been continuing to addressing the agriculture sector especially for vegetable business.

Major Field crop: Major percentage area is covered by rice cultivation especially the Boro rice and T-Aman rice. During the Boro season major cultivated variety rice BRRI Dhan-28, 29, 45, 50, and BINA-6, and T-Aman rice major variety are cultivated BR-11, BRRI Dhan-30, 31, 32, 33, 34, 39 40, 41, 44, 49, 51, 52 and BINA -4, 7, 8 and BAU Dhan-1. As considering other field crop, very good numbers of area are covered by vegetable cultivation; beside, wheat, and sunflower, fruit (jujube) are cultivated in very few numbers of area as field crop (table-25).

Major Vegetable: Tomato, cauliflower, Cabbage, olcapi, Radish, Red amaranth, Brinjal, Country bean are cultivated in Robi season and Ladies finger, Bitter gourd, bottle gourd, snack gourd, sweet gourd, Long yard bean, Pointed gourd are cultivated in Kharip-1 which continue production cycle up to Kharip-2.

Table 14: Major cultivated vegetable variety;

SI No	Vegetable	Variety
1	Potato	HYV-Granula, Cardinal, Dimond, Petronis, Estarixs, Raza, Felsina, Local- Sheel Bilaty, Jhaow, Endurkani
2	Tomato	Manik, Raton, Lalima. Jhumka, Sindur, Apurba, BARI tomato-10, 11,12,13,14,15 and BARI Hybrid Tomato- 1,2,3,4,5,6
3	Brinjal	Nyontara, Kajla, Uttara, Islampury, Katabegun,BARI Begun-5,6,7,8,9,10
4	Bitter gourd	BARI karola 1,2 Taz, Teea,
5	Bottle gourd	BARI Lao-1, 2 and IPSA lao-1
6	Sweet gourd	Swety, BARI Mistykumra-1
7	Country bean	BARI sheem-1, 2 IPSA sheem-1,2
8	Long yard bean	BARI-1

- a) **Spices:** Ginger, turmeric, garlic, onion, and chili cultivated very negligible numbers only for locally consume but chili cultivated to selling purpose as high value crop to reaching the national market after fulfill the local demand.
- b) **Others:** Mustard, maize, sweet potato, Arahor, ground nut etc cultivated by covered very negligible area but it does not fulfill the local demand.

Table 15: Crop wise covered area.

Major crop	Area covered under season (ha)		
	Robi	Kharip-1	Kharip-2
Boro rice	1830	5	
T-Aman			2150
Wheat	5		
Mustard	10		
Maize	5		
Sunflower	8		
Potato	20		
Vegetable	290	255	
Spices			
Onion	10		
Garlic	5		
Zinger	2		
Chili	4		
Fruit			
Mango	15		
Jujube	30		

Table 16: Average yield of different crops

Major crop	Yield (Ton/ha)		Gap
	Present	Good Farmer yield	
Rice	Boro=6.5ton/ha Aus=(HYV) 3.5 T-Amon=(HYV) 4.6	Boro=7/ha Aus=4/ha T-Amon= <5	Boro=1.5/ha Aus=0.1/ha T-Aman=0.4/ha
Vegetable	Robi season Patato=18 ton/ha Tomato=25 ton/ha Cauliflower=25 ton/ha Brinjal=30 ton/ha	Robi Potato=22 ton /ha Tomato=30 ton/ha Cauliflower=30 ton/ha Brinjal=35 ton/ha	Robi Potato=4 ton /ha Tomato=5 ton/ha Cauliflower=5 ton/ha Brinjal=5 ton/ha
	Summer Pointed gourd=15 ton/ha Ladies finger=12 ton/ha Bitter gourd=15 ton/ha Bottle gourd=22 ton/ha	Summer Pointed gourd=17 ton/ha Ladies finger=15 ton/ha Bitter gourd=18 ton/ha Bottle gourd=25 ton/ha	Pointed gourd=2 ton/ha Ladies finger=3 ton/ha Bitter gourd=3 ton/ha Bottle gourd=3 ton/ha

Sources; DAE

5.1.e Cropping patterns and Intensity:

The polder is dominated by Agricultural crop such as T-Aman, Boro and different kind of Robi crop like vegetable which are mainly cultivated under irrigated or non-irrigated condition. The major cropping intensity of this polder is 205% which indicate that double cropped area covers maximum land. This is due to unfavorable soil condition, land characteristics, and hazards like; salinity, flood, water logging, post monsoon drainage congestion, scarcity of irrigation water, cyclonic storm surges etc. By considering the table, the polder is followed the major cropping pattern is Boro-Fallow-T Aman (NCA-35.5%) and second is Fallow –Fallow –T Aman (NCA-28.75%) and third is Boro-Fallow-Fisheries. In addition, vegetable and annual crops are growing in the high land and medium high land area. T-Aman rice is cultivated in the rainy season as the salinity decreases during the period.

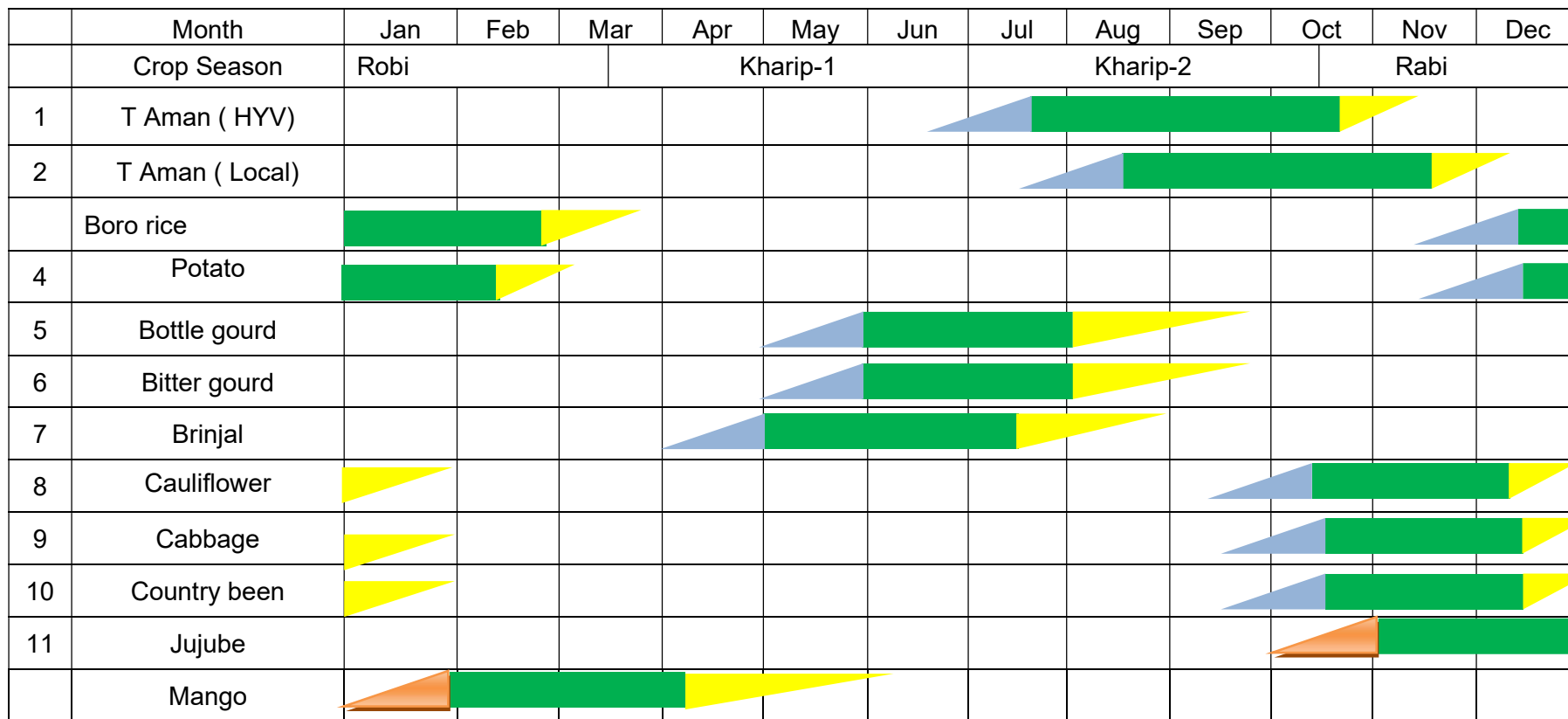
Table 17: Major Cropping Pattern in Polder

Cropping pattern	Total	
	Area	NCA
Fallow-Fallow-T aman	1734	60
Boro-Fallow-T-Aman/Fisheries	289	10
Boro-Fisheries-Fisheries	202	7
Boro-Fallow-Fallow	173	6
Robi Veg-Fallow-T-Aman	145	5
Spices-Kharif Vegetable- Kharif Vegetable	145	5
Robi vegetable-Kharif Vegetable- Kharif Vegetable	116	4
Total	2804	100

(Sources; Land Zoning Report: Dumuria Upazila-2011)

Crop Calendar

5.1.f. Crop calendar:



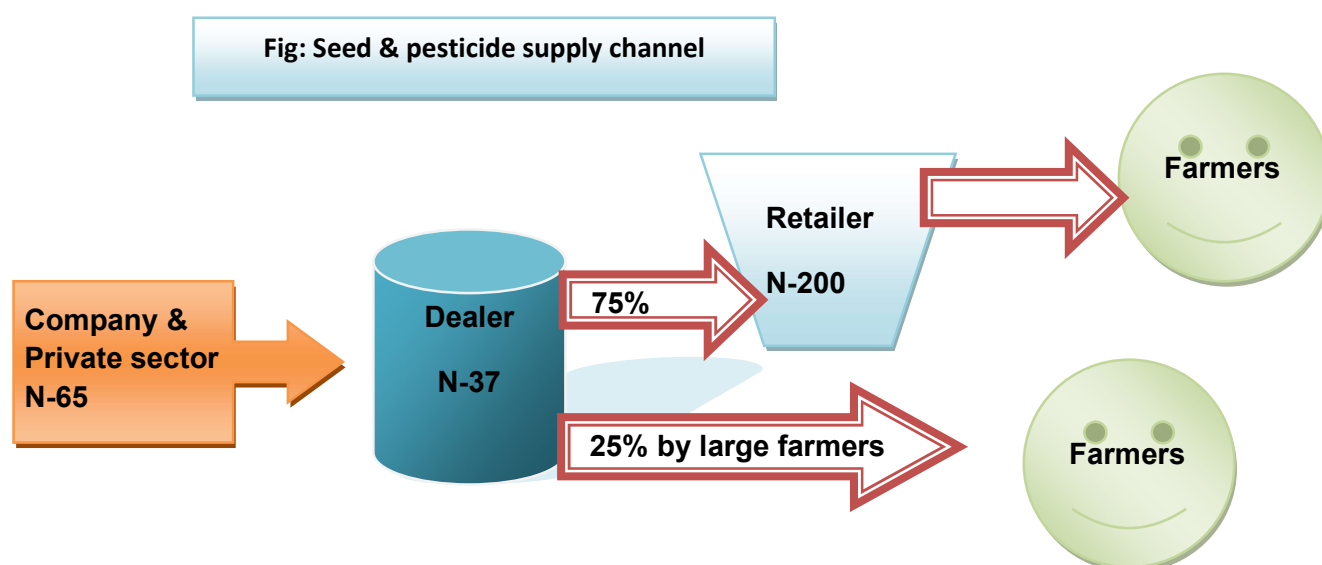
5.1.g. Input market in Agricultural sector

Seed, fertilizer, pesticide, farm machineries, irrigation facilities and technology & information is the main input of agriculture sector. Most of the input company and private sector have been working in this upazilla and also they are established close connection with farmers through the dealership system. In the upazilla, DAE listed total of 120 fertilizer retailer, 13 BCIC fertilizer dealers, 14 BADC fertilizer dealers, 22 BADC seed dealer, company managed 37 seed & pesticide dealer, more than 200 seed & pesticide retailer including more than 65 company and private sector have been working in agriculture input sectors. Lal teer, Supreme Seed Ltd, Metal Agro Ltd, Buyer crop science, Syngenta, Alfa Agro Ltd, Modern seed Ltd, Petro Cam Ltd, Semco Ltd, Gatco Agro Ltd, BRAC seed, Partex Agro Ltd, Malik seed Ltd, ACI Ltd, Mc Donald BD Ltd, Mimpex Agro Chemical Ltd, Larsen chemical ind, Setu corporation, Popular agro ind Ltd, Map agro in Ltd, Arany internation,

Table 17: Input supplier in Upazila and Polder

Type of input	No of Input supplier	
	In Upazila	In Polder
Fertilizer retailer	120	7
BCIC fertilizer dealer	13	1
BADC fertilizer dealer	14	1
BADC seed dealer	22	1
Seed & pesticide Dealer	37	0
Seed & pesticide retailer	200	12
Company & private sector	65	

(Sources DAE & KII with Input supplier)



5.1.h. Output market in Agriculture sector:

There are 6 markets in the polder area where the Agriculture producers easily can access to selling their products including total of 42 markets are available in the upazila boundary. In the polder area, farmers are get the opportunity to selling & buying their products every day, because polder area's markets place are sited every day by consecutively. Most of the markets have facilities for selling all agricultural products, some of market have specialist for specific products like; Hasem Ali kacha maler arot specialist for vegetable and fish wholesaling market and seasonal vegetable wholesaling market by forming temporary collection point on the roadside.

Table 18: Market actor and place

SI No	Market/actor	In Upazila	In Polder
1	Hat/Bazer/Market	42	6
2	Arot	12	0
3	Piker (Vegetable)	70	4
4	Piker (Field crop)	120	10
5	Retailer	300	22
6	Bapary (vegetable)	65	12
7	Collector (vegetable)	110	8
8	Collection point (vegetable)	15	4

5.1.i. Factors affecting the Agriculture Sector:

All type of agricultural crop depends on the seasonality. Different type of factor like; rain water logging, drought, labor crisis, low & high temperature, and tidal surge are mostly affected the normal crop calendar in the year. Some time people could not start the production cycle untill end the factors specially rainfall, water logging and drought so that factor very much considerable for maintain the crop calendar. On the other hand, if farmers started the seed bed preparation or any others primary stage activities in timely but they cannot complete the all cycle due to the interim time factors. If any year happens this type of circumstances in any season ultimately they have behind to start the next crop timely and resulting is changing the cropping season as well as cropping pattern gradually.

Table 19: Factors Affecting Crop Production through the year

Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall						Blue	Blue	Blue				
Draught				Green	Green							
Labour Demand	Purple			Purple				Purple				Purple
Tidal surge							Red	Red				
High Temperature			Cyan	Cyan								
Winter/cold stress	Olive	Olive										Olive
Cyclone/tonedo			Pink	Pink						Pink	Pink	
Water logging						Yellow	Yellow	Yellow				
Salinity		Grey	Grey									

Source: FGD & KII with SAAO

5.1.j. Common Agricultural practices:

Land cultivation: Bangladesh do not maintain and apply the 100% farm mechanization in agriculture but it is true that in the land preparation stage, all land are covered and cultivated by power tiller so it is cal that Bangladesh is going to the farm mechanization especially the tillage system. All of the activities for land preparation like; land tillage, labeling and in some cases cannel making activities done by farm mechanization, now in polder area most of the land are cultivated by apply the modern technology.

Seed & seedling use: Considering the rice cultivation it was shown that 69.04% HYV varieties seed use in rice cultivation, very few number of farmers use the quality seed and seedling but they did not maintain the actual or improved production technology as per the guideline.

Planting & seed sowing: Very few percentage (Approximately 7%) farmers are followed the actual transplanting technique both in rice & vegetable cultivation. Most of the farmers are not skill or did not maintain the row to row and plant to plant distance for crop cultivation. They did not award about the seed & seedling requirement in the pit or space. Some of project have initiated (like CSISA MI) bed planter and drum seeder for seed sowing very few numbers (it not measurable in percentage) of farmers use this technology as trial process but not continuing due to the less skill or awareness.

Harvesting: In our agriculture still now crop harvesting system has been continuing by traditionally or human driven harvesting methods. The major causes behind that, unequal distribution of land type, most of the farmers are marginal to small so they could not maintaining the farming system crop cultivation by acquire huge area of land, high price of harvester, inadequate knowledge of operate the harvester.

5.1.k. Major Problem and its Impacts on crop cultivation:

- The canals of the polder are found mostly closed or silted up due to the unplanned constructed of different manmade intervention which are creating barriers of water flow and thus had happened severe drainage congestion and hampering timely T-Aman cultivation.
- Different manmade and naturally created factors like; rainfall, drought, salinity, water logging tidal surge are affecting the crop cultivation specially hampered the cropping pattern.
- Cyclone and storm surge frequently damage T.aman and other rabi crops and also cause huge damage to lives and properties of the people.
- Moderately to deep monsoon flooding which cause severe crop damage and intrusion of valuable agricultural land for different non agricultural uses.
- Saline water intrusion, over doses of chemical fertilizer, over use of pesticide and insecticide, scarcity of surface water for irrigation, inadequate drainage system, and siltation reduced the soil fertility as well as decline the soil productivity.
- Financial requirement is one of the problems to start the crop cultivation in timely. Some of Bank provide the crop loan but it is not easily accessible for farmers due to the long procedure system of bank and farmers do not get this type of loan in timely.
- Lack of farmer's knowledge specifically on; identifying the quality seed and seedling, updated market information and technology which restricts intensive agricultural practice of lands.
- Crisis of fertilizer and pesticides during the peak season due to inadequate supply (Though DD, DAE don't agree with farmers complain). Quality of pesticide is not good enough and sometimes does not work as standard one. There are some company's produces less quality pesticides and promoting their market at remote area (as people are not aware with the quality).
- Agricultural land very rapidly reduced the soil fertility due to unplanned shrimp culture (Ghers) activities. Saline water is very much required for continue the shrimp culture but polder activities especially sluice gates regulate the saline water flow from sea. At

this situation shrimp culture fisher use the ground water as alternative sources and it is interrupt the biodiversity.

- The valuable agriculture land is reducing rapidly in every year due to unplanned construction of houses and settlements, industries, markets, river erosion and for different infrastructural development.
- Unplanned shrimp and prawn culture and water logging damaging sustainability of land in the area.
- The farmers of polder area face scarcity of irrigation water in the dry seasons and shortage of necessary agricultural inputs, which are hampering intensive agricultural practices in timely.
- Farmers unenthusiastic to adopt new technologies and not to maintained production cycle or planned way production.
- Scarcity of surface water for irrigation, higher price of agricultural machineries/equipment in the local markets is the major problem for intensive irrigation in the area.
- In some cases lack of market information happening the price fluctuation especially for vegetable marketing. Most of the cases farmers did not know the actual demand of the local market and everybody storage the vegetable for selling into the same market at same time and ultimately market are over saturated by surplus vegetable. Here buyer gets an extra opportunity to hike the illegal price and farmers are loss the profit.

5.1. Livestock

5.2.1. Introduction:

In the Polder area, poultry, duck, cattle, dairy, buffalo, goat, sheep, pigeon are rearing as a major livestock. Every villages are rich in those farm animals. There is a possibility of improvement in rural income distribution with an increase in investment for indigenous livestock development. The landless and small farm's rearing the highest percentage of poultry and goat. 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 to generate employment and income for the rural poor and thus improve livelihood. Local breed cattle are being low in body weight and low in milk production but little bit resistant to disease and the challenges posed by the climatic conditions.

This sector has also generated good employment, thus providing a means to solve the unemployment problem of the polder area. Jobless and unemployment youth firstly select the sector as a way of new earning sources and most of the cases it was make a turning point of life. On the other hand rural women firstly select this sector as their own income and they easily have established their rights in this earning source. These reasons and the potential for growth have made poultry an important sector. There have no any recent specific numerical data in relation to numbers of livestock population. During our data collection period we discussed with DLS representative also got information from milk producers, every sources are not provide the numerical data but both give us the percentage basis data, which from we can get the overall picture in our Polder area. The data are given bellows;

Table 20: Households involve in Livestock sector at Polder area.

	HHs Involve in Livestock sector					
	0	1-5	6-10	11-15	16-20	20+
Backyard poultry	8%	50%	20%	12%	5%	5%
Milking cow	35%	53%	10%	2%	0%	0%
Bull fattening	85%	12%	3%	0%	0%	0%
Goat rearing	75%	15%	7%	3%	0	0
Duck rearing	15%	45%	25%	12%	3%	0%

(Sources; DLS and KII with WMG producers)

Poultry: It was normally and traditionally reared by our women at the household's level. There are no any households in rural area where the poultry are not reared. Approximately 92% rural women involved to rearing poultry (e.g. chickens, ducks) at the household level and it is makes an important role in income generation and poverty reduction for women. Still now the women have established the rights and ownership on this asset. It is not only income generation activities also contribute the nutritional requirement of the family members, it is also proved that the major percentage animal protein are come from poultry egg and meat. But it is the true sense that the women are reared this valuable asset by traditionally and have no any improved technical knowledge on their hand especially the housing facilities, feeding, and treatment. Moreover, backyard poultry is mostly owned and managed, and sometime traded by women, and therefore has high potential to advance women's socioeconomic empowerment.

Milk production:

Sobhna union is also famous for milk producing area. In the Polder area 65% HHs are rearing at least 1-4 milking cows as traditional farming system. They take it as secondary income sources, someone is takes as main income sources but do not takes it as business. Very few numbers of HHs (2%) are take it as their main income sources by practice farming system. Approximately 80% cows are local breed as per data of DLS and KII with WMG and milk producer, but still now it is questionable that all are not high productive milking cow. The average milk production of those cows is 2-3 litter, some of cows are give milk up to 4 litter (cross breed) but they area rearing as farming system. Milk marketing of this zone are not develop, the farmers selling their milk in open market as retail practice.

5.2.2. Livestock population:

Department of Livestock Services (DLS) have done livestock census by 4 years interval. Every year calculate the figure by adding certain percentage. But it is difficult to calculate actual data by every year. Upazila DLS office did not keep any union wise data, but their assumption is upazila's total livestock populations are represent based on the household numbers. So it is multiply to union data as per their total HHs. The Bellows data represent the upazila's livestock population.

Table 21: Livestock population at Upazila

SI No	Livestock	Numbers
1	Cow (Local breed)	71805
2	Cow (Cross breed)	54682
3	Goat	73614
4	Sheep	5995
5	Buffalo	305
6	Horse	332

7	Poultry (local breed)	795752
8	Poultry (improve breed)	1643184

Sources; DLS

Table 22: HHs involve in Livestock sector

SI No	Livestock	% HHs
1	Poultry rearing	92% HHs
2	Milky Cow rearing	65% HHs
3	Bull fattening	15% HHs
4	Goat rearing	25% HHs
5	Duck rearing	85% HHs

Sources; KII with VFA

Table 23: Commercial Farm at Upazila level

SI No	Farm type	Numbers
1	Milking cow farm	355
2	Goat farm	80
3	Sheep farm	21
4	Duck farm	18
5	Poultry farm (layer)	286
6	Poultry farm (Broiler)	399

Sources; DLS

Table 24: Egg & Meat Production situation

Variety	No of poultry	Total production	Way of calculation
Local breed	795752	8,75,32,720 egg	poultry x 110 egg per year
Improve breed (layer)	686059	19,89,57,110 egg	Poultry x 290 egg per year
Improve breed (broiler)	957125	48,81,337 kg	Poultry x 1.7 kg/cycle x 3

(Sources; KII with VFA)

Table 25: Milk Production situation.

Variety	No of cow	Total production	Way of calculation
Cow (Local breed)	71805	10339920 liter	cow x 1.2 lt x 120/year
Cow (Improve breed)	54682	21325980 liter	Cow x 3 lt x 130/year
Total	126487	31665900 liter	

(Sources; KII with VFA)

5.2.3. Market Demand and Growth Potential

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.

Day by day increase the intake rate of animal protein; here poultry is the first choice to fulfill the protein requirement of human. On the other hand several types of festivals like; Eid, marriage ceremonies, and any other occasion have led to a greater potential for poultry business in Bangladesh. So it is proved that the market demand is always create. For fulfill the consumers demand fortunately, fast growth of broiler chicken has effectively met this increasing demand but still now people kept the interest & test to buying the backyard poultry's egg and meat. Considering the consumers demand, backyard poultry's egg and meat are not sufficiently available in the market but it is also having information that the backyard poultry 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.

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 investing the poultry sector.

5.2.4. Output market:

Backyard poultry egg market is not going to the formal system has not any specific market place. This market is running with the part of other marketing channel. After started the layer farming system, some of egg collection centre or Arot has established and their business mainly running & depends by the production of layer farm. On the other hand, meat's retailer & Piker market also depends on Broiler farm. There are no any shops and market where any entrepreneur has continued their business depends on backyard poultry's egg and meat, rather this business are continued with the part of other business. Beside the normal practice of backyard poultry marketing system is, farmers always selling their products (egg & meat) in market by taken as a secondary task or backyard poultry's income money use for buying the households necessity. Milk marketing of this zone are not well organized, Mobile milk collector (locally called Ghos) mainly handle the total milk marketing channel, other hands farmers sale the milk in local market as retail price.

But in many cases all type of livestock producer does not get the fare price because, mostly they are not collecting the enough marketing information. Then also 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. 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. 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 overall egg and meat marketing in the polder 26 is depends on the weekly local markets. Egg and meat marketing is mostly carried out in an unorganized manner.

5.2.5. Input Market:

Livestock input market is developed compare to others agriculture sub sector input market. More the 50 company have been continuing the technical and business related service to the stakeholder. Company always tries to keep the maximum level of consumer's satisfaction by providing their best services and ultimately farmers get the actual services. By this way all type of input like feed, medicine and new improved technology are available at rural level.

Table 26: Company is available in Upazila

Company name	Product
RENETA Ltd	Medicine
NOVARTIS	Medicine & Vaccine
ACME Lab Ltd	Medicine
Chemist Ltd	Medicine
Progressive Enterprise	Medicine
Global Agrovat Ltd	Medicine
FnF Ltd	Medicine & Vaccine
Jaison farma	Medicine
Doctors	Medicine
Super power Ltd	Medicine
Aftab Feed Ltd	Poultry feed
Nourish Poultry & Fish feed Ltd	Poultry feed
JS feed Ltd	Poultry feed
MR Feed Ltd	Poultry feed
Kazi Farms Ltd	Poultry Feed

5.2.6. DLS delivered Animal health & extension services:

- i) Vaccination
- ii) Artificial insemination
- iii) Fodder production
- iv) Technology transfer
- v) Treatment support

5.3. Fisheries

5.3.1. Introduction:

The fisheries of Dumuria upazila consist of inland open water fisheries and fresh water aquaculture. Fisheries of Dumuria upazila is a major sources of income, nutrition, employment and livelihoods support of the local people.

In the polder area as well as Dumuria upazila, two type fishing system are practiced, one is open water fishing that is capture fisheries and another is culture fishing. Culture fishing also classified by pond culture, prawn mixed with carp culture the more specific variety.

5.3.2. Area covered and production analysis:

Open water fisheries: Wetlands are among the most fertile and productive that support the life cycle of different fauna and flora resources of an area. The polder is enriched with 170 ha open water fisheries which are available in rivers, khals/cannel, and floodplain. The open water fisheries are commonly found in the area.

Culture fisheries: In the polder area total of 65 ha land are covered by culture fisheries and the major area is homestead pond culture, small scale & large scale commercial culture were found in the area. The open water fisheries are commonly found in the area.

Prawn mixed with carp culture: Galda (prawn) has been culturing in this area from the last few years which is increasing day by day. The single cropped paddy field or the beel areas are generally used for prawn culture. A canal is dug in the outer side of land, the dug soil used as a dyke vegetable cultivation. This canal is locally called as 'per' 'top' or 'drain' which are stocking the larvae, the poor growth post larvae are also stocked here for nursing which could be used for next year. The prawn culture started from the Bengali month of Baishakh (April-May) and harvesting after 4-6 months. In the Polder area total of 1193 ha land are covered by prawn culture and 110 ha land covered by shrimp culture.

Table 26: Covered area under fish culture in Polder area.

Open water fisheries (ha)	Culture fisheries (ha)			Total wetland (ha)
	Culture fisheries	prawn mixed culture	Shrimp culture	
170	65	1193	110	1538

(Sources; Land Zoning Report: Dumuria Upazila-2011)

Table 27: Covered area under fish culture in Upazila

Culture	No Gher/pond	Area (ha)	Production (Mt)
Shrimp culture	7734	6957	2290.35
Prawn culture	15427	8246	5099
Pond culture	4112	1404	3121.09
Open water capture fish		920	200

Table 28: Productivity ratio in culture fish in Upazilla

Type of farmers	Ponds	Area	Productivity (Mt/ha)
Marginal culture fisher (Up to 10 dec)	1768	71.58	1.23
Small culture fisher (11- 30 dec)	616	75	1.72
Medium culture fisher (31-50 dec)	123	24.97	1.98
Large culture fishers (51 or more dec)	70	34	2.47

Table 29: commercial fish culture

Type of farm	No of Farm	Area (ha)	Production(Mt)
Commercial carp farm	15	65	179
Commercial Pangas farm	8	10	70
Commercial Telapia farm	20	125	563
Commercial singh farm	1	1	4
Total	44	201	816

(Sources; DoF)

Chart 3: Fishing from different culture

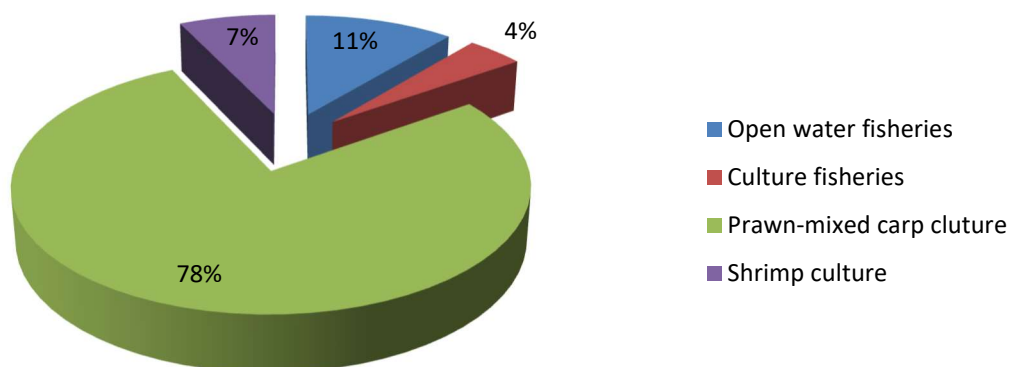


Table 30: Labor distribution in fish culture

	Own labor	Hired labor
Open water fisheries	100%	0%
Pond fish culture	75%	25%
Galda mixed with carp culture	40%	60%
Shrimp culture	5%	95%

Chart 4: Labor distribution in culture fish

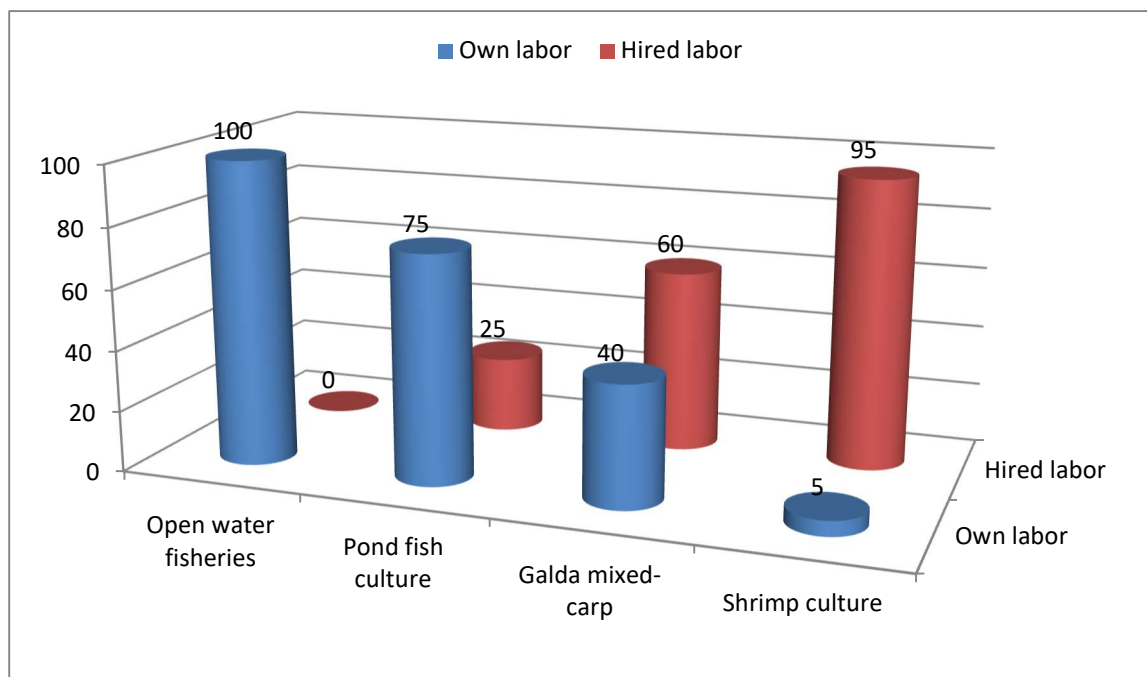
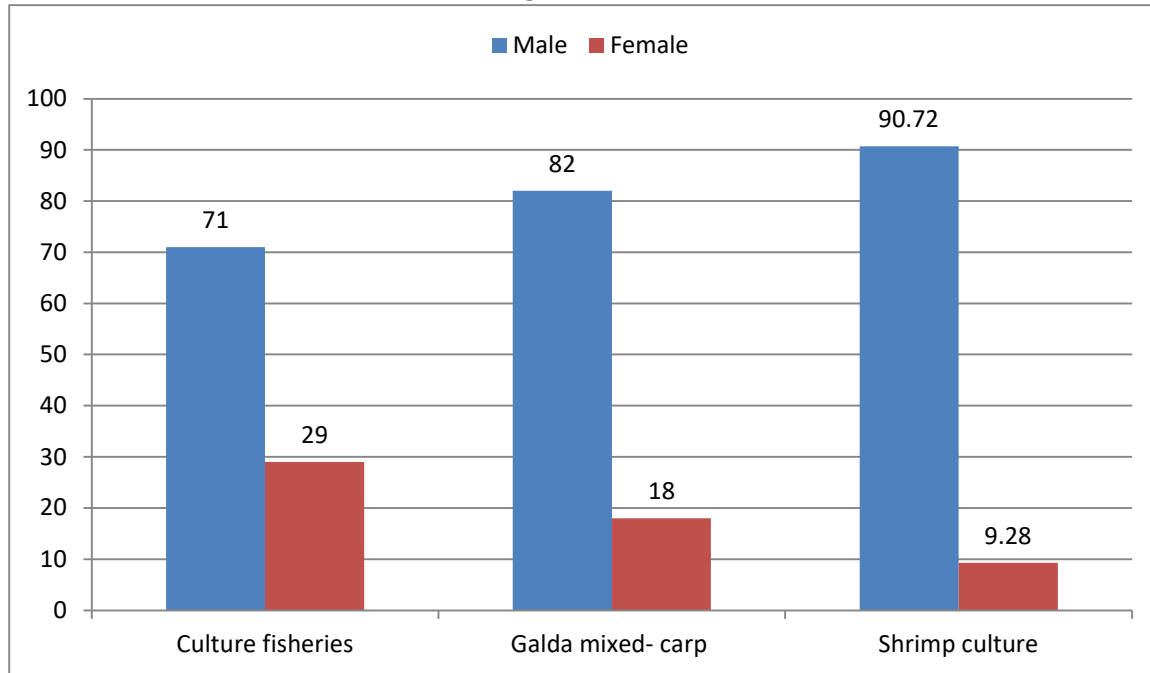


Table 31: Labor distribution in culture fish

Activities	Labor distribution (%)					
	Culture fisheries		Galda mixed with carp culture		Shrimp culture	
	Male	female	Male	female	Male	female
Pond preparation	75%	25	88%	12%	100%	0%
Feed preparation & supply	60%	40%	70%	30%	85%	15%
Inter culture operation	72%	28%	90%	10%	100%	0%
Input collection	65%	35%	80%	20%	100%	0%
Harvesting	90%	10%	95%	5%	100%	0%
Grading & processing	50%	50%	60%	40%	50%	50%
Marketing	85%	15%	95%	5%	100%	0%
Average labor distribution	71%	29%	82%	18%	90.72	9.28

Sources;FGD with Fish farmers & WMG

Chart 5: Labor distribution based on gender



5.3.3 Input Market:

Normally fish input market are not expansion compare to others input market because no of limited company have serve their product marketing in together with other sub sector (with Agriculture & livestock inputs). On the other hand usually farmer are not used readymade fish feed due to the lack of knowledge and awareness, instead they use own made feed i.e. rice bran, rice husk, mustard oil cake and leafy green parts of hyacinth. Still now most of the farmers followed the traditional culture practiced. Some of farmers try to followed the improve culture technology and they used the readymade feed & medicine but not sufficient as the actual requirement of fish. Fish input retailing and dealership are not develop independently it has continued business jointly with others sub sectors. Readymade feed form as granule and pellet size and have contain different nutrients for nursery feed, starter, grower and finisher. The primary ingredients of readymade feed are rice bran and mustard oil cake, but during formulation with other ingredients the producer ensures the required protein percentage (35%). However it was found that input retailers are situated in village or union level but company and dealer are mostly concentrated in upazila level and they maintain the distribution channel from upazila to union level. But it is also observed that the cohesion between dealer & retailer not strong compare to the other input marketing channel. On the other hands mainly fish meal sold by grocery shopkeeper especially rice & wheat husk, oil cake and here absence the business relation with dealer and they collect inputs from different mill. So fish input market does not maintain the specific supply chain.

Table 32: Input & service market

Input market	In Upazila
Feed & Medicine retailer	200
Feed & Medicine Dealer	37
Fish nursery	56
Patilwala (mobile fingerlings seller)	120
Mono sex Telapia & carp hatchery (BRAC Hatchery)	01
Khulna north Galda hatchery	01
Company	11
LEAF	14

5.3.4. Service provides:

Manpower of Department of Fisheries (DoF) is limited to provide the technical services to the farmer's level as the farmer's requirement. DoF trained some advance farmer who are responsible to provide technical services, information, improved technology dissemination through set up demonstration and also organized the different awareness raising event and training at union level. Total of 14 skilled persons are involved in this related service as called them LEAF (Local Extension Agent for Fisheries). DoF supply one Kit box to the worker so that they can provide qualitative services to the culture fishers, mainly the kit box & medicine use for testing the soil quality, soil pH, water quality, feed measurement and diagnosis of fish disease. In the polder area four LEAF worker have been continuing their services as taking the business mentality.

Table 33: List of Company at Upazila.

Company name	Product
Aftab Feed Ltd	Fish feed
Nourish Poultry & Fish feed Ltd	Fish feed
Kazi fish feed	Fish feed
Paragon fish feed	Fish feed
Quality fish feed	Fish feed
Mega feed	Fish feed
Niribili fish feed	Fish feed
Novertis	Medicine
organic	Medicine
Thailand	Feed & Medicine
Saudi Bangla fish feed	Fish feed

5.3.5. Major problem in open water fisheries:

- Indiscriminate the using destructive fishing gears like; estuarine set bag net, current net in the open water are decreasing the sustainability of open water fisheries.
- Depletion of wild fish population due to harvesting the fish fry (Renu pona) and brood fish (Mother fish) from the open water.
- Over exploitation of high valued and traditional species.
- Absence of proper water management practices of open water areas or concern department (DoF) did not take management initiative open water fisheries.
- Unplanned construction of road, sluice gate, embankment and cross-dam etc are decreasing open water fisheries production.
- Extensive use of agro-pesticide, chemical and fertilizer have makes negative impacts on open water fisheries.

5.3.6. Major problem in culture fisheries:

- Low quality and under size fingerlings are decrease the productivity.
- High price of fish feed discouraging the fish culture.
- Some time fingerlings mortality rate is high due to the traveling hassle.
- Frequently and in some cases depth flooding interrupt the culture practice and damage the farm productivity.
- Perennial water bodies are reducing due to down the existing ground water level and land conversion.
- Siltation rapidly storage the sand on the river and ultimately raise the river height. During monsoon, tidal saline water flow is moving towards the marshy land and devastated the crop field as well as pond and fish go away to open water which decrease the pond productivity.

5.3.7. The unfavorable impacts of shrimp cultivation on the situation are:

- Shrimp cultivation needs the intrusion of saline water, which affects soil quality through Stalinization, and so the yield of T. Aman. It also causes delay in transplanting of paddy seedlings after shrimp cultivation, which also contributes to a reduction in paddy production.
- Shrimp cultivation enhances the income of rich people (shrimp gher owners) sharply and thus economic inequality among the people of the area is increased; this creates social imbalances and resentment in the area.

- Shrimp cultivators use the outside and local muscle-men in order to cultivate shrimp safely, thus violence and lawlessness increase in the area.
- Anti-social activities of different types (reign of terror, physical torture, rape etc.) increase in the shrimp cultivation areas, creating panic among the peace-loving common people, especially women. Children also become delinquent, as many of them cannot keep themselves from earning money by stealing shrimp.
- New trees cannot grow, and the growth of existing trees is affected due to salinity intrusion for shrimp cultivation. This reduces the production of fruit and timber and affects the shelter and security of birds and their propagation.
- Growing kitchen vegetables is affected by salinity intrusion caused by bagda cultivation.
- Shrimp cultivation creates an unemployment problem in the area by reducing the labor required in crop cultivation, and outsider shrimp cultivators employ labor from outside the area. This causes emigration of local poor people.

(Sources; IPSWAM planning study-2005)

6. Potential Value chain in Polder-26

6.1. Potential VC list in Polder

1. Boro Rice
2. T-Aman
3. Mustard
4. Potato
5. Vegetable
6. Sunflower
7. Prawn (Galda)
8. Shrimp (Bagda)
9. Culture fish (Table fish)
10. Backyard Poultry
11. Milk
12. Jujube
13. Mango

6.2. Value Chain Identification

Criteria →	Indicate market level (Local, District, Regional, National, International)	Growth Potential (32)					Impact (32)						Structure of the Industry (15)				Gender & Employment (17)		Collective Action (4)	Risk	Total Weighted Value	Rank
		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	Food Security	Nutrition	Forward / backward linkages conducive to	Existence of service providers	Favourable business environment	Other programme interests	Involvement of women	Employment generation	Collective Action Opportunities	Major risks (No, High, Medium, Low) green, Red, orange, yellow		
Weight →		7%	6%	6%	7%	6%	5%	5%	6%	5%	6%	5%	5%	4%	4%	2%	9%	8%	4%		100%	
<i>Food</i>																						
Boro Rice	National	5	2	3	3	2	5	3	5	1	5	2	1	2	2	0	2	3	0		2.76	7
T Aman	National	5	1	1	2	1	3	3	2	1	5	1	1	2	2	0	2	2	1		2.08	12
Potato	National	3	4	3	4	3	1	1	1	1	3	3	2	1	2	0	4	3	1		2.49	9
Vegetable	National	4	3	5	5	5	4	3	4	3	5	4	3	3	3	2	5	4	2		3.93	1
Mustard	Regional	3	4	4	5	3	1	2	2	2	2	2	2	1	2	0	3	2	0		2.6	8
Sunflower	Regional	2	2	2	2	2	1	1	2	1	1	2	2	1	1	1	3	3	0		1.78	13
<i>Aquaculture</i>																					0	
prawn	International	4	4	3	3	3	4	3	4	3	3	3	3	3	3	2	2	4	1		3.13	5
Shrimp	International	5	5	3	2	3	4	3	4	3	3	3	3	3	3	2	1	4	1		3.10	6
Culture fish	National	5	3	3	3	5	3	3	3	3	3	3	3	3	3	2	2	4	3		3.23	4
<i>Livestock</i>																					0	
Backyard Poultry (Egg)	Regional	3	5	2	4	3	3	5	3	5	3	3	3	3	3	1	7	4	2		3.69	2
Milk	Regional	5	3	5	3	4	4	4	4	3	4	3	3	3	2	1	6	1	1		3.49	3
<i>Fruit</i>																					0	
Mango	Regional	3	4	3	4	3	2	2	2	2	2	2	2	1	1	0	2	2	0		2.25	11
Jujube	Regional	3	4	3	3	3	3	2	2	2	2	2	2	1	1	0	2	3	0		2.31	10

6.3. VC selection scoring information

- A. Growth Potential (32)
- B. Impact (32)
- C. Structure of the Industry (15)
- D. Gender & Employment (17)
- E. Collective action opportunities (4):
- F. Risk

A. Growth Potential (32)					
Criteria	Measuring criteria	Product gain score			
		Score-5 plus	Score-3-4	Score-1-2	Score-0
Present Market size(7)	- 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,	Boro Rice T-Aman Milk Shrimp Fish culture	Potato Vegetable Mustard Prawn Poultry Mango Jujube	Sunflower	
Unmet market demand (6)	- 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	Shrimp Poultry	Boro Rice Potato Vegetable Mustard Prawn Fish culture Milk Mango Jujube	T-Aman Sunflower	
Productivity Improvement (6):	- 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	Vegetable Milk	Boro Rice Potato Mustard Shrimp Poultry Fish culture Prawn Mango Jujube	Sunflower	
Expansion of areas/capacity (7):	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	Vegetable Mustard	Boro Rice Potato Prawn Fish culture Poultry Mango Jujube Milk	T-Aman Sunflower Shrimp	
Value Addition (6):	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	Vegetable	Potato Mustard Prawn Shrimp Fish culture Milk Poultry Mango Jujube	Boro Rice T-Aman Sunflower	

B. Impact (32)					
Criteria	Measuring criteria	Product gain score			
		Score-5 plus	Score-3-4	Score-1-2	Score-0
-Current production(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	Boro Rice Poultry	T-Aman Vegetable Prawn Fish culture Shrimp Milk Jujube	Potato Mustard Sunflower Mango	
No. of HH Involved (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	Poultry	Boro Rice T-Aman Vegetable Prawn Fish culture Milk Shrimp	Potato Mustard Sunflower Mango Jujube	
Contribution to HH income(6):	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,	Boro Rice	Vegetable Prawn Shrimp Fish culture Poultry Milk	T-Aman Potato Mustard Sunflower Mango Jujube	
Seasonality -Short or long harvesting season(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	Poultry	Vegetable Prawn Shrimp Fish culture Milk	Boro Rice T-Aman Potato Mustard Sunflower Mango Jujube	
Food Security (6): is it a food crop contributing to food security (availability and access in the polder)?	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	Boro Rice T-Aman	Potato Vegetable Prawn Shrimp Fish culture Poultry Milk	Mustard Sunflower Mango Jujube	
Nutrition - potential of	some product which is needed to ensure proper nutritional food intake,		Potato Vegetable	Boro Rice T-Aman	

increasing Nutrition intake (5):	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.		Prawn Shrimp Fish culture Poultry Milk	Mustard Sunflower Mango Jujube	
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C. Structure of the Industry (15)					
Criteria	Measuring criteria	Product gain score			
		Score-5 plus	Score-3-4	Score-1-2	Score-0
Forward/backward linkage and MD Approach (5):	Consider existence of lead firms, in either inputs, 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		Vegetable Prawn Shrimp Fish culture Poultry Milk	Boro Rice T-Aman Potato Mustard Sunflower Mango Jujube	
Existence of Service Providers (4):	Similar to above, existence and performance of public and private service providers to the value chain actors. If no existence for SP, score =0, very limited presence (1/2) =1, Medium presence (2-5)= 3, High existence (>5) =5		Vegetable Prawn Shrimp Fish culture Poultry Milk	Boro Rice T-Aman Potato Mustard Sunflower Mango Jujube	
Favorable Business Environment(4):	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.		Vegetable Prawn Shrimp Fish culture Poultry	Boro Rice T-Aman Potato Mustard Sunflower Milk Mango Jujube	
Other program Interest(2):	The extent there are 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			Vegetable Sunflower Prawn Shrimp Fish culture Poultry Milk	Boro Rice T-Aman Potato Mustard Mango Jujube

D. Gender and Employment (17)					
Criteria	Measuring criteria	Product gain score			
		Score-5 plus	Score-3-4	Score-1-2	Score-0
Involvement of	Focus is on the contribution to women empowerment, not just more work while	Vegetable Poultry	Potato Mustard	Boro Rice T-Aman	

women (9):	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	Milk	Sunflower	Prawn Shrimp Fish culture Mango Jujube	
Employment Generation (8):	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		Boro Rice Potato Vegetable Sunflower Prawn Shrimp Fish culture Poultry Jujube	T-Aman Mustard Milk Mango	

E. Collective action opportunities (4):

Criteria	Measuring criteria	Product gain score			
		Score-5 plus	Score-3-4	Score-1-2	Score-0
	-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		Fish culture	T-Aman Potato Vegetable Prawn Shrimp Poultry Milk	Boro Rice Mustard Sunflower Mango Jujube

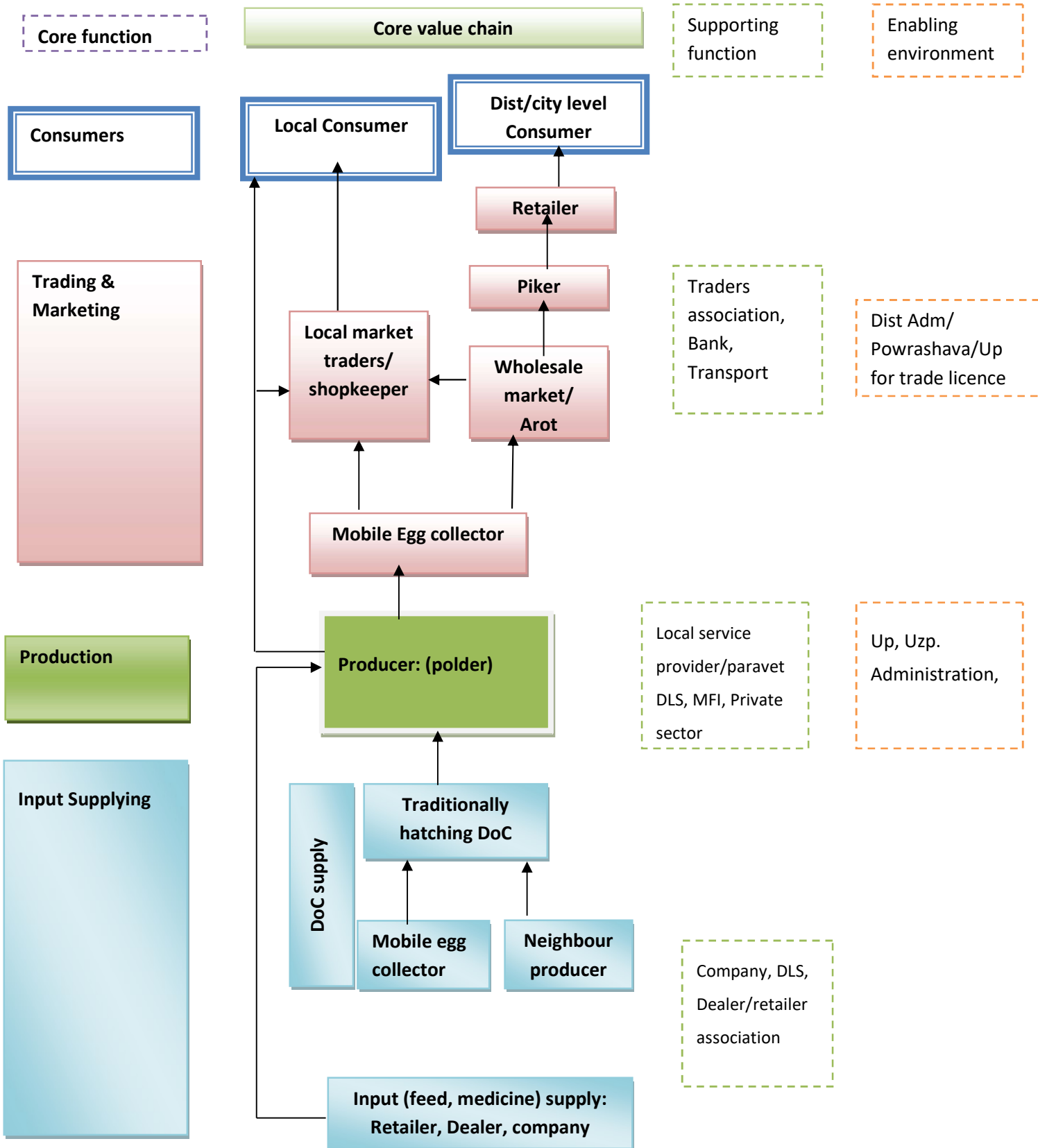
F. Risks

Criteria	Measuring criteria	Product gain score			
		Green	Orange	Red	
	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.	Potato Vegetable Mango Jujube	T-Aman	Prawn Shrimp Fish culture	Boro Rice Mustard Sunflower Poultry Milk

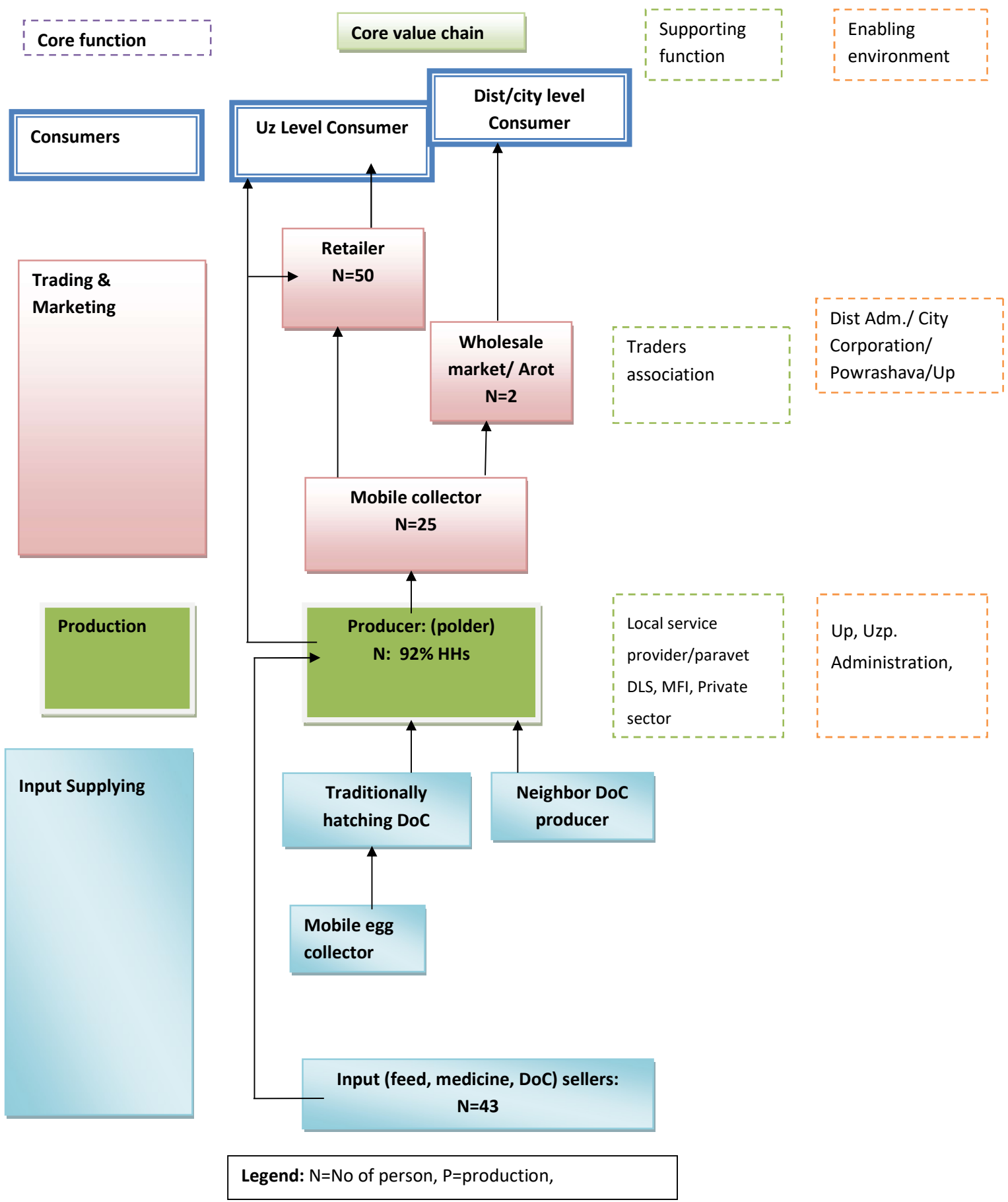
6.4. Potential Value chain Analysis:

6.4.1 Value chain Map

Backyard Poultry Egg Value Chain Map



Backyard Poultry Meat Value Chain Map



6.4.2. Value Chain actor

Table-34: Value Chain actor in Polder

Core function	Name of actor	Function	Numbers
Input Supply	Mobile egg collector	Egg supply	25
	Neighbour producers	Egg supply	
	Retailer	Feed & medicine	60
	Dealer	Feed & medicine	0
	Company	Feed, medicine	50 at Uz
Producers	Producers	Egg production	92% HHs
Trading	Shopkeeper/retailer (for egg)	Egg selling	50
	Piker	Egg supplier	0
	Wholesaler/Arot		2
Service provider	DLS	Treatment & vaccination service	1
	Local service provider (paravet/Vet doctor)/vaccinator	Treatment & vaccination service	5
	Company	Technical service	50 at Uz
Supporting function	Market place/Hat	Scope for trading	6
	Company/private sector	Licence/dealership	50
	MFI	Credit	6
	Traders association	Scope for trading	0

(Sources; KII with market actor)

Potentiality for VC selection:

- Almost every family of this polder is involved with poultry rearing (92%) and 100% managed by women and still now they are established the rights and ownership on this asset.
- It is a women intervention and a family business.
- Major percentage of animal protein is come from egg and meat which easily uptake by rural women and children.
- Have scope to start collective action opportunity leaded by the women through establish the collection point.
- Backyard poultry rearing by traditional method specially housing, feeding and treatment facilities are not improved, so have a scope to improve rearing system as well as productivity improvement.
- Still now consumers have keep the maximum interest in backyard poultry's egg and meat, so have an unmet market demands of this sector.
- The producers did not use the supplementary feed and improved variety DoC as input for increase their productivity, for this perspective have a good scope to introduce and value adding the raw materials.
- Have a scope to create another business as women vaccinator to support this sector.

Opportunity:

- The earning all money from this sector mostly goes to the pocket of women
- Very easy technology and every family have the skill.
- It requires minimum investment and in some cases zero investment

- Still now backyard poultry's egg and meat has higher demand and price in the market.
- In polder area approximately 5 local service provider (Paravet)/vaccinator have been providing the technical services
- More the 50 company have been feed, medicine and in some cases technical support to the poultry owner.
- Approximately 50 shopkeepers/ retailers have been working for effective the output market system.
- All are rearing backyard poultry by traditionally specially the poor housing facilities and not use the supplementary feeding system.

Constraint:

- Women are reared this valuable asset by traditionally and have no any improved technical knowledge on their hand especially the housing facilities, feeding, and treatment.
- Producers are not awarded in vaccination, treatment and veterinary service for the backyard poultry.
- Women did not survey the market price or they have not any market information about the price and always they sold from the farm gate.

Vegetable Value Chain Map

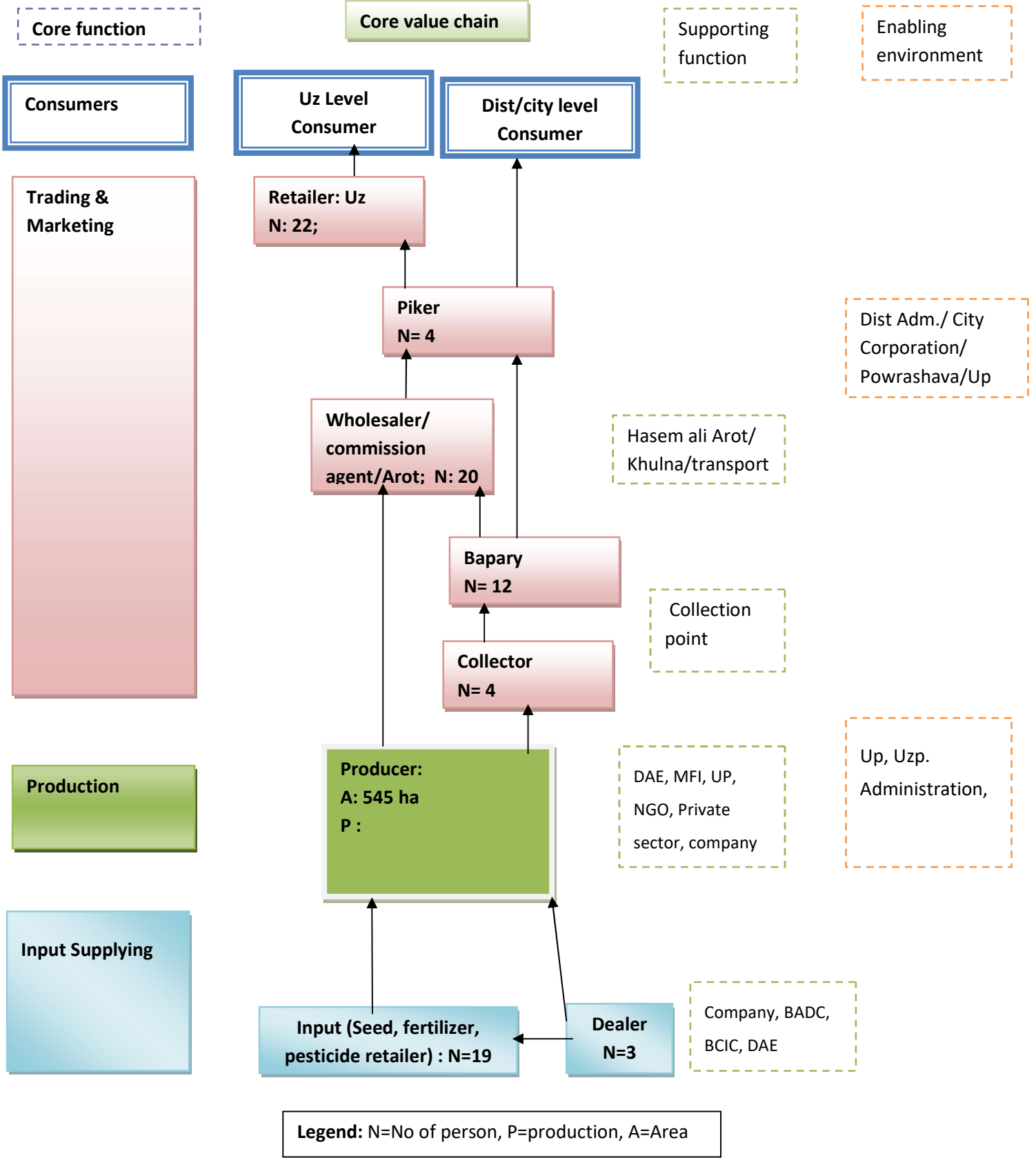


Table 35: Value Chain actor

Core function	Name of actor	Numbers	
		In Upazila	In Polder
Input Supply	Fertilizer retailer	120	7
	BCIC fertilizer dealer	13	1
	BADC fertilizer dealer	14	1
	BADC seed dealer	22	1
	Seed & pesticide Dealer	37	
	Seed & pesticide retailer	200	12
Production	Producers		
Trading	Arotder	20	0
	Piker (Vegetable)	70	4
	Retailer	300	22
	Bapary (vegetable)	65	12
	Collector (vegetable)	110	8
Service provider	DAE	1	1
	Local service provider		
	Vaccinator		14
Supporting function	Market place/Hat	45	6
	Arot	12	0
	Collection point (vegetable)	15	4
	Company/private sector	65	

An overview of Vegetable production:

- In polder most of the area is focused in vegetable cultivation area and so many businesses have been continuing to addressing the agriculture sector.
- Three major areas are covered in vegetable cultivation like; field vegetable, homestead vegetable and pond dike vegetable.
- In generally 75% HHs are directly involve in vegetable cultivation out of total agril HHs.
- More the 50 company and 22 input sellers have been providing inputs and technical & business related service to the farmers.
- .

Opportunity:

- Hasem Ali Arot always helps to strengthening the vegetable supply chain in polder area.
- In peak season 4 collection points provided the business support to the farmers.
- Some time Piker/Bapary directly communicates to the large farmers for collecting the vegetables.
- Well developed physical infrastructure makes an easier for vegetable transportation facilities
- 2 Arot, 20 Arotder, 70 piker, 65 Bapary, 110 collector and 300 retailer involved in this sub sector at Upazila level.

Constraint:

- Poor drainage and irrigation facilities.
- Inadequate knowledge on improve production technology on vegetables.
- Lack of knowledge on identifying and processing the quality seeds.
- Frequently and in some cases depth flooding interrupt the vegetable production cycle.
- Siltation rapidly storage the sand on the river and ultimately raise the river height. During monsoon, tidal saline water flow is moving towards the marshy land and devastated the vegetable crop field.
- Different manmade and naturally created factors like; rainfall, drought, salinity, water logging tidal surge are affecting the vegetable cultivation
- Saline water intrusion, over doses of chemical fertilizer, over use of pesticide and insecticide, scarcity of surface water for irrigation, inadequate drainage system, and siltation reduced the soil fertility as well as decline the soil productivity.
- Financial requirement is one of the problems to start the crop cultivation in timely. Some of Bank provides the crop loan but it is not easily accessible for farmers due to the long procedure system of bank and farmers do not get this type of loan in timely.
- Crisis of fertilizer and pesticides during the peak season due to inadequate supply (Though DD, DAE don't agree with farmers complain). Quality of pesticide is not good enough and sometimes does not work as standard one. There are some company's produces less quality pesticides and promoting their market at remote area (as people are not aware with the quality).
- The valuable agriculture land is reducing rapidly in every year due to unplanned construction of houses and settlements, industries, markets, river erosion and for different infrastructural development.
- The farmers of polder area face scarcity of irrigation water in the dry seasons and shortage of necessary agricultural inputs, which are hampering intensive vegetable cultivation in timely.
- Scarcity of surface water for irrigation, higher price of agricultural machineries/equipment in the local markets is the major problem for intensive irrigation in the area.
- In some cases lack of market information happening the price fluctuation especially for vegetable marketing. Most of the cases farmers did not know the actual demand of the local market and everybody storage the vegetable for selling into the same market at same time and ultimately market are over saturated by surplus vegetable. Here buyer gets an extra opportunity to hike the illegal price and farmers are loss the profit.

Potentiality for VC selection:

- It has a great scope to ensure women participation especially in homestead vegetable cultivation.
- Most of the farmers are not able to identify the quality seed and seedling so here have a scope to improve the farmer's knowledge on this issue.
- In many cases farmers used none-recognized seed which collect from the neighbor. For the productivity concern it is required the quality seed and have a scope to establish the business relation with the good quality input provider.

- It has scope to increase the productivity by introducing and adopting the improve technology.
- Have a scope to strengthening the vegetable supply chain by establish the cohesion and coordination among the different actor like; Piker, Bapary, Arotder, collector and producers.
- It is easier to dissemination of improved technology through set up the demonstration by the supervision of FFS.
- It has a scope to increase maximum utilization of homestead area under vegetable cultivation.
- It is possible to increase women income and asset by ensure the women participation in homestead vegetable cultivation.
- Female are physically less capable of work than the male and never done comparatively hard work in the field. So here a great scope to employment creation in different flexible work like; vegetable harvesting, grading, cleaning and any other packaging activities.
- By the food security concern, vegetable supply the different nutritional value especially for women and child.
- Have scope to start collective action opportunity through establish the collection point where women can easily access the marketing facilities by selling their very small amount of products.

Milk Value Chain Map

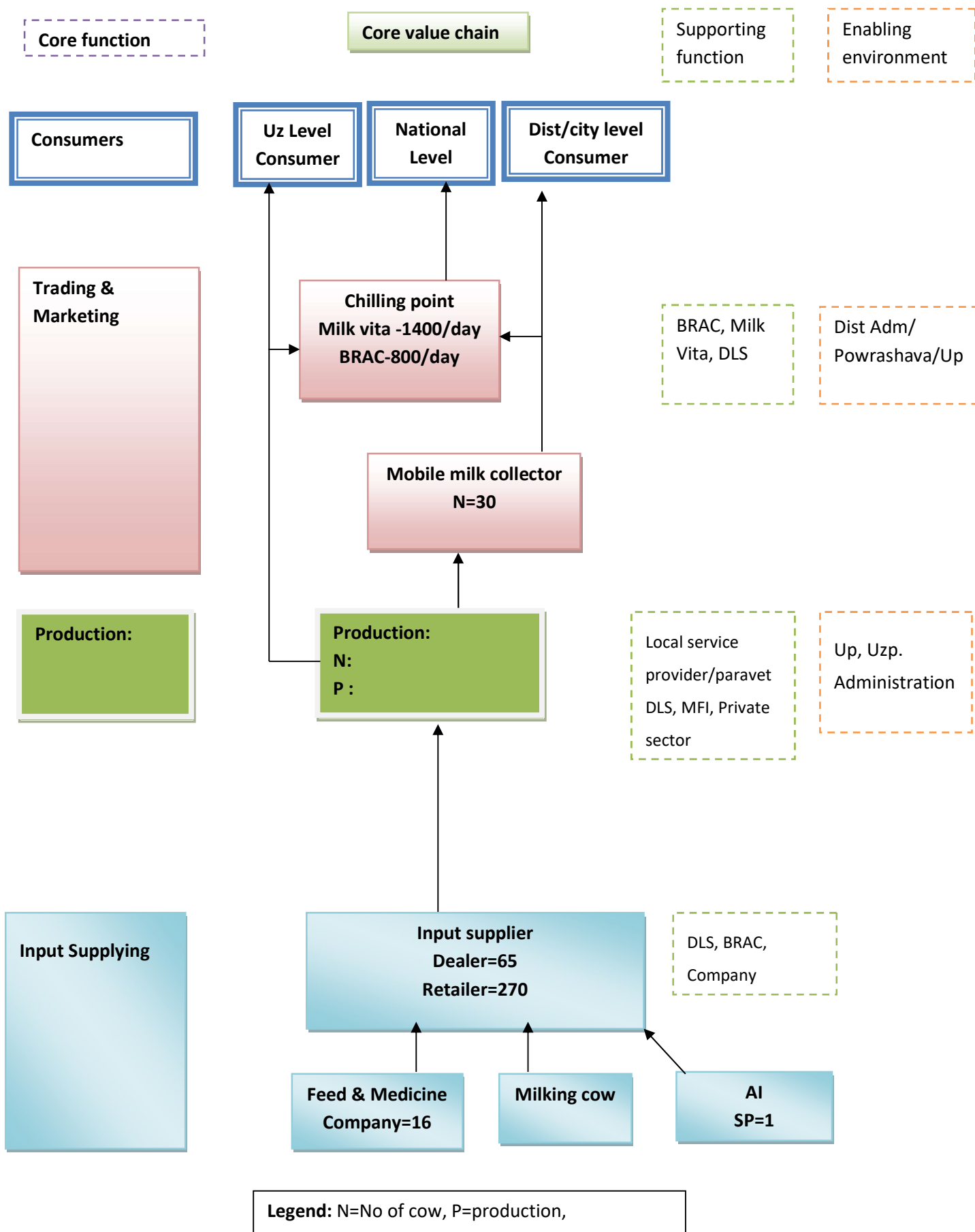


Table 36: Value Chain actor

Core function	Name of actor	Numbers In Upazila	Numbers in Polder
Input Supply	Feed and medicine Retailer	270	40
	Feed & medicine Dealer	65	0
	AI center	15	1
Production	HHs	65% HHs	65% HHs
	Cow		
Trading	Milk Vita	1	
	BRAC	1	
	Mobile milk collector	225	30
	Hat	45	6
Service provider	DLS	1	1
	Local service provider (paravet)	37	5
	AI inseminator	15	
Supporting function	Milk vita	1	
	BRAC	1	
	Company/private sector	16	
Enabling Environment	Union parishad, Upazila parishat, Powrashava		

Potentiality for VC selection:

- Most of the activities done by female so it is scope to take it as a women entrepreneurship.
- It is normal calculation that the 4 membership small family easily maintain their livelihoods from earning sources of two milking cow.
- The producers get the long time return (6-7 months) and it is the great opportunity for poor & extreme poor people as the concern of food security.
- Easily open the different supporting business like; grass cultivation & marketing, fuel marketing by use the byproduct of cow dung, milk collection & marketing, and it is also possible to start milk processing (cream making) by effective the local technology at the rural area which make new business opportunity.
- In generally 65% households in the polder areas are reared at least one cow for producing milk.
- Two milk processing company like; Milk Vita, BRAC are established chilling point and collect very day approximately 2200 litter milk from producer at upazila level.
- Local sweetmeat shops consume or buying the major percentage milk from the producer through mobile milk collector.
- In the area some people already start fodder production as new business
- Have an opportunity of share cow rearing system in the community.
- As the normal phenomenon that, rural women are skilled to manage the all responsibility in relation to cow rearing.

Constraint:

- Low productivity of milking cow, (1.2 litter/local breed and 3 litter/cross breed).

- Some farmers use supplementary feed but most of the farmers did not supply the supplementary feed only they depends the natural or green grass and straw.
- Always milk price fluctuated due to undeveloped milk marketing channel especially when company deny to buying the milk for certain period.
- Some time farmers take advance money from mobile collector and most of the cases it is create a problem to get fair price or they are bound to selling the milk to the collectors.
- Farmers are not aware about the nutritional feed which increase the fate rate as well as milk productivity.