Food and Agriculture Organization of the United Nations

Rapid Assessment on the Potential Impact of COVID-19 on the Food and Agriculture System in Cox's Bazar

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List of Acronyms

A2F	Access to finance
BBS	Bangladesh Bureau of Statistics
BINA	Bangladesh Institute of Nuclear Agriculture
BRRI	Bangladesh Rice Research Institute
BARI	Bangladesh Agricultural Research Institute
BADC	Bangladesh Agricultural Development Corporation
BFDC	Bangladesh Fisheries Development Corporation
DAE	Department of Agricultural Extension
DAM	Department of Agricultural Marketing
DD	Deputy Director
DLO	District Livestock Officer
DFO	District Fishery Officer
DOC	Day-old chick
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus group discussion
HH	Household
ICT	Information and communication technology
LSP	Local service providers
MFI	Microfinance institutions
SAAO	Sub-Assistant Agriculture Officer
UAO	Upazila Agriculture Officer
ULO	Upazila Livestock Officer
UFO	Upazila Fisheries Officer
SUFO	Senior Upazila Fisheries Officer

Executive Summary

The novel coronavirus disease (COVID-19) outbreak was declared a pandemic on 11 March 2020. The health crisis risks sparking a food crisis, unless measures are taken quickly to protect the most vulnerable, keep global food supply chains functioning, and mitigate the pandemic's impacts across the food system. FAO knows from dealing with past health crises that these can have a drastic effect on food security, especially that of vulnerable communities. This shock is unprecedented in that it simultaneously affects significant elements of both food supply and demand in countries around the world. Supply chain and trade disruptions could restrict people's access to sufficient and nutritious sources of food, especially in countries that already have high levels of food insecurity.

In response to the outbreak, FAO along with other humanitarian organizations in Cox's Bazar, is working with the Government of Bangladesh on preparedness and response measures in Rohingya camps and host communities.

The objectives of this assessment are to understand the existing production and marketing systems and identify options to mitigate the effects of the pandemic on rural livelihoods and to keep the food value chain functioning.

This report summarizes the findings with respect to the preliminary impact of COVID-19 on the agri-food system, livelihoods, and food supply chains, as well as seasonal labour. With an emphasis on services and input availability, access to market, opportunities to overcome these new challenges and protect the food value chain.

Primary data were collected at the field level using key informant interviews (KIIs), focus group discussions (FGD), and in-depth interviews with relevant stakeholders. Study tools were developed to collect information from market actors and stakeholders, farmers, input market actors, output market actors, and relevant line departments. Most of the KIIs were conducted by telephone. The study included 26 FGD exercises with 31 females (17%) and 182 male participants, 68 farmers KIIs with 15 female (25%) participants, and in-depth interviews with 19 input market actors, 22 output market actors, and 16 government officials.

The study area lies within Cox's Bazar district, located in the south-eastern coast of Bangladesh, under the Chattogram administrative division. The specific area covered four sub-districts (locally termed as 'upazilas'), during the period of 22 March – 9 April 2020.

Lockdowns and other restrictions on business activity to control COVID-19 will lead to reductions in food consumption and in nutrition status — especially among the poor (through rising food prices, falling incomes, or both). People will have less money to pay for their food. Consequently, these families buy more grains and staples in bulk at low cost instead of more expensive goods like meat and fresh produce.

In addition, the study demonstrates large negative effects for the agriculture sector in several categories: harvesting may be disrupted because of a lack of seasonal labour; planting because of a lack of seed or fertilizer; transport because of reduced transport facilities; and market exchange because of lockdowns or social distancing. These will combine to disrupt the food system.

That potential impacts in the agri-food system were strongly heterogeneous, depending on the nature of the commodity, and the resource-intensity of the systems. In consequence, to respond to the economic fallout from COVID-19, effective support to the agri-food system is needed at different levels: enhance agricultural production, cash transfers and safety nets for the poor and vulnerable, labour mobilization, transportation support for the aggregation centre engaging youth as local service provider, and use of information and database support for farmers' groups and business coordination within the food supply chain. This approach will optimize the chance to enhance economic investments and keep small firms operating.

To avoid a food crisis, government, together with national and international actors, need to implement policies and programmes that target the most vulnerable communities.

Key findings

A. Existing agricultural practices/capacity

There are large differences in cultivation techniques between coastal and inland plains areas. The farmers in coastal areas mostly utilize traditional technology. In Cox's Bazar, the major cereal crop is rice, and the major vegetables are aubergine (eggplant), cucumber, radish, bean, red amaranth, Indian spinach, tomato, chili pepper, sweet gourd, bottle gourd, bitter gourd and ridge gourd (Table1).

According to a statement by the Deputy Director of the Department of Agricultural Extension, Cox's Bazar, a short-term shutdown will not have a large effect on irrigated winter rice (i.e., Boro) cultivation, as this is in the milking stage and irrigation is mostly required now. The shutdown will not have an impact on the irrigation system, and fertilization is not required at this stage of crop growth. The only concern is an attack of Rice Stem Borer (Scirpophaga incertulas); the crop needs to be checked for this pest regularly. If chemicals are needed for pest control, they will be available at the local level, as they have some stocks. In the case of the vegetables sub-sector, the winter vegetables stage is almost at an end, and the summer vegetables are at the planting and seed sowing stage. In rural areas, the availability of quality inputs (i.e., quality vegetable seeds, seeds of modern rice varieties) is a critical issue. Farmers have limited access to quality inputs and appropriate technology.

The major constraints, however, are on the marketing of agricultural commodities. Due to movement restrictions, people are not going to the market in large numbers. The prices of vegetables have come down for farmers and increased in urban areas due to travel restrictions and decreased mobility of buyers/ traders at the farmer level. People are bound to restrict their lifestyle as well as their food habits. In general, broiler chickens are not selling well, resulting in a lower price of chicken and increased debt for poultry farm owners. At the same time, poultry hatcheries are facing challenges to sell their day-old chicks (DOCs). In the case of fisheries, demand for fish has decreased as non-residents and tourists have left Cox's Bazar. For farmed fish, it is possible to delay the harvest, but fishers need to sell their catches for their livelihood. If they cannot sell their fresh catch, one alternative is to dry the fish.

Table 1: Demand-supply situation of Cox's Bazar

Major agricultural commodities	Annual production (metric tons)	Annual demand (metric tons)	Observation
Cereal (rice)	420,287	340,400	Surplus
Vegetables	220,000 (winter) 37,500 (summer)	308,000 (winter) 52,500 (summer)	Demand gap of 35-40%
Fish (wild-caught and farmed)	249,000	60,000 (excluding refugees)	Surplus
Livestock: eggs (chicken and duck)	136.98 million (55.56%)	246.50 million	Demand gap of 109.51 million (44.43%)
Meat (beef, mutton, poultry)	79,100 (76%)	103,800	Demand gap of 24,600 MT (24%)
Milk (cow and buffalo)	84,000 (38.83%)	216,300	Demand gap of 132,200 MT (61.11%)

Source: BBS 2011; DAE, DLS and DoF Cox's Bazar 2019; Traders KII

A.2 Potential risks of current practices/capacity (focus on market and price)

The COVID-19 outbreak is limiting the movement of people as well as their access to commodities and basic consumer goods. Markets, transportation, and supply chains are being intensely and significantly affected. The supply chain consists of the production of food and its movement from point of origin to use or consumption. Every step of the supply chain requires human and/or natural resources. Because the food supply chain is domino-like, when one part of the food supply chain is affected, the whole food supply chain is affected, which is often manifested through changes in price as well as demand and production, value added and markets. From the interviews with different stakeholders, the major potential risks below were identified:

i. Restrictions on vehicle movement and home quarantine obstruct farmers' access to markets, shortening their productive capacities and hindering them from selling their produce.

ii. Supply is being disrupted due to containment efforts, which restrict mobility, and the higher costs of doing business within restricted supply chains.

iii. Demand for agricultural commodities such as chicken, milk, and fish has fallen due to increases in uncertainty and precautionary behaviour as well as rising expenses, which reduce people's ability to spend.

iv. Poultry farmers have stopped restocking due to the market uncertainty and fear of input (feed and medicine) availability, resulting in a huge price drop for day-old chicks.

v. Milk is going largely unsold due to the closure of sweet shops and Big Bazar.

vi. An unparalleled crisis is taking place in the tourism sector; all hotels and restaurants have shut down, resulting in negative impacts on essential commodity prices (i.e. chicken, fish, milk etc.), as the number of buyers has been cut down significantly.

vii. Immediately after the shutdown, the prices of non-perishable commodities (rice, pulse, onion, eggs, oil, dry food) increased as people stocked up on essential items.

viii. From the focus group discussion, it was found that a segment of people, especially in rural areas, are most at risk and most severely affected in terms of interruptions of their regular incomes and health services and challenges in meeting their living expenses.

ix. FGD participants mentioned that a longer-term shutdown would limit input availability (e.g., vegetable and rice seed, fingerlings, feed, day old chicks, agricultural machinery, etc.) in rural areas. As a result, production would go down, creating a food crisis. They also mentioned that they have no joint production and marketing plan and demanded support for their collective business plan.

x. Traders also assumed a forthcoming food crisis unless measures are taken fast to protect the most vulnerable, keep food supply chains alive and mitigate the pandemic's impacts across the food system.

A.3 Strategies to overcome potential impacts

Depending on the degree to which economic activities are interrupted, the loss of livelihoods may overwhelm current coping strategies. In rural areas, given the lack of income due to restricted movement, people will have to prioritize the money they have left for life-sustaining needs such as food and primary health care. The coping strategy suggested by the different stakeholders is summarized as follows:

i. Provide immediate support to continue food production

- Input support: Rainfed Aus and Aman rice (May–June) seed distribution, summer and upcoming winter season vegetable seed distribution (leafy and non-leafy), and support for fingerlings, day old chicks and feed.
- Cash grants for immediate recovery of agricultural losses and to support farmers' production system, i.e., labour, fertilizer, irrigation, crop protection, and animal health care.

ii. Provide agricultural machinery support: To harvest irrigated rice in a timely manner (April-May) and address the labour crisis, support is needed for mechanical harvesters/reapers and threshers for rice harvesting and threshing.

iii. Provide irrigation support: In the summer season of Boishakh-Joistha (mid-April to mid-May), there is a huge scarcity of irrigation water, especially for growing summer vegetables in some of the sub-districts of Cox's Bazar. The soil surface becomes hard after a certain period, which hampers crops from extracting moisture from the soil. Water availability during that time is hardly sufficient for drinking purposes and is not adequate for irrigating summer crops. To promote crop production, improved and efficient irrigation support is required, and the following interventions could be taken into consideration:

- Provide a diesel-engine-operated water pump at the farmers' group level.
- Provide marginal and poor farming households with a rainwater harvesting system for both drinking water and homestead gardening purposes.

iv. **Ensure food support for vulnerable populations**: Ensure that the specific needs, unique vulnerabilities and risk exposures of affected people are recognized. Quickly identify vulnerable groups with specific needs (fisher folk, wage labour families , pro-poor households (HHs), women-headed HHs, HHs highly affected by agricultural loss, and highly indebted HHs facing increasing livelihood costs and business losses) to provide immediate support to retain their livelihood.

v. **Support alternative means of income generation**: Strengthening local aggregation centres for vegetables, eggs, fish and milk marketing by introducing a market aggregator, i.e., a Local Service Provider (LSP) with an engine-operated rickshaw-van, will help connect rural farmers with local markets, yield better prices and enable collective actions for input and output markets.

vi. **Facilitate technical and business support:** For farmers to maintain production, they require effective technical and business support. Facilitate the private sector in ensuring the availability of quality inputs at the local level as well as supporting farmers in selling their products.

vii. **Transportation support:** Strengthening of local aggregation centres for vegetable, eggs, fish and milk marketing through introducing the market aggregator i.e. Local Service Provider (LSP) having support with an engine-operated rickshaw-Van. This will help rural farmers to relate to the local markets through the aggregator or LSP for better prices and will practice collective actions for input and output markets. This is also an alternative income generation option through start up grants or easy access to means of transport.

A. Prioritized tasks for agricultural production, food security and market

Immediate measures for food security, food safety and logistics during COVID-19

i. Local social welfare department should expand social-protection schemes (cash for work, VGF, etc) to protect the most vulnerable and extreme poor families. Selection Criteria needs to be relaxed to cover the poor groups as well because they are also affected at high rate by the COVID-19 impact.

ii. It is most important now for the development actors including government entities in Cox's Bazar to gear up the food value chain at local level including strengthening input and output market functions to facilitate input supplies so that farmers can plant, harvest, transport and sell products without exposing to risk;

iii. Need to work together more intensively to save lives, meet immediate needs through urgent support services and plan for longer-term solutions to support loss-recovery activities. Incentive packages could support the agricultural sector with seed distribution, fertilizer programmes, enhancing irrigation support and subsidies for essential farm machinery.

iv. Awareness programme on hygiene, safety protocol, nutrition, avoid usual farm visit for all the actors along the food value chain with practices that need to be adhered to mitigate the risk of disease transmission.

v. In addition, testing for COVID-19 should be increased as much as possible for all farm workers.

vi. Capacity building of agricultural labour on hygiene, safe production, harvesting and transportation.

Availability of food on the market

Food availability is determined by food production and food trade. It is the supply side of food security. To make available of food in the market needs the following steps:

i. To continue availability of food in the market stakeholders need to plan diversified options to ensure quality transportation of food commodities;

ii. Make sufficient protection equipment and awareness available among the workers/labours and transport operators including incentives to keep the supply chain alive;

iii. Capacity building of the farmers and market actors on appropriate coping mechanisms and improve market functions to increase business interactions through digital learning methods and small-scale workshops with limited participants so that social distancing could be maintained. Post situation workshop might be effective as well to address the adverse situation;

iv. Intervention design to keep the agricultural market functional maintaining safety protocol.

Steps to be taken for the current agricultural season

The growing agricultural season is the part of the year during which local weather conditions (i.e. rainfall and temperature) permit normal plant growth, essential inputs availability and its application. To keep continuation of this season productive, the following steps need to be taken:

i. Ensure support to the farmers in Cox's Bazar on safe harvest of irrigated winter rice crop (i.e. Boro) by all the farmers.

ii. Facilitate movement of the seasonal farm workers with safety by special transportation provisions and with well preventive and hygiene measures. ;

iii. Support the farmer communities to maximize utilization of the machineries to reduce production cost as well as addressing labour crisis;

iv. Ensure fair price of rice and vegetables through increasing safe farmers market outlets as well as procure rice from the producers with reasonable price for local government food go-downs to address risk and vulnerability;

v. Provide technical support and inputs (feeds, seeds, chicks and fodder) to the farmer communities to grow high value vegetable crops, fish and livestock. Additionally, support through irrigation facilities to use the seasonally fallow lands;

vi. Strengthen institutional capacity and ensue agricultural extension services provisions for the producers maintaining safety.

A foreword look in terms of value chains and micro-entrepreneurs:

Value chain includes the activities such as production, marketing, distribution and support services up to the final consumer. Among the activities different stakeholders like; private sector (input

and output market), public sectors involved in the entire the value chains. To make the value chain functional need to priorities:

i. Provide comprehensive support to the farmers to continue agriculture, fisheries and livestock productions in broader scale.;
ii. Work with the key input providers (private sectors) and support them promoting their businesses through incentives to strengthen agricultural input supply chain;
iii. Enhance market monitoring to ensure fair trade of agricultural commodities and support farmers getting appropriate price of their products;
iv. Ensure business support to micro, small and medium enterprises e.g.: grant support, credit support to maintain cash flow;
v. Promote use of local variety seed, practice IPM and other good agriculture practices.

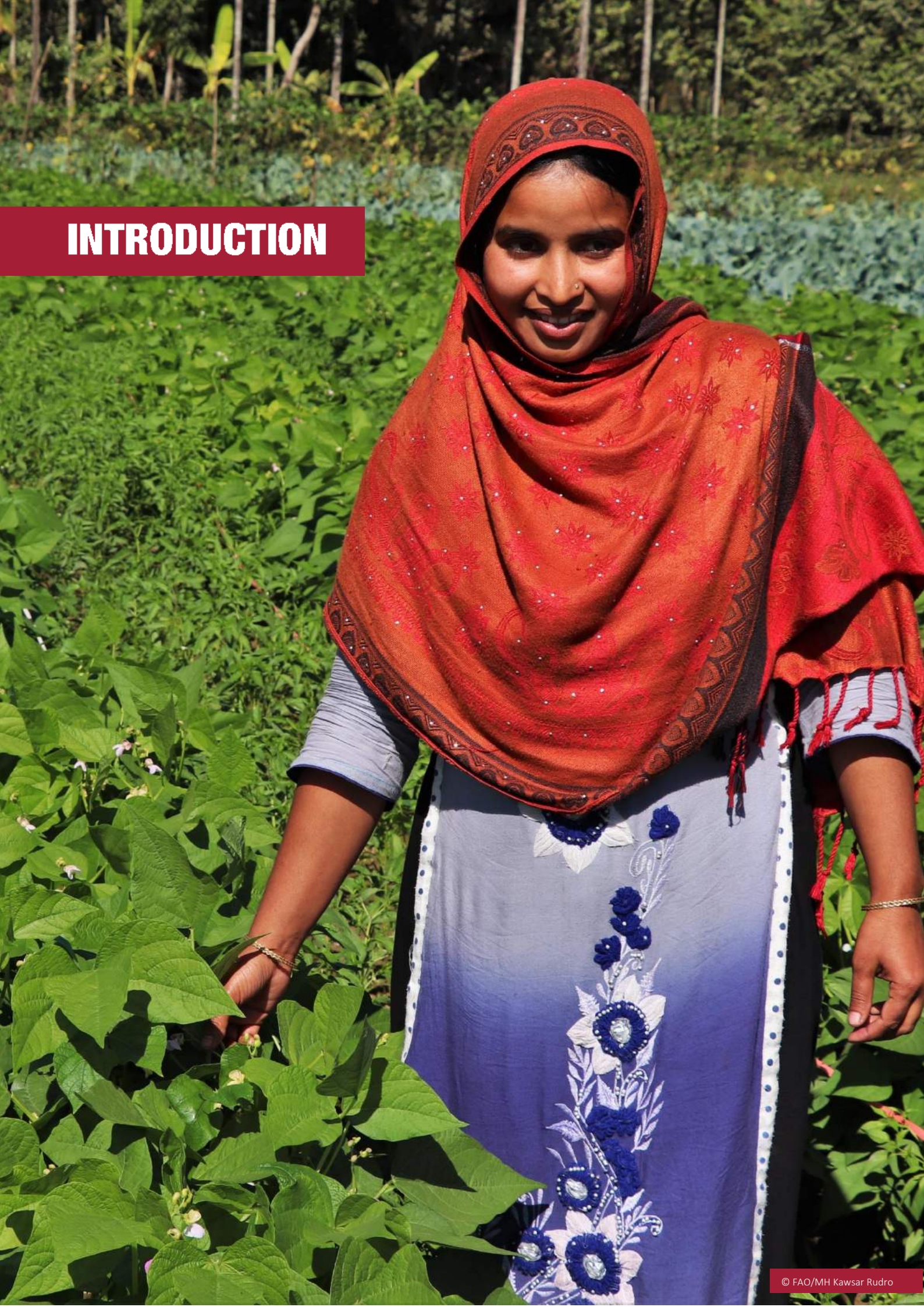
Support the on-going market systems

The private sector entities are the key actors to support the market as well as operations of the market systems and the government also needs to provide regulatory support to perform the business in terms of workers' mobility, transportation, capacity building and access to finance in maintaining cash flow for operations of the businesses. The environment can be forwarded through bilateral dialogues, small scale workshops and field level joint monitoring and performance evaluation.

Strengthening more involvement of private sector in the rural market systems

Unemployment risk is a prime issue in strengthening market management and operations. The private sector actors in the district need to avoid redundancy in preventing supply-chain challenges that will help to ensure smooth supply of products, storage, distribution, processing, packaging, retailing and marketing during the crisis period. At the same time private sectors need to take measures to protect workers and prevent the spread of COVID-19. Support also required from the government to ensure farm workers' transportation, their safety and skill development.

INTRODUCTION



1.0 Introduction

1.1 Background

The novel coronavirus SARS-CoV-2 was identified as the cause of a significant number of human cases of respiratory disease (COVID-19) in China and other countries. The current outbreak was first detected in Wuhan City, which is a major domestic and international transport hub in China. Due to the scale and spread of transmission, the COVID-19 outbreak was declared a global pandemic on 11 March 2020.

Cox's Bazar district located on the south-eastern seaboard of Bangladesh has a total area of 2,492 square kilometre with a population of about 2.3 million. Its population density (918 per square kilometre) is slightly lower than the country average of 1,115 per square kilometre. Table 2 showed the category of the agricultural farming families, of them 70% are land less (owned land 0-0.49 acre) and marginal (owned land 50-1.49 acre) and only 1.57 % are large holding farmers.

Table 2: Category of the agricultural farming families

Type	Land (acres)	Teknaf	Ukhiya	Sadar	Ramu	Mahesh khali	Kutubdia	Pekua	Chakaria
Landless	0-0.49	3004	8228	20850	3004	3500	4500	7074	25166
Marginal	0.50-1.49	5235	14997	24582	5235	7290	4450	11032	24000
Small	1.50-2.49	5856	2589	8850	5856	9050	2915	3229	10000
Medium	2.50-7.49	3761	1500	3603	3761	3200	120	1715	4000
Large	>7.50	574	150	465	574	550	15	450	1100

Source: DD DAE, Cox's Bazar 2019

The arable agricultural land In Cox's Bazar is shrinking at an alarming rate due to urbanization, construction of roads and infrastructure, etc., while natural resources like soil and water are experiencing serious degradation, and the climate is changing. Under the circumstances of the COVID-19 pandemic, the Bangladesh Government has instructed that crops should be cultivated on all arable land to increase food production. The categories of agricultural land in Cox's Bazar for which plans need to be made for the next cultivation period are presented in Table 3 below.

Table 3. The agricultural land types in Cox's Bazar district

Sub-district	High land (HL)	Medium HL	Medium LL	Low Land	Arable land Fallow	Salt land	Hilly land
Teknaf	3842	5800	2736	750	1700	2207	14602
Ukhiya	1098	7048	2225	330	150	400	981
Sadar	760	2750	1050	750	91	1450	7313
Ramu	2698	3550	2827	625	1300	50	3503
Moheshkhali	6460	5365	3740	15806	285	12855	4630
Kutubdia	0	50	50	20	1200	2700	0
Pekua	950	4250	2850	450	100	5200	702
Chakaria	2987	9404	2021	7811	260	4892	0

Source: DD DAE, Cox's Bazar 2019

Rice is the major crop in Cox's Bazar and is produced in both seasons, that is, rainfed summer rice (i.e., Aman) and irrigated winter rice (i.e., Boro). Most of the farmers in the district practice traditional farming methods of growing rice and other, non-cereal crops. Sufficient rice production is the key to ensure food security in the country as well as in the Cox's Bazar district. Irrigated Boro rice is now on the field, and a short-term shutdown will not affect its production if it is irrigated properly. The farmers in the study area are using shallow tube well (STW) and low lift pump (LLP) technologies for irrigating the summer crops due to the inadequacy of the deep tube wells (DTWs) in this area. The respondents stated that the water level, especially in the southern part of the district, is decreasing by the day due to deforestation and pumping of water through DTWs in Rohingya camps. Respondents also stated that the farmers pay irrigation costs of USD 300 per hectare of land to grow Boro rice. For sandy loamy soil, frequent irrigation (every other day) is required due to the lower water-retaining capacity of the soil.

The key informant of Department of Agricultural Extension (DAE) and the market actor i.e. rice trader stated that the storage of rice crop is satisfactory in local silos and government warehouses and there is no shortage of food grains or any possibility of shortage by next three months (Table 4). But they informed that both wholesale and retail prices of coarse rice have increased in the local markets.

Table 4: Government grain stock (warehouse) status (thousand MT)

Current year government stock in warehouse			**Previous year government stock in warehouse**		
Rice	Wheat	Total	Rice	Wheat	Total
1 386.95	307.81	1 694.76	1 329.09	164.14	1 493.23

Source: MIS & M, Directorate General of Food as on 23 March 2020

1.2 Objectives of the study

The coronavirus pandemic has curtailed peoples' movement as well as their ways of life, triggering adverse effects on the global and local market economy. Bangladesh has been struggling with emerging threats in every district, including Cox's Bazar in the south. Tourism has been closed down, and changes are reverberating through the local market chain. The main objectives of this assessment are as follows:

- Determine the existing capacity of the agricultural market (amounts of agricultural commodities, marketing capacity) and how the lockdown might affect food availability.
- Understand the adverse effects of the coronavirus disease (COVID-19) epidemic on agricultural market chains.
- Identify the effects at various levels of agriculture value chains.
- Identify the supply mechanisms of the private sector.
- Understand the supply chain of inputs at the rural level through local retailers/the private sector; Strengthen the capacity of farmers' groups (FGs) to collect their inputs jointly to continue the course of production of agricultural commodities.

STUDY METHODS

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2.0 Study methods

In mid-March, the FAO Cox's Bazar planned to design a rapid market assessment to understand the local market situations (i.e., demand, supplies, cost, deficiencies, market chain) currently occurring due to COVID-19 effects and to establish coping strategies with different timelines.

The design, approach, tools, sample size and data collection methods for the rapid market assessment were identified through discussions within the team and with relevant stakeholders. The study was designed in the form of exploratory research, using multiple data collection methods to gain insight into the local market situation due to the effects of the coronavirus response. The assessment explored and identified the local market situation with respect to key variables such as products, demands, supplies, deficiencies, price volatility, market chains, change agents, and the establishment of coping mechanisms to lessen the severity of the pandemic's effects on four market value chains (vegetables, cereals, fish and livestock).

2.1 Design and approach

A literature review was employed to review documents—both printed and electronic (computer-based and Internet-transmitted) material—that are relevant to the emerging outbreak and its potential impacts on the local economy, and the findings were tracked systemically. The literature review-scanning checklist, FGD questionnaires and KII checklist were developed and pretested before the final surveys were conducted to obtain pertinent information. The questionnaire was semi-structured, and interview duration was 40 to 60 minutes per individual. The assessment was conducted from March 20 to April 9. Producers-level data were collected from 20 unions of the Cox's Bazar Sadar, Ramu, Ukhiya and Teknaf sub- districts of Cox's Bazar district. These sub-districts are driven by agriculture mixed with fisheries, tourism and livestock value chains. Data were collected from market actors and line departments at the district level.

2.2 Sample design

Sample and data collection techniques were determined based on rapid assessment standards and respondent characteristics and addressed the key market actors (i.e., local agricultural producers, retailers, wholesalers, market association leaders, supply companies and agricultural extension officers) who have direct involvement and linkages in the local market to get complete insight into the current situation. The respondents who participated in the study are summarized in Table 5, and the data collection techniques and their implementation are described below.

- **Focus Group Discussion (FGD)**

A total of 26 FGDs were conducted in four sub-districts (Cox's Bazar Sadar, Ramu, Ukhiya and Teknaf), with each producers group represented by 8-12 farmers who have direct involvement with the local markets in terms of supplying products or purchasing inputs. The respondents were selected using non-biased procedures following the key criteria. The respondents' selection criteria helped with performing non-biased sample selection. In selecting the FGD participants, the following were the major considerations:

- Respondents should be homogenous in occupation and socio-economic background.
- Must be a Bangladeshi citizen and have direct involvement with the local agricultural markets for any of the four (vegetables, cereals, fish and livestock) sub-sectors.
- Must have multiple years of experience with the local market and an understanding of the current market situation.
- The geographical distribution and level of representation from each sub-sector was also considered.

- **Key Informants Interview (KII)**

A total of 68 KIIs were planned for four sub-districts (Cox's Bazar Sadar, Ramu, Ukhiya and Teknaf), and 86 interviews were ultimately conducted with individual stakeholders. The key informant interview technique was applied to explore key information about the local market in-depth. The respondents included retailers, wholesalers/market leaders, supply companies and agricultural extension officers from DAE, DoF and DLS who have first-hand knowledge and experience in the four market value chains (vegetables, cereals, fish and livestock). The selection process was considered with the following key criteria:

- Respondents should have practical first-hand knowledge/experience and engagement/influence in the local agricultural production and market chains.
- Respondents should be up to date on the current market situation and changes in product demands, supplies, and deficiencies and are able to suggest strategies to overcome the emerging situation for different time intervals.
- Each sub-district is represented.

Table 5: Summary of sample

Type of respondent	Sample size	Respondent number		
		Male	Female	Total
Farmer FGD	26	122	60	182
Farmer KII	68	53	15	32
Input retailer/dealer	19	19	0	10
Private company	6	6	0	6
Trader/wholesaler/arotdar	16	16	0	16
DAE / DoF / DLS	16	16	0	12

2.3 Data collection and analysis

The primary data were collected at the field level using key informant interviews (KIIs), focus group discussions (FGDs) and in-depth interviews with relevant stakeholders. Prior to data collection, the FGD questionnaires and KII checklist were developed, survey enumerators were oriented, and tools were inserted into the Tab and pretested. The study tools were developed for collecting information from the following market actors and stakeholders: farmers, input market actors, output market actors and the relevant line departments. Most of the KIIs were conducted by telephone given the adverse COVID-19 situation. The study period was March 20 to April 09, 2020. The questionnaire was semi-structured, and interview duration was 40 to 60 minutes per individual.

2.3.1 Data analysis: The qualitative variables were measured on a nominal scale using coding and analysed in parallel, sequential and synthesis forms. Some data and qualitative answers can be quantified (i.e., sum, frequency, average) and interpreted using contrasting and comparing techniques. Data entry and analysis were done using software and resources.

2.3.2 Limitations: The representation provided by the overall sample size may be a problem due to time constraints, and bias in sample selection and errors at different levels may occur, but these problems were minimized by using precautions, bias and error controlling techniques and mitigation strategies. The study's approach is quick and flexible; however, it is very important to understand the situation and identify the coping strategies that will help to limit the severity of the developing COVID-19 situation. The time and timing of this study also presented challenges, as people were maintaining social distance and the need to complete this study in a timely manner meant that the time available for collection of information was short.

STUDY FINDINGS

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3.0 Study findings

3.1 Crops

3.1.1 Potential constraints and opportunities

The key informant from the DAE stated that in Cox's Bazar, major cropping patterns are Boro-Fallow-T.Aman, Vegetable-Boro-Fallow-T. Aman, Fallow-Fallow-T. Aman, and Vegetable-Fallow-T. Aman. Among those, Boro-Fallow-T. Aman has been the dominant one . . This pattern indicates that quite some areas remain fallow in between Boro and Amon seasons due to lack of enough irrigation provisions. These lands, if brought underutilization, would largely increase farmers' income as well as ensure food security during the epidemic conditions.

The study observed that the farmers in Cox's Bazar commonly cultivate local rice varieties, i.e., paijam, barotia paijam, horidhan, and some high yielding varieties, i.e., BINA-7, BRRI Dhan-40, BRRI Dhan-41, BRRI dhan-49, BRRI dhan-45, BBRRI dhan 76, BRRI dhan 57, and BRRI dhan 52 (saline tolerant). They mainly practice traditional methods, resulting in lower productivity against higher production costs. Farmers depend on agricultural labours , especially for land preparation, plantation, weeding, harvesting and other important intercultural operations. The number of active agricultural laborers is decreasing by the day, and farmers face huge problems during the peak season due to a high wage rate.

The study also observed that the farmers of Cox's Bazar commonly cultivate following high yielding rice varieties.

- **BRRI dhan 49**: This is a rainfed Aman rice variety with a medium slender (thin/fine) grain. Plant height is 100 cm and average life cycle is 135 days with yields 5.0 MT/ha. Crop harvesting time is late October to early November. It is widely cultivating in Ukhiya and Teknaf Sub-districts of Cox's Bazar. Farmers like this variety last three years due to rice grain is fine and thin.
- **BRRI dhan 45**: This is an irrigated winter rice variety with a medium white grain. Plant height is 100 cm and average life cycle is 145 days with yields 6.5 MT/ha. Harvesting time is late April to early May.
- **BRRI dhan 52**: This is also a rainfed Aman rice variety with medium thin to fine and white grain. Plant height is 116 cm and average life cycle is 145 days with yields 4.5-5.0 MT/ha. Crop harvesting time is late October to early November. It is resistant in water logging condition and it survives 12-14 days during sudden flood in rainy season. The farmers in Ukhiya and Teknaf Sub-districts are cultivating this rice variety. But the variety is not yet very much popular due to unavailability of the quality seeds within the farmers reach.
- **BRRI dhan 57**: This is also a rainfed Aman rice variety with medium thick grain. Plant height is 113 cm and average life cycle 105 days and yields 4.0 MT/ha. Crop harvesting time is Mid-October. It is a drought tolerant variety and not yet very much popularized to majority of the farmers.

The FGD exercise also identified that in the summer season, Boishakh-Joistha (mid-April to mid-May), water is not available from natural sources (chora/canal), making irrigation very essential for growing

rice. Some land goes fallow in the summer season due to the unavailability of irrigation facilities. The average yield of rice (clean rice) is 2.8 tons/ha, while the average yield of HYV rice (clean) is 3.7 t/ha (DAE Report 2019). Blast disease is one of the threats to rice cultivation, along with market price. At present, Boro rice is at low risk, as it is in the milking stage. No fertilizer application is required at this stage. However, if the crop shows any disease, such as rice stem borer (Scirpophaga incertulas) infestation, then chemical pesticides will be required to control it and the crop will need follow-up on a regular basis.

3.1.2 Potential impacts on rice cultivation

Input market

The study revealed that the common inputs for rice are quality seed, irrigation and pesticide for disease infestation. Almost all farmers use Aman rice seeds from their own stores or from neighbours (unpacked/open seed and retained seeds) and, when cultivating Boro (i.e., hybrid or HYV) rice, purchase seed from local retailers marketed by different national companies such as Supreme Seed Company, Ltd., and Lal Teer. Farmers generally purchase seeds mostly from their nearby input sellers. They also buy from mobile seed vendors (MSVs), who generally sell open seed but more recently also sell packet seeds. For pest treatment, farmers generally depend on local pesticide sellers for suggestions and necessary pesticides. Some advanced farmers seek assistance from SAAOs and UAOs for the treatment of their field crops. Though disruptions thus far have been minimal, as the food supply has been adequate and markets have been stable, current blockages of transport routes, transport restrictions and quarantine measures, labour shortages, and spikes in product prices present obstacles to the continuation of the supply chain, potentially resulting in food shortages over the long term. In the short term, procuring labour for Boro rice harvesting from late April to mid-May will be a large obstacle for farmers.

Output market

In 2019, the local price of Aman rice was 200 USD/MT, whereas in 2018, the local price was 275-287 USD/MT. From the FGDs, it was found that farmers usually sell paddy rice at the farm gate to the rice trader. They also carry their paddy rice to local millers but do not sell it in the open marketplace or to the government. On the other hand, they have to sell all of their product at harvest time to cover the cost of labour, and rice supply is high at that time, resulting in a comparatively lower price. Farmers generally have no capacity for storing their harvest, as they have no alternative means to pay their labourers, and sometimes they also pay for inputs out of the income from selling paddy rice.

Table 6: Coping strategy for rice crop production

Sl No	Potential impacts of COVID-19	Actions to be taken (coping strategy)
1	Inadequate supply of machinery inputs (e.g. reaper and power thresher)	• Farm machinery support for rice harvesting • Facilitate private sectors to ensure smooth supply chain
2	Unavailability of inputs to cultivate and Aman rice	• Rice seed (Aman) support for farmers

3.2 Vegetables

3.2.1 Potential constraints and opportunities

The study indicated that the vegetable sub-sector is more promising for meeting the growing demand as well as getting better margins for farmers in Cox's Bazar in the shortest possible time. Vegetable cultivation is equally important for obtaining better margins and for improving households' nutrition. Most vegetable growers (97%) have no alternative livelihood apart from agriculture. Major vegetable crops are eggplant, cucumber, radish, bean, red amaranth, Indian spinach, tomato, chili pepper, sweet gourd, bottle gourd, bitter gourd and ridge gourd.

The FGD participants opined that the winter vegetable season will end soon and the early summer vegetable cultivation season (i.e., Kharip-I) will start. A short-term shutdown will have no negative effect on summer vegetable production, as the necessary inputs are available at the local level. If the restriction of movement lasts longer, the major constraint will be on the marketing of agricultural commodities.

As identified by the FGD participants, the major problems related to growing commercial vegetables are i. unavailability of quality seed, ii. a market dominated by middlemen, iii. traditional farming practices, iv. farmers' lack of skills with using improved technologies, v. inadequate storage facilities, vi. access to credit, vii. inadequate investment from the private sector, viii. access to higher markets, and ix. access to irrigation.

The key informants stated that the weather, climate and soil of the study areas are very suitable for growing vegetables year-round. The respondents also reported on the present situation and the potential opportunity for vegetable cultivation to form part of the response to the current crisis. Although land in the district is suitable for vegetable cultivation, farmers are not interested/habituated/involved in commercial vegetable cultivation due to a lack of information on modern technology, lack of irrigation facilities and lack of access to credit support in some areas.

The FGD participants agreed that at present, the vegetable supply seems normal, and markets have been stable. However, they expressed fear that current blockages of transport routes, transport restrictions and quarantine measures, shortages of labour, unavailability of inputs and services, and spikes in product prices will interrupt the food value chain.

3.2.2 Potential impacts on vegetable cultivation

The FGD participants along with key informants including vegetable farmers, input market actors (retailers, dealers, private seed and pesticide companies) and output market actors (retailers, pikers, wholesalers/arotdar, etc.) identified the following potential impacts of the COVID-19 outbreak.

A. Supply and production of vegetable inputs (seed, fertilizers, pesticides)

The seed industry in Bangladesh comprises both public- and private-sector initiatives. In the private sector, more than 100 companies are involved, but only 8-10 of those work in Cox's Bazar. The expansion of private-sector seed companies has resulted in the engagement of thousands of contract farmers into the formal seed production chain, leading to improved livelihoods amongst the rural community. Government agencies involved in this sector include the Bangladesh Agricultural

Development Corporation (BADC), Bangladesh Agricultural Research Institute (BARI) and Department of Agricultural Extension (DAE).

Private companies are not active in the southern sub-districts of Cox's Bazar, i.e., Teknaf and Ukhiya, due to their lower market size. Most of the private companies for both seeds and pesticides are based in either Chokoria or Chottogram Sub-district. Therefore, A.R Malik seed, Lal Teer, Syngenta, Krishibid group, and Alamgir seeds are supplying seed from Chokoria and Chottogram. For pesticides, most of the companies follow the same modalities, resulting in the unavailability of their products in rural areas. Most of the farmers (83%) collect their inputs from local and sub-district markets, while only 17% purchase them from district markets.

As the season for winter vegetables is almost finished, farmers will soon move on to the next season's cultivation (i.e., summer vegetables). If they don't get quality inputs and timely services or if they face higher prices for inputs, farmers may be discouraged from cultivation, which will lead to a shortage of supply. Vegetable production in the summer season may also be restricted by irrigation in some areas.

B. **Vegetable market**

The market demand for vegetables is higher than the local supply. A maximum of 60% of the vegetable supply comes from local producers in winter, but in summer, the local volume is lower. Vegetables are bought by wholesalers/traders directly from the farmers and via bepari (brokers). Since the local production of vegetables cannot meet local demand, vegetables are also bought from distant aratdar. As per the statement of traders, 35-40% the vegetables sold in Cox's Bazar are coming from outside of the district, from places like Chokoria, Chattrogram and Narsingdi. There are no vegetable storage facilities in Cox's Bazar. Stallholders are currently facing difficulties in selling their produce, which influences their regular income and in turn their livelihood.

If the outside supply of vegetables is hampered by the current situation, it will create a huge supply shortage, resulting in higher prices. In response to the pandemic, farmers' markets have been shut down. Farmer groups involved in farmers' markets are being deprived of their regular sales and income, which ultimately impacts their livelihood. In general, the farmers of this area are not accustomed to group production and marketing. They do not have enough information about market demand and supply to develop such a strategy on their own. Because of this, it is very difficult for the output market actors to reach the individual farmers directly. Group production and marketing could be an option to facilitate better communication between farmers and output markets (Annex 2: Crop calendar).

Table 7: Coping strategy for vegetable production and marketing

Sl No	Impacts	Actions to be taken (coping strategy)
1	Food insecurity for smallholders and labours	• Cash for work to improve essential food purchase capacity/ grant support for smallholders
2	Hamper farmers' access to markets, restrict their productive capacities and hindering them from selling their produces	• Engine Operated Van for the LSP (Market Aggregator)
3	Inadequate supply of inputs (seeds, vermi compost fertilizer)	• Support farmers to purchase seeds/ input (seed, vermi compost) support directly to vegetables farmers • Facilitate private sectors to ensure smooth supply chain
4	Inadequate irrigation support	• Water pump support
5	Lack of supply in longer term	• Improve production techniques/adopt new technologies • Shorter period vegetables cultivation • Facilitate commercial vegetables cultivation to ensure supply
6	Poor working condition and environment	• Improve hygiene, healthy and safe working conditions for fishers • Incorporate health screening protocols at every step

3.3 Fisheries

Potential constraints and opportunities

Fishing is one of the major economic activities in Cox's Bazar. Approximately 18% of the population in the district is engaged in the fish sector in one way or another. A total of 45,878 fishers in the district are registered with the Department of Fisheries.

The number of registered fishers has been increasing over the years. The fishing industry in Cox's Bazar is expanding, boosted by booming tourism and associated demand from the hospitality industry. Demand for dry fish, a signature product of Cox's Bazar, is also booming. Associated businesses, including ice production, fish transportation, and fish supply to the bigger markets, including Chittagong and Dhaka, are also growing.

The study identified that despite this growth, fishers are reporting lower catches due to the depletion of resources and a lack of appropriate tools and fishing gear at affordable prices. Consequently, most fishers are reported to have fallen into a debt trap with traders. At the same time, the signature product of the district, dried fish, has been found to contain non-edible ingredients used for long-term preservation, resulting in a market slowdown. Similarly, the traders are failing to meet the quality and quantity requirements of institutional buyers and large-scale suppliers and as a result are losing their market demand.

The results of this study's analysis revealed that though Cox's Bazar is mostly dependent on marine fisheries, there are some underutilized and unutilized ponds and chara in the area that could have a high potential for aquaculture. The total surface area of closed water bodies in the district is 40,257 ha, including a pond area of 2,654 ha, but farmed fish production is only 38,000 MT, meaning that there is an opportunity to adopt improved technologies such as semi-intensive or intensive culture to increase production. Approx. 97% of fish producers in the district have no alternative livelihood options other than agriculture.

Though disruptions in this sub-sector have been minimal so far, as the food supply has been adequate and markets have been stable, current blockages of transport routes, transport restrictions and quarantine measures, labour shortages, and spikes in product prices pose obstructions for fresh food supply chains and might result in increased levels of food loss and waste. These obstructions are likely to impede farmers' access to markets, curbing their productive capacities and hindering them from selling their produce. It was found that 99% of fish producers purchase their inputs from local and sub-district markets. Shortages of labour could disrupt the production and processing of food, particularly for labour-intensive products.

The key informant from the DoF stated that COVID-19 is expected to have no short-term effect on marine fishing. Though the harvest has increased compared to last year, if the shutdown is extended for a longer term, the fish market will decline due to a lack of consumers. Fishers will also face challenges storing their catch due to limited storage facilities and their regular income will decline, resulting in food insecurity. Given this risk, some fishers choose to dry their fish and will be waiting to sell later when the market returns to normal operational conditions. Another key informant, the Executive Engineer, BFDC, Cox's Bazar, reported that there are five cold storage facilities in this area for fish storage which are described in Table 8.

Table 8: Fish storage facilities with capacity

Sl No	Name of the cold storage	Address	Capacity (MT)	Ownership
1	BFDC cold storage	Airport Rd, Cox's Bazar	110	Government
	Sagar cold storage	Airport Road, North Nuniarchata, Cox's Bazar	350	Private
2	Purvani cold storage	Airport Rd, Cox's Bazar	300	Private
3	Urmi cold storage	Cox's Bazar	220	Private
4	Ali Amzed cold storage	Cox's Bazar	400	Private
5	Megna cold storage (Bakkli)	Cox's Bazar	250	Private
Total			**1,630**	

Potential impacts on fish farming and fishing

3.3.2.1 Fish fingerling supply and production

The viral outbreak is taking place during the time of year that is most suitable for stocking fish in the Cox's Bazar district. The district mostly depends on other parts of the country for sourcing fin fish fingerlings. There are only 2-3 tilapia hatcheries and no carp hatcheries in the studied part (Sadar, Ramu, Ukhiya and Teknaf) of the district. This limited number of tilapia hatcheries will not be able to meet the demand for tilapia in this region. On the other hand, for carp fingerlings, the region totally depends on other parts of the country. Because of the lockdown and associated supply chain

disturbances, uncertainty and shortages in the fingerling supply, many farmers in this region might miss the upcoming farming season, resulting in a shortage of farmed fish in the local market over the long term. At the same time, many fin fish hatcheries have limited their production because of the low demand for fingerlings. The cumulative effect could be a price hike for fish fingerlings. Many private finfish hatcheries have limited their production because of the low demand for fingerlings and transportation problems.

3.3.2.2 Aquaculture feed/drug supply

The FGD participants expressed that because of the uncertainty, 50% of farmers are limiting fish feed, while others are not stocking fish at all. The cumulative effect is that feed sales are going down, even though some suppliers are reducing the price to promote sales, and therefore, the market is expecting a drop in the price of fish feed in the short term. However, in the long term, the scenario might reverse. Many feed companies promote their sales by providing credit to farmers through the dealers. If the farmers fail to pay back the credit on time because of the impact of the disease outbreak, many small feed companies will struggle to remain in business. At the time of the interviews, most companies said that they expected their business to fall an average of 30-40%.

On the other hand, it will be difficult for the surviving companies to meet the demand immediately by increasing their production capacity. As a result, the market might respond by increasing the price of fish feed. Fish farming activities also involve the use of aquaculture drugs. If fish culture is interrupted, the use of aquaculture drugs and in turn the business of private companies that sell those drugs will decrease. At the same time, local-level retailers do not maintain large stocks of fish medicine. If they limit their business in response to uncertainty, ultimately farmers will not have access to aquaculture medicine when they need it.

3.3.2.3 Marine fishing:

Marine fishing, which makes up 95% of fishing in the district, will follow a declining trend of production because of COVID-19. At present, the export of marine fish has been completely halted because of the closing of the seaports and associated activities. The demand for marine fish in local markets has also decreased dramatically.

3.3.2.4 Fish market:

A. Cultured fish and marine fish

With the outbreak of the infection, the number of customers and therefore sales for the fish market dropped almost immediately. Fish is a perishable item, and fishmongers do not have adequate facilities to preserve fish. As a result, the price of fish is dropping, and fishmongers are selling their fish with very little profit margin or no profit at all. However, if fish farmers are not able to stock their ponds with fish due to uncertainty, in the long term, it will be hard to meet the demand for fish. As a result, customers might see a skyrocketing price for fish.

Wholesalers purchase fish from local fishers (in the case of marine fish) and from farmers (in the case of farmed fish). Fishers bring their catch from the Bay of Bengal into the wholesale markets; the marine fish also come from Cox's Bazar and Chittagong. Farmed fish—tilapia, pangas, carps and catfish—come to the wholesale markets from Mymensingh, Comilla, Jessore and Satkhira. Then the wholesalers in Teknaf and Ukhiya sell these fish to retailers or to consumers.

At present, the export of marine fish is totally stopped because of the closing of the seaports and associated activities. The demand for marine fish in local markets has also decreased dramatically but the fishing in the sea through industrial trawlers and mechanized boats are going on.

B. Tourism market

Before the viral outbreak, a considerable portion of local marine catches were sold in the local live fish and dried fish markets near the beaches as well as in local hotels and restaurants. During the viral outbreak, the government has completely shut down these shops, hotels and restaurants to stop the spread of infection. Thousands of people associated with this business have become unemployed, and the potential marine fish market related to tourism vaporized overnight.

Table 9: Coping strategy for fish production and marketing

Sl No	Potential impacts	Actions to be taken (coping strategy)
1	Food insecurity for fisher folk and labours	• Cash for work to improve essential food purchase capacity/ grant support for fisher folk
2	Inadequate supply of fingerlings	• Support farmers to purchase fish fingerlings and feed/input (fingerling, feed) support directly to fish farmers • Facilitate private sectors to ensure smooth supply chain
3	Inadequate supply of fish feed/aqua drug	• Support farmers with fish feed • Facilitate private sectors to ensure smooth supply chain of feed and medicine • Govt. Fish Seed Farm should pay special attention to produce more spawn, fry and fingerlings as much as possible.
4	Lower market demand and price of fish	• Diversification of the product (e.g.: dry fish) • Support for safe dry fish production • Facilitate to store unsold fish
5	Lack of supply in longer term	• Improve production techniques/adopt new technologies • BFDC Cox's Bazar with their storage facilities and hiring private storage facilities may purchase and stock present catch to address the future demand in the coming days. • Govt. may Provide BFDC with additional funds for implementation of the proposed programme • Shorter period fish culture
6	Poor work condition and environment	• Improve hygiene, healthy and safe working conditions for fishers • Incorporate health screening protocols at every step

3.4 Livestock

3.4.1 Potential constraints and opportunities

Livestock farmers in this region mainly practice traditional systems, which is reflected in their productivity. A lack of technical knowledge about animal health, vaccination, feeding, and breeding as well as limitations of quality essential services and inputs for extension support systems are all holding this region back from becoming competitive with other parts of the country. The host communities in the sub-districts of Cox's Bazar Sadar, Ukhia, Teknaf, and Ramu have also experienced very rapid and dramatic changes in their society, markets and livelihoods since the August 2017 influx of Rohingya refugees. It has been observed that due to the Rohingya influx, especially in Teknaf and Ukhiya, some livestock farmers have sold their livestock to cover their living expenses, and others have sold or rented their land for makeshift construction, reducing the amount of available grazing land.

The recent DLS, Cox's Bazar report (Annual report 2018-'19) showed that milk demand in Cox's Bazar is 216300 metric tons, production was 84 000 (38.8%) metric tons, deficit was 132300 metric tons (61.1%), Meat demand was 103800 metric tons, productions was 79100 metric tons (76%) and deficit 24600 metric tons (24.0%). Eggs demand was 246.5 million, production was 137.0 million (55.6%), deficit 109.5 million (44.4%). The study also identified that total 492 dairy farms (including register and unregister) 208 goat farms , 435 broilers farms , 302 layers farms , 112 sheep farms , 20 duck farms are available at 8 Sub – districts of Cox`s Bazar.

The FGD participants provided their opinion that the livestock sub-sector is facing a lot of problems in Cox's Bazar, such as a lack of technical knowledge on improved farming practices, vaccinations, and feeding/fodder; inadequate extension services; unavailability of improved species; frequent outbreaks of poultry and livestock diseases; low skill levels and adoption rates for new technologies; operations of farmers' organizations; lack of access to credit support and an absence of adequate support to the appropriate livestock farmers, all of which affect the growth of livestock farming in the project area. Approximately 83.0% of livestock producers purchase their necessary inputs from local and sub-district markets.

The tourism and expatriate economies have also developed in Cox's Bazar Sadar in response to the needs of a growing tourism industry and refugee population, creating additional market opportunities for local institutions such as hotels, restaurants and catering services. In general, the market has responded well to meet the demand, particularly in terms of food commodities; however, this is largely being met by producers who are better suited, technically, financially and structurally, to respond to the increased demand and who are mainly from the target areas of the project.

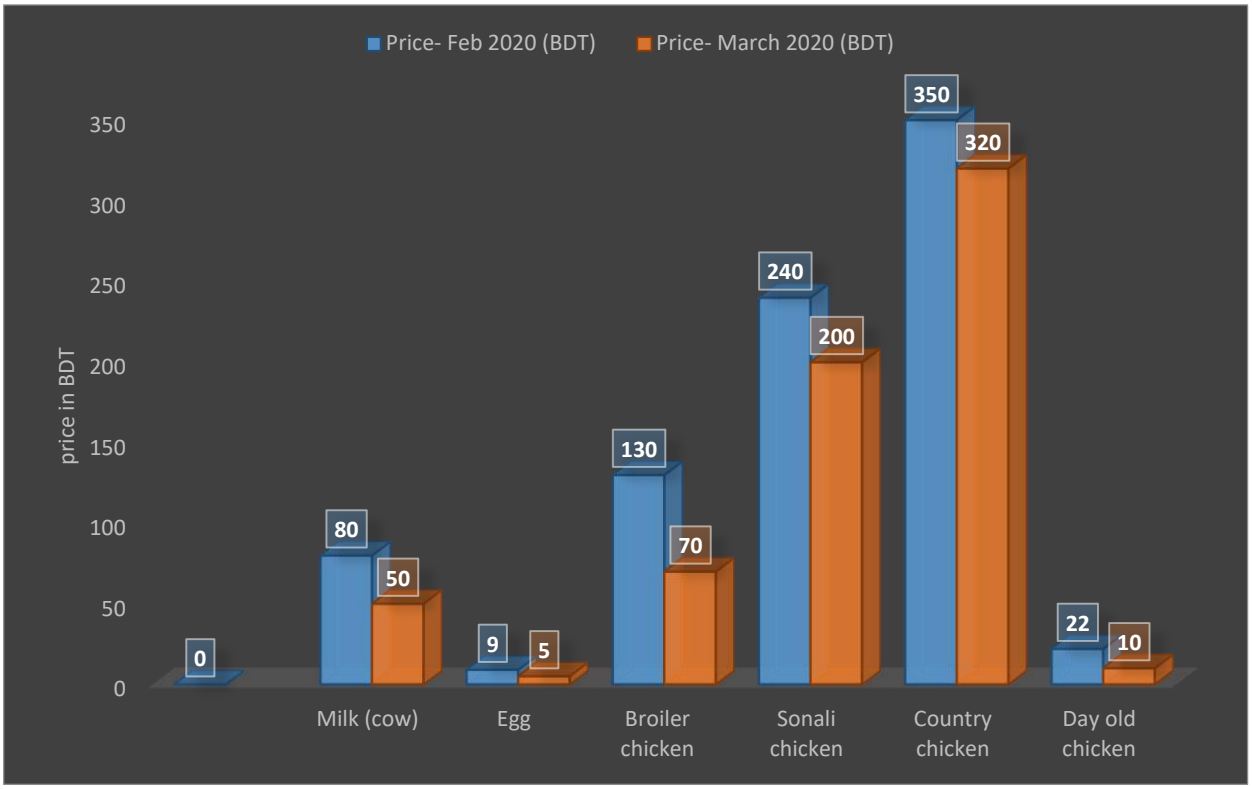
3.4.2 Potential impacts on livestock

FGD participants expressed that dairy/cattle and poultry farmers are most strongly affected by a lack of feed and services. They also cannot currently sell their animals because of the restrictions on movement and transport. In this situation, concentrated feed, fibre/fodder and nutritional support for livestock and poultry farmers are very essential. Misinformation shared through social media about spread of the virus through poultry and eggs has reduced the prices of those products drastically. This forced the Department of Animal Husbandry to take out advertisements in newspapers stating that

eating chicken is safe and appealing to people not to heed the rumours being circulated on social media. FGD participants shared the following:

- One rumour that has been shared in some areas of Ramu is that coronavirus is spreading via birds/poultry. As a result, 20% of poultry farmers have sold their birds at a 50% discount (less than 1 USD/kg).
- 20% of poultry farmers are not properly vaccinating their birds at the right time, which has resulted in viral infections such as ND and Gumboro disease in Ukhiya, and some birds have died.
- The price of livestock items has decreased drastically. Table 7 below shows the comparison between normal market prices and the present adverse market prices. It is calculated that 5,992,875 USD has been lost by the 302 layer farmers due to the low price of eggs.

Chart 1: Price comparison of livestock items



3.4.2.1 Day-old chick supply, production of chicken, milk and eggs

In general, the poultry industry is worst hit during the spread of viral diseases, be it bird flu, chikungunya, or now the coronavirus. The viral outbreak is limiting the new stock that poultry farmers are acquiring due to the uncertainty about whether they will be able to sell broiler chickens soon. There is one poultry hatchery in Ukhiya, Cox's Bazar, but due to the outbreak and the associated lack of demand, DOC production has stopped. The DOC price fell 55-60%, e.g., the normal price of a DOC is BDT 22-23 but now the price is below BDT 10. Typically, the district mostly depends on Chittagong

as the source of DOCs. Because of the lockdown, supply chain disturbances, uncertainty and shortages in the DOC supply, many farmers in this region might miss the season, which in the long term may cause shortages of chicken in the local market. On the other hand, many hatcheries have limited their DOC production because of the low current demand. The cumulative effect could be a price hike for DOCs.

The evidence indicates that the estimated production and demand gaps for milk and eggs in the district are approx. a 65% deficit in milk production and 47% deficit in egg production. These values are higher than the corresponding national average deficit values of 59.7% and 10.36% (DLS, 2019), respectively.

- There is a substantial possibility that the deficit percentages of livestock and poultry productivity will increase further in greater Cox`s Bazar due to the possibility that many farmers may leave livestock and poultry farming.
- Many poultry farmers are worried about paying off their bank loans and incurring financial losses.

3.4.2.2 Animal feed/drug supply

The supply and sales of animal feed/medicine have slowed, and so far, the prices have remained normal. However, the prices of poultry and milk have fallen dramatically, and as a result, farmers are going to lose income. Farmers will not be able to purchase required feed/medicine at the same prices as before because they are selling their products at very poor rates. In addition, 83% of livestock producers purchase their necessary inputs from local and sub-district markets. Because of the lockdown and resulting supply chain disturbances, the feed and medicine supply may be lower in rural areas, resulting in price hikes for inputs. In the context of Bangladesh, feed and medicine company workers normally visit dairy farms and poultry farms to provide technical support and support for inputs, disease diagnosis, etc. In the current situation, however, workers cannot move among farms, and as a result, many of the normal interactions between farms and the private sector are shut down.

3.4.2.3 Livestock services

- According to the government, all government offices are closed except police and health offices, resulting in the shutdown of livestock services to farmers.
- Veterinary surgeons cannot travel among farms, and farmers cannot bring their sick animals to the sub-district and district veterinary hospitals.
- Field veterinary extension workers/vaccinators are not permitted to travel in the field.

3.4.2.4 Livestock market

The price of chicken usually declines every summer, as there is less demand for poultry during hot weather. Currently, however, the misinformation passed on through social media about the spread of the virus through poultry, eggs and meat has reduced the market demand for milk, eggs, and meat below normal levels. There are no customers at the markets, especially at local-level markets. As a result, poultry rearers are suffering huge losses. “Hundreds of poultry rearers are facing tough times and this is considered a very bad year for the industry,” one poultry farmer said.

Another poultry farmer stated that poultry farmers are not able to pass on their input costs to wholesalers and are therefore incurring losses on birds and eggs. The potential impacts of the pandemic on the livestock sub-sector are summarized below:

- In Cox's Bazar, the prices of poultry meat and eggs have fallen because some people have left the district
- The shutdown is hampering transportation, which may cause feed scarcity for broiler, layer and dairy farms
- Restaurants have shut down, significantly reducing the number of buyers of meat, eggs, and milk
- The price of DOCs has dropped sharply, as poultry farmers are not adding new stock

Table 11: Coping strategy for livestock farming and marketing

Sl No	Potential impacts	Actions to be taken (coping strategy)
1	Food insecurity for labourers	• Cash for work to improve essential food purchase capacity/ grant support
2	Inadequate supply of DOC/price fall of DOC	• Support farmers to purchase DOC/ input (DOC) support directly to poultry farmers • Facilitate private sectors to ensure smooth supply chain
3	Inadequate supply of feed/medicine	• Support farmers with poultry feed • Vaccination support • Fodder grass and Ipil Ipil (fast growing legume plant) seed distribution • Facilitate private sectors to ensure smooth supply chain of feed and medicine
4	Lower market demand and price of egg, chicken and milk	• Facilitate farmer to store egg • Support smallholder farmer to retain their business
5	Lack of supply (egg, chicken, milk) in longer term	• Facilitate private sectors to ensure smooth supply chain
6	Poor work condition and environment	• Improve hygiene, healthy and safe working conditions for fishers • Incorporate health screening protocols at every step

RECOMMENDED ACTION PLAN

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4.0 Recommended action plan

Table 12 showed a road map for sub-sectors wise action plans for short-term (1-6 months), medium-term (> 6 to 12 months) and long- term (> 12 months) periods.

Table 12: Action plan

Sector	Short-term (1-6 months)	Mid-term (>6 to 12 months)
1. Crops		
1.1 Cereals	• Seed support	• Seed support • Capacity building on improved technology
1.2 Vegetables	• Seed support • Market linkage support	• Seed support • Capacity building on improved technology • Capacity building on business planning, collective production and marketing • Transportation support (van)/LSP model/youth involvement • Aggregation centre • Market linkage support
2. Fisheries		
2.1 Culture fisheries	• Fingerling support • Feed support • Market linkage support	• Fingerling support • Capacity building on improved technology • Capacity building on business planning, collective production and marketing
2.2 Marine fisheries	• Grant support • Market linkage support	• Capacity building on safe dry fish production
3. Livestock		
3.1 Poultry farming	• Day-old chick support • Vaccine support	• Capacity building on improved poultry management • Capacity building on business planning, collective production and marketing
3.2 Dairy farming	• Feed support • Capacity building on fodder production	• Capacity building on improved livestock management • Capacity building on fodder production
3.3 Small scale Goat Rearing and Cattle farming	• Feed and fodder support • Housing support • Grant support	• Capacity building • Linkage with market • Business development

CONCLUSION

5.0 Conclusion

Measures to contain coronavirus are disrupting agricultural production and trade. Movement restrictions decrease farmers' access to markets to buy inputs and sell products. It is particularly important to take proactive measures that are cost-effective at a time when there will be heavy demands on financial resources. Farmers need cash assistance and safety net programmes to keep them operating and to enhance their productivity, focused on those whose agricultural livelihoods are most impacted and vulnerable populations who are most food insecure. FAO's experience and expertise can aid efforts to safeguard people's food security, nutrition and livelihoods in Cox's Bazar.

To ensure a smooth supply of food, immediate measures must be taken to support farmers to increase production. Each of the subsectors studied here has significant market demand and diversity. The interventions proposed are thus focused on utilizing market opportunities by facilitating changes in the service market and enabling environment. Strengthening agricultural value chains through targeted input and output market interventions will result in diversified cropping, increased incomes, and more resilient livelihoods. It is evident that a lack of knowledge about good agricultural practices and a weak marketing situation related to low-quality processing techniques have resulted in low yields and low product quality in this district. Therefore, future agricultural potential depends on the development of private agricultural service providers equipped to deal with a wide range of inputs, technologies, and services as well as farmers' organizations that are active in improving production, processing, and marketing, in order to ensure food security in Cox's Bazar.

Annex 1: Value Chain Analysis – Cox's Bazar Context

Figure 1 illustrates the rice value chain in the south eastern region of Bangladesh, particularly in Cox's Bazar district. This schematic diagram is developed based on FGDs with farmers, interviews with value chain actors, and key-informant interviews.

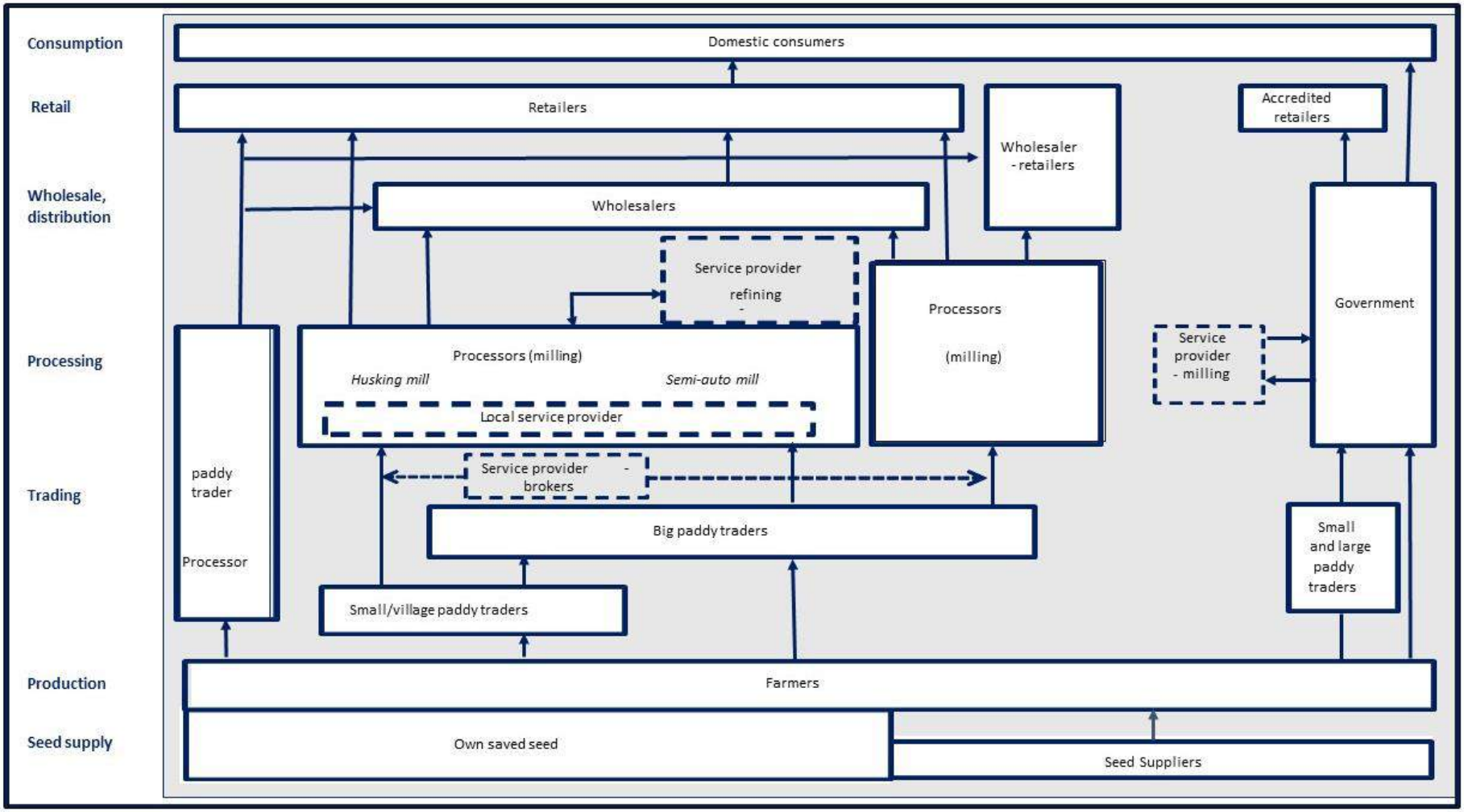


Figure 1: the rice value chain in the south eastern region of Bangladesh

Figure 2 showed the main actors and channel of vegetable value chain in Cox's Bazar district. The vegetable market is very inefficient, unstable and middlemen dominated in this area. The farmers have limited access in the local market and most of them sell their products to the local vendor or middlemen.

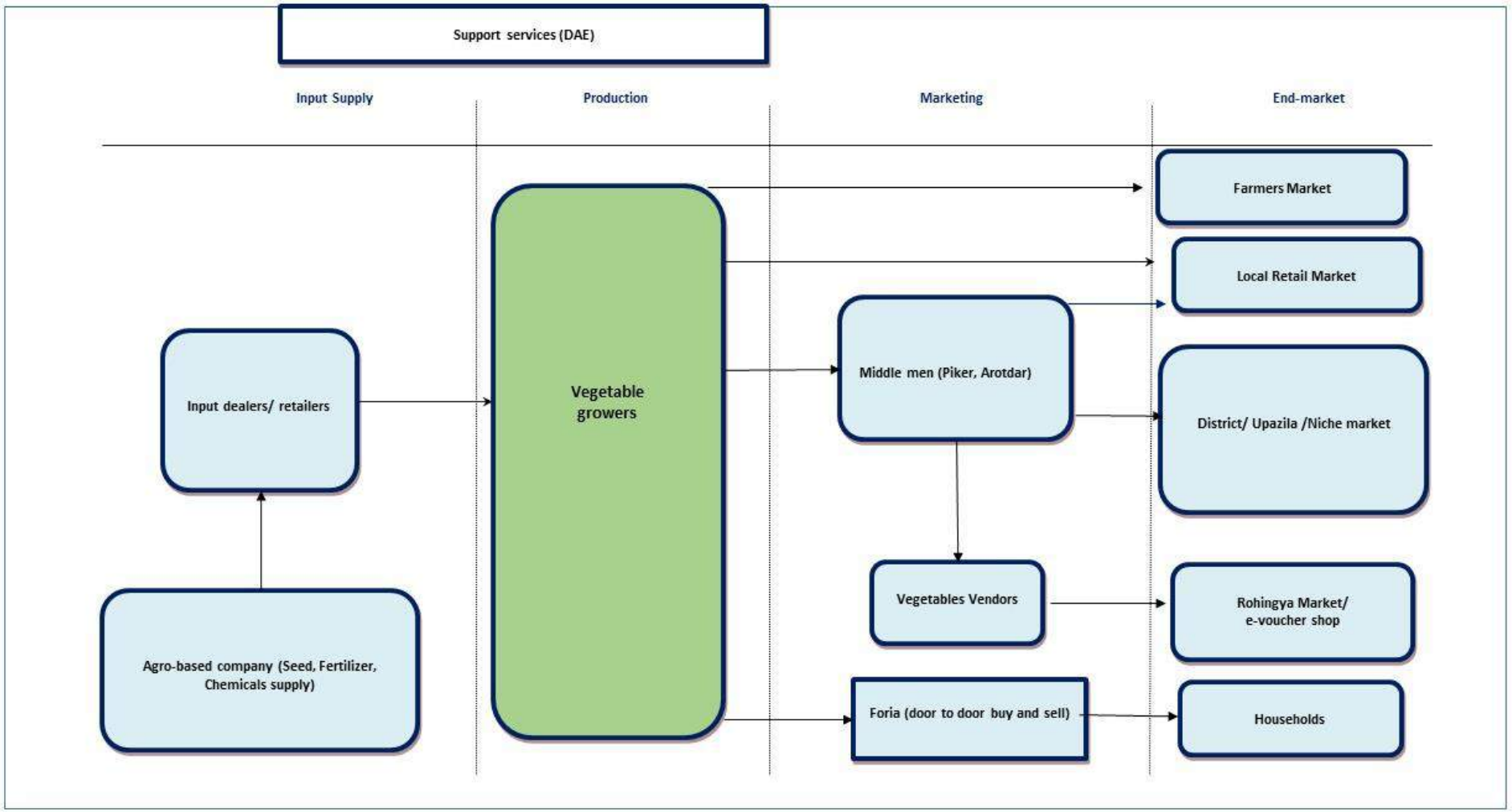


Figure 2: Key actors and channel of vegetable value chain in Cox's Bazar district

Figure 3 illustrates the culture fish value chain in the Cox's Bazar, which starts from inputs supply to consumer market. The main value chain actors are inputs suppliers (i.e. fingerling and fish feed, medicines), hatchery owners, nursery owners, fry traders, middlemen (for buying fish at farmers' gate), whole seller, retailers and consumers. Profit margin is relatively higher in consumer market followed by primary and secondary markets where *beparies* and aratdars are involved

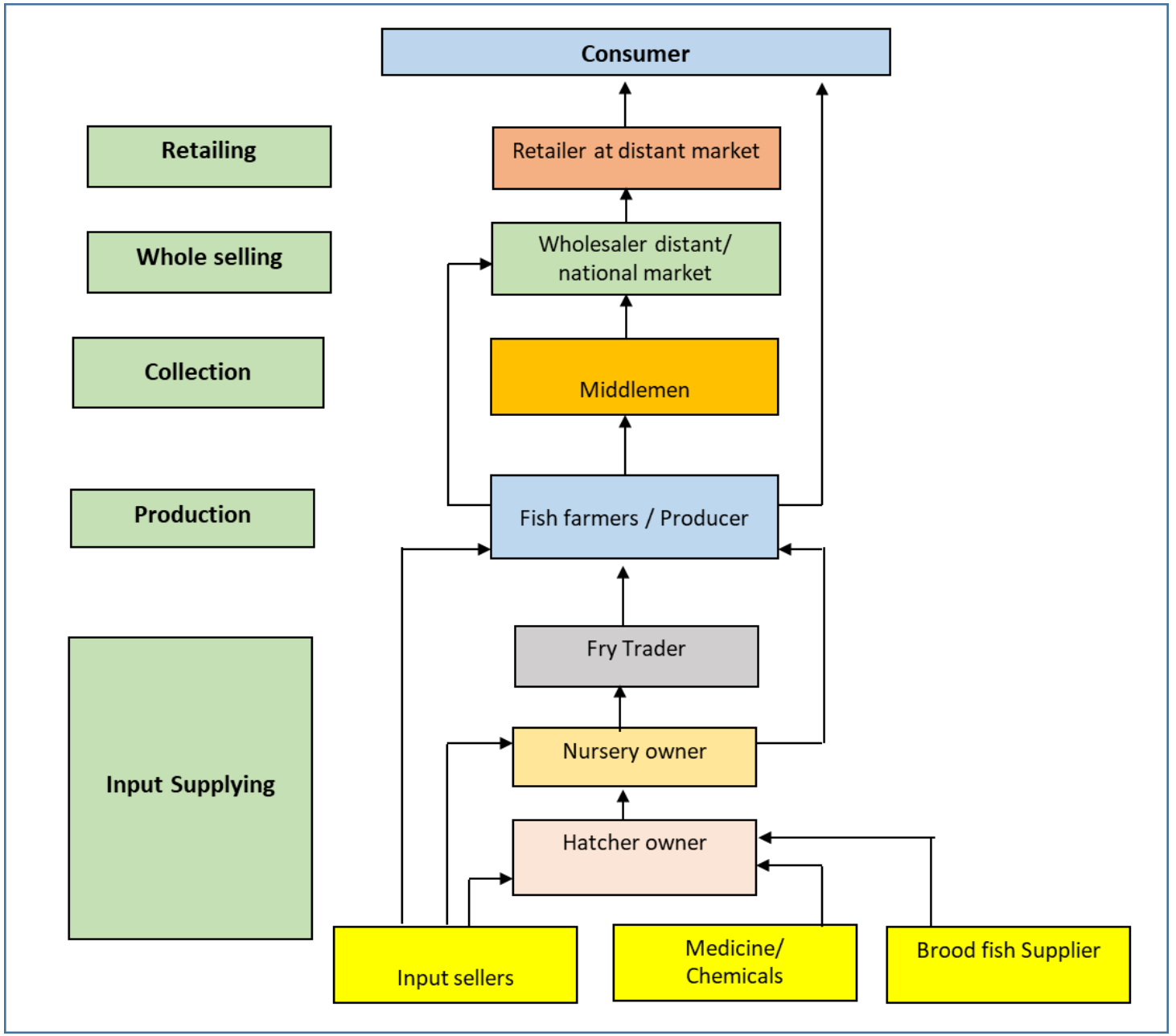


Figure 3: the culture fish value chain in the Cox's Bazar

Figure 4 showed that in the poultry value chain mainly two types of input sellers provide inputs to producer level one is fully medicine base and another feed and day-old chicken. The major problems of poultry sector of this area are limited access to technical know-how, low quality of day old chicken (For commercial birds), lack of knowledge on chicken (live bird) and egg packaging, transporting and preserve at retail shop, unavailability of quality vaccine, lack of market knowledge and limited access to finance.

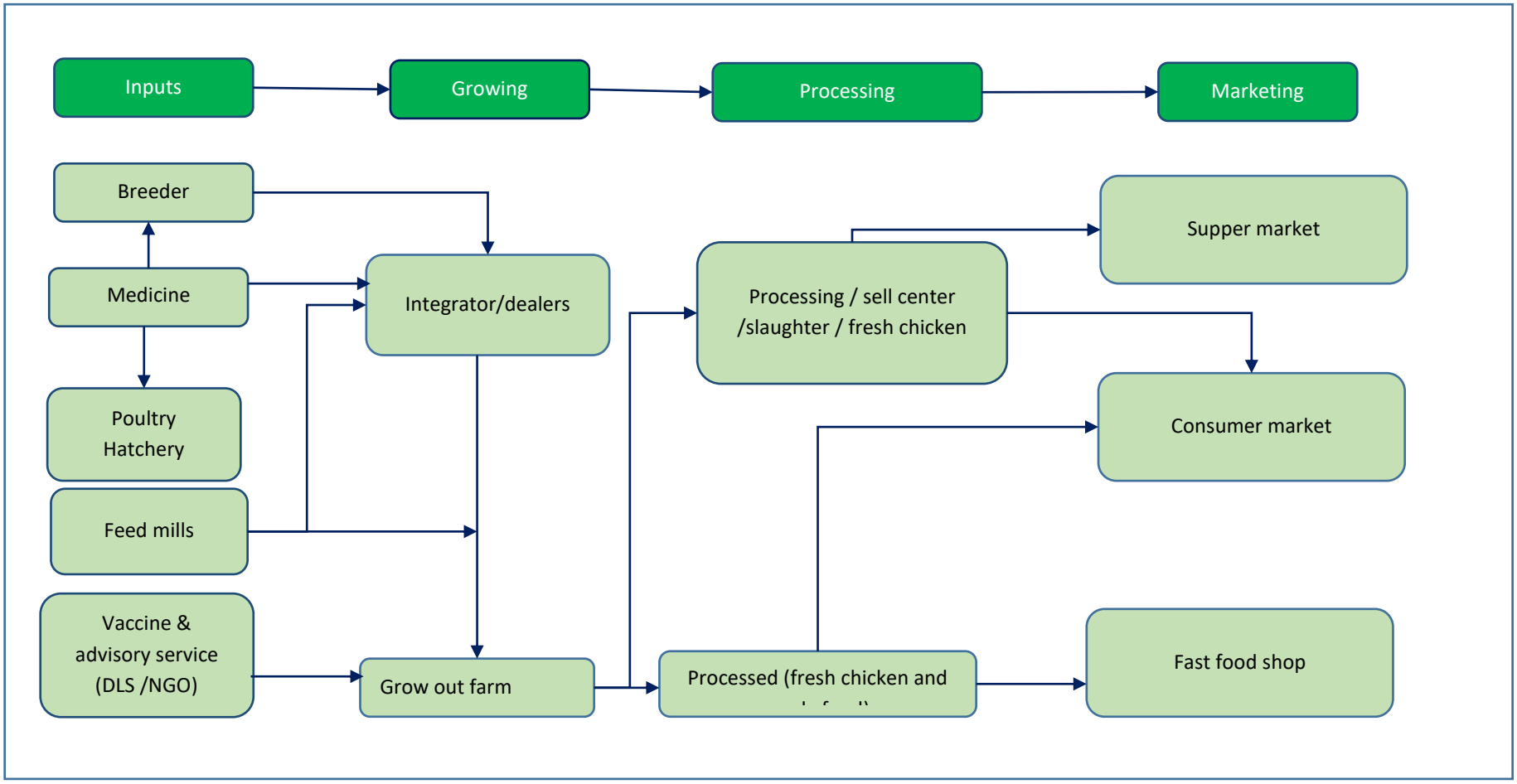


Figure 4: The poultry value chain mainly

Figure 5 illustrates the relationships among different actors of dairy value chain. Input dealers and retailers have weak relationship with dairy producers. Input dealer and retailer work both as an actor and supporter here. DLS are also connected with dairy producers. Also, Local Service Providers (LSP) have weak connection with dairy producers. Dairy producers are unaware about access to finance for strengthening farming practices. There is no direct relationship between dairy producer and formal processors. Dairy producers have good connection with local consumers, whereas formal processors have good connection with regional and national consumers.

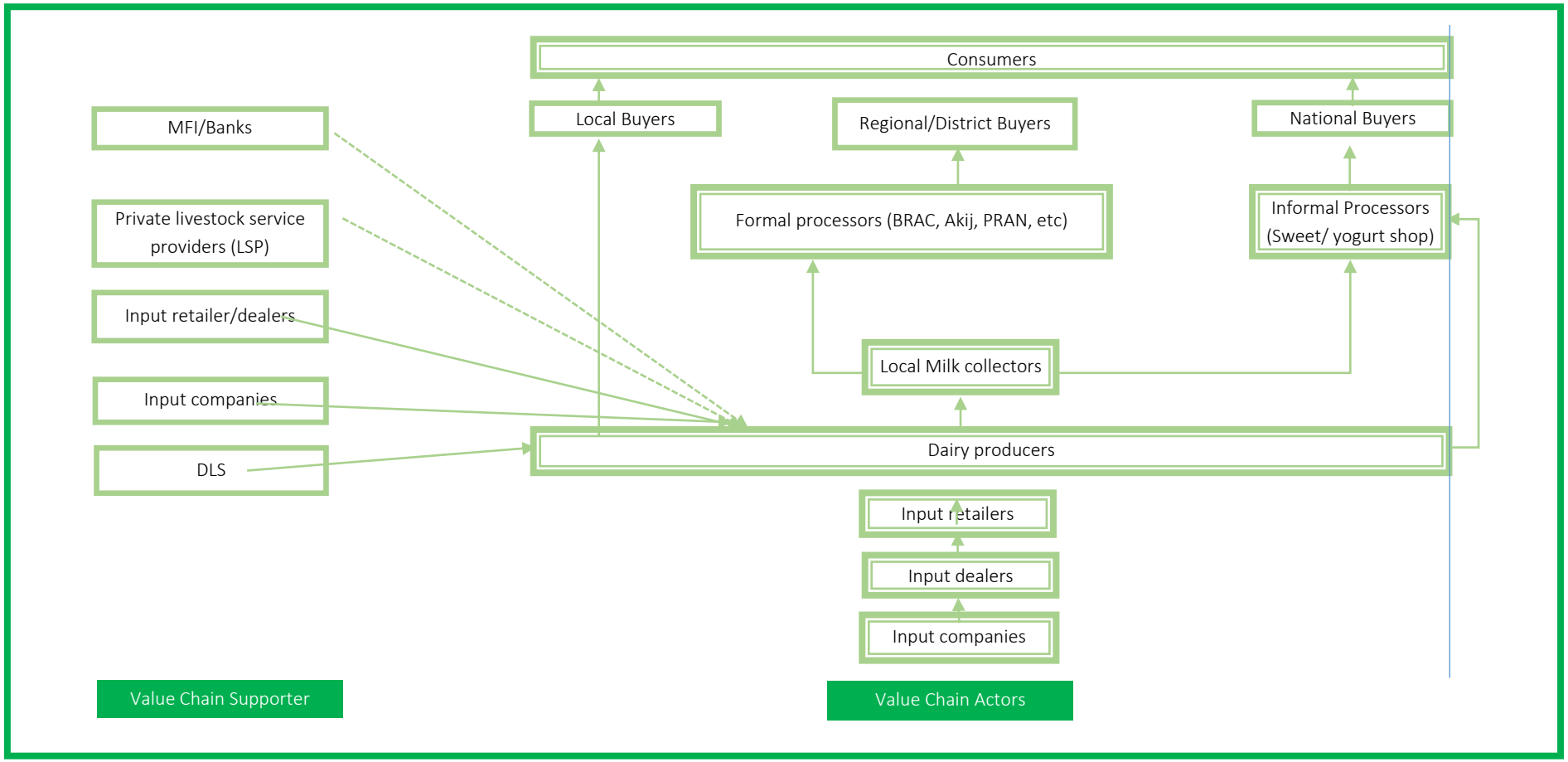


Figure 5: The dairy value chain

Annex 2: Crop Calendar of Bangladesh

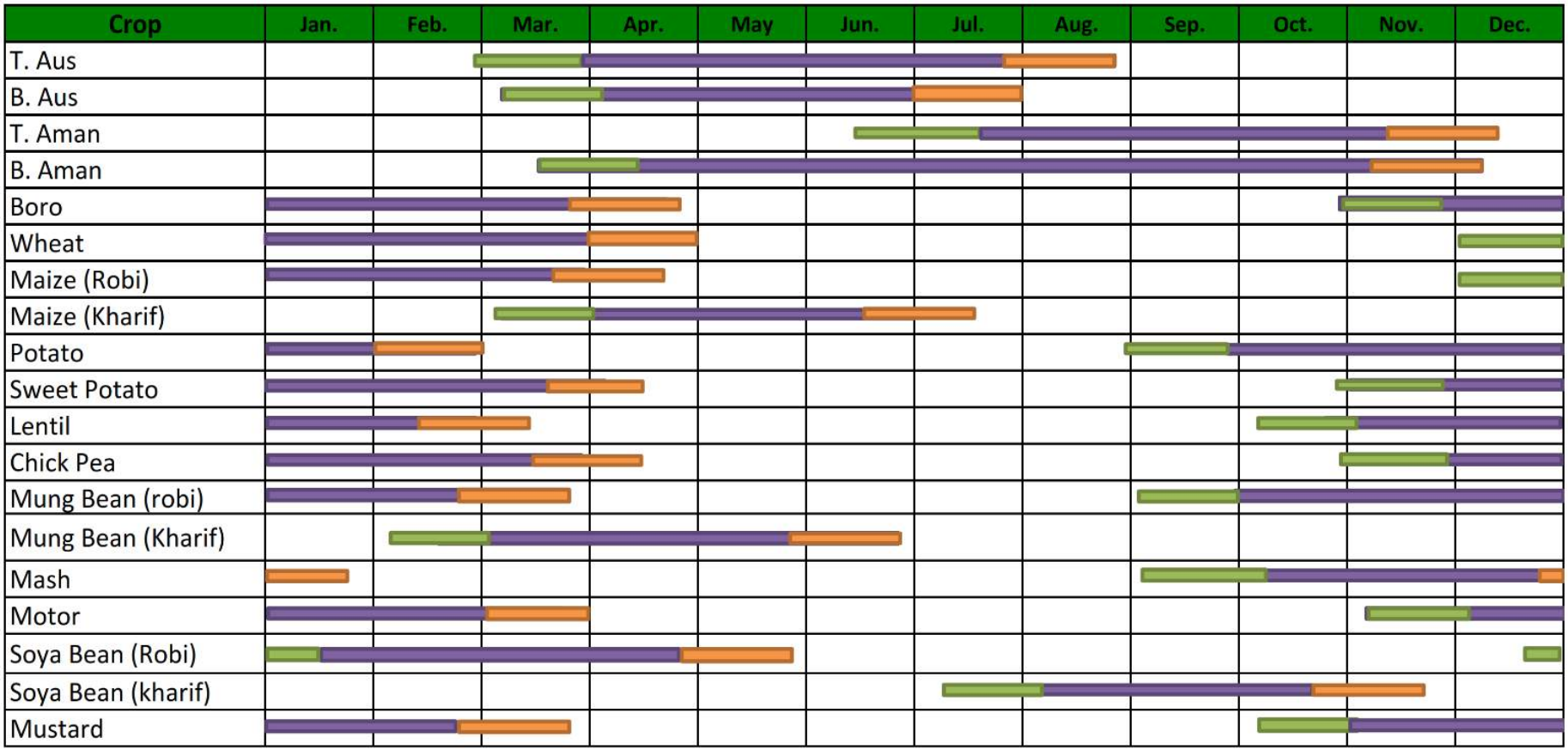
Transplantion
Growth
Harvest

3 Seasons of Agriculture

Season - Rabi; 16 October-15 March or Katrik-Falgun

Season - Kharif 1; 16 March-15 July or Chaoitro-Ashar

Season - Kharif 2; 16 July -15 October or Srabon-Asshin




Crop
Jan.
Feb.
Mar.
Apr.
May
Jun.
Jul.
Aug.
Sep.
Oct.
Nov.
Dec.
Ground Nut (robi)
Ground Nut (kharif)
Sesame (Robi)
Sesame (kharif)
Ginger
Turmeric
Onion (Robi)
Onion(Kharif)
Garlic
Dhonia
Chili
Stem
Red Amaranth
Indian Spinach
Pumpkin
Wax Gourd
Bottle Gourd
Pointed Gourd
Okra
Bitter gourd
Rich Gourd
Brinjal
Carrot
Radish
Cauliflower
Cabbage
Tomato
Cucumber
Country Bean

Crop	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Jute (white)												
Jute (Tosha)												
Sugar Cane												
Jujubi												
Orange												
Lemon												
Pine Apple												
Banana												
Papaya												

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