Component-2: Business Model Development for Agricultural Products

February, 2023

[Final Report]

FEASIBILITY STUDY

of
Automated Mail Processing Centre of Bangladesh Post Office Project (1st Revised)

(Digital Transformation, Service Model Re-engineering and Enhancement of Postal Services)

Directorate of Posts
Post and Telecommunication Division
Ministry of Posts, Telecommunications and IT

ADVISORY SUPPORT BY:

a2i - Aspire to Innovate

SUBMITTED BY THE JOINT VENTURE OF :

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FEASIBILITY STUDY REPORT

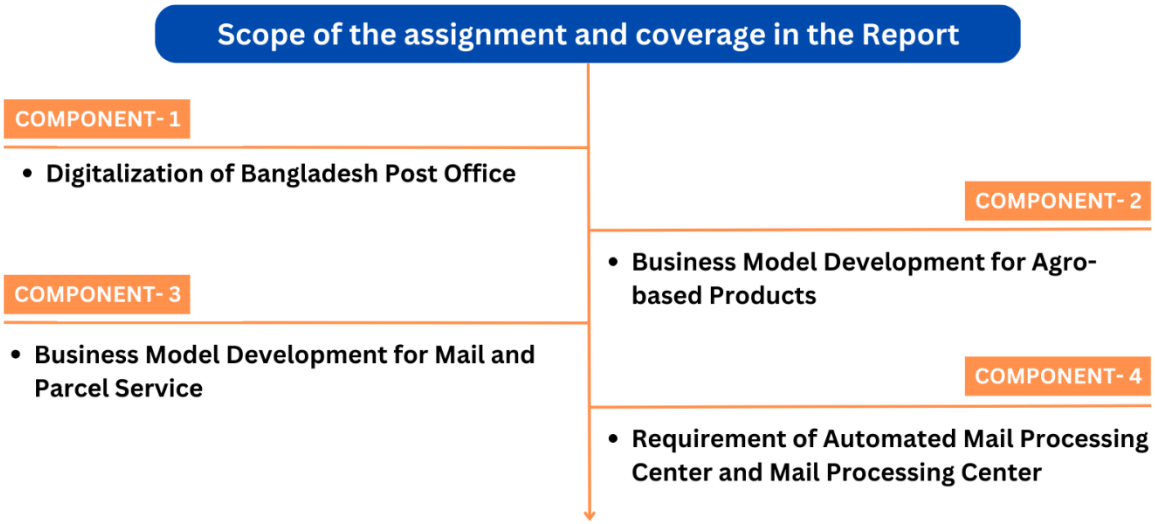
Component 2:

BUSINESS MODEL DEVELOPMENT FOR AGRICULTURAL PRODUCTS

Context of the Study

As Bangladesh is moving towards digitalization and planning to harvest the benefits of the 4th industrial revolution with the introduction of emerging technologies. Due to technological revolution and the country's economic achievement, time demands to deliver every service with the touch of technology. Accordingly, Bangladesh Post Office (BPO) is planning to initiate different projects to provide benefits to the customers digitally and efficiently. Therefore, the Bangladesh Postal Service automation is essential in providing services with ease and speed through digitalization. Besides, SDGs targets 5.b, 8.10, 9.c, 17.6 and 17.8 encourage the Post and Telecommunications Division (PTD) to take the new technology through BPO.

This study is being undertaken to carry out the requirement analysis on digital transformation, service model designing and overall enhancement of postal services. The scope of work under the study have been mapped below:



The study conducted by:

The NewVision Solutions Ltd., is a Research & Consultancy firm working in the sectors including energy, transportation, water & sanitation, agriculture & environment, and industrial and institutional and the **Tri-Vision Limited** is an innovative solutions and service provider in the field of Information and Communication Technology (ICT), Information Technology Enable Service (ITES), Technology Consultancy, Architectural Design, Development and support services.

The team of NewVision Solutions Ltd. and Tri-Vision Ltd. by using their extensive experience, technical ability, and management skills, implemented the feasibility study.

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A. ACRONYMS AND ABBREVIATIONS

a2i	:	Aspire to Innovate
ACR	:	Annual Confidential Report
ACS	:	Assistant Controller of Stamp
AD	:	Acknowledgement Delivery
AGM	:	Assistant General Manager
AHP	:	Analytical Hierarchy Process
AI	:	Artificial Intelligence
AIR	:	Audit Inspection Report
AIT	:	Advance Income Tax
AMC	:	Air Mail Centers
AME	:	Assistant Maintenance Engineer
AMPC	:	Automated Mail Processing Center
API	:	Application Programming Interface
ARPU	:	Average Revenue Per User
ATI	:	Agriculture Training Institute
ATM	:	Automated Teller Machine
BB	:	Bangladesh Bank
BBS	:	Bangladesh Bureau of Statistics
BCR	:	Benefit-Cost Ratio
BDCCL	:	Bangladesh Data Center Company Ltd.
BDT	:	Bangladeshi Taka
BIAM	:	Bangladesh Institute of Administration and Management
BNPL	:	Book Now Pay Later
BPO	:	Bangladesh Post Office
BRT	:	Bus Rapid Transit
BTCL	:	Bangladesh Telecommunications Company Limited
CAAB	:	Civil Aviation Authority of Bangladesh
CB	:	Certification Body
CBRNE	:	Chemical, Biological, Radiological, Nuclear, or Explosive Threats
CCT	:	Conditional Cash Transfer

CCTV	:	Closed Circuit Television
CEO	:	Chief Executive Officer
CEP	:	Courier Express and Parcel
CEPT	:	Centre for Excellence in Postal Technology
CGA	:	Controller General of Accounts
COD	:	Cash on Delivery
CPTU	:	Central Procurement and Technical Unit
CRM	:	Customer Relation Management
CSMPC	:	Customer Service Mail Processing Center
DAE	:	Department of Agricultural Extension
DAM	:	Department of Agriculture Marketing
DC office	:	District Commissioner Office
DG	:	Director General
DM	:	Disaster Management
DMS	:	Domestic Mail Service
DNCC	:	Dhaka North City Corporation
DOE	:	Department of Environment
DoP	:	Directorate of Posts
DPC	:	Departmental Promotion Committee
DPHE	:	Directorate of Public Health Engineering
DPMG	:	Deputy Postmaster General
DSA	:	Digital Service Accelerator
DSCC	:	Dhaka South City Corporation
DSDL	:	Digital Service Design Lab
DTCA	:	Dhaka Transport Coordination Authority
EBCR	:	Economic Benefit Cost Ratio
ECA	:	Environmental Conservation Act
e-CAB	:	e-Commerce Association of Bangladesh
EDA	:	Extra Departmental Agent
EDBO	:	Extra Divisional Branch Office
EDDA	:	Extra Departmental Delivery Agent
EDMC	:	Extra Departmental Mail Carrier

EDSO	:	Extra Divisional Sub Office
EDSPM	:	Extra Departmental Sub Post Master
EFT	:	Electronic Fund Transfer
EIN	:	Employer Identification Number
EIRR	:	Economic Internal Rate of Return
EMS	:	Express Mail Service
EMS	:	Emergency Mail Service
EMTS	:	Electronic Money Transfer Service
ENPV	:	Economic Net Present Value
EQS	:	Environmental Quality Standards
ERP	:	Enterprise Resource Planning
ESIA	:	Environment and Social Impact Assessment
ESMP	:	Environment and Social Management Plan
FD	:	Fixed Deposited
FGD	:	Focused Group Discussion
FMCG	:	Fast Moving Consumer Goods
FSM	:	Financial Service Management
FY	:	Fiscal Year
FYP	:	Fiscal Year Plan
G2C	:	Government to Customer
G2E	:	Government to Employee
G2G	:	Government to Government
GAP	:	Good Agricultural Practices
GDP	:	Gross Domestic Product
GEO-code	:	Geographical Code
GEP	:	Guaranteed Express Post
GM	:	General Manager
GO	:	Government Order
GoB	:	Government of Bangladesh
GPO	:	General Post Office
GPS	:	Geographic Positioning System
HIES	:	Household Income and Expenditure Survey

HO	:	Head Office
HoPE	:	Head of Procuring Entity
HR	:	Human Resource
HRD	:	Human Resource Development
HSU	:	Hartridge Smoke Unit
HVAC	:	Heating, ventilation, and air conditioning
iBAS	:	Integrated Budget and Accounting. System
ICT	:	Information Communication Technology
ICTD	:	Information & Communication Technology Division
IEE	:	Initial Environmental Examinession
IFS	:	International Financial Service
ILR	:	Internal Land Rate
IMPC	:	International Mail Processing Center
INGO	:	International Non-Government Organization
IoT	:	Internet of Things
IPC	:	Integrated Parcel Centre
IPPB	:	India Post Payments Bank
IRD	:	Internal Resource Division
IRD	:	Internal Resource Division
IRR	:	Internal Rate of Return
ISC	:	International Service Centers
ISDP	:	Integrated Service Delivery Platform
ISO	:	International Organization for Standardization
IT	:	Information Technology
KII	:	Key Informant Interview
KPI	:	Key Performance Indicator
LAN	:	Local Area Network
LGED	:	Local Government Engineering Department
LPH	:	Letter Per Hour
LSM	:	Letter Sorting Machin
LTM	:	Limited Tendering Method
MC	:	Municipality

ME	:	Maintenance Engineer
MFI	:	Micro-Finance Institute
MFS	:	Mobile Financial Service
MIS	:	Management Information System
MJM	:	Mail Journey Management
MMS	:	Mixed Mail Sorter
MoA	:	Ministry of Agriculture
MoFE	:	Ministry of Forest and Environment
MOPA	:	Ministry of Public Administration
MoPT&IT	:	Ministry of Post, Telecommunication and IT
MPC	:	Mail Processing Center
MRT	:	Metro Rail Transit
MT	:	Metric Ton
MVP	:	Minimum Viable Product
NAPD	:	National Academy for Planning and Development
NBR	:	National Board of Revenue
NBR	:	National Board of Revenue
NDC	:	Network Distribution Center
NDC	:	Nodal Delivery Center
NGO	:	Non-Governmental Organization
NID	:	National Identity
NJS	:	Non-Judicial Stamp
NOA	:	Notification of Award
NOC	:	No Objection Certificate
NPV	:	Net Present Value
NTTN	:	Nationwide Telecommunication Transmission Network
OCR	:	Optical Character Recognition
OTM	:	Open Tendering Method
OTP	:	One-time password
PD	:	Project Director
PF	:	Provident Fund
PFS	:	Proposal for Feasibility Study

PH	:	Parcel Hub
PI	:	Postal Innovation
PID	:	Postal Identification
PIN	:	Personal Identification Number
PLI	:	Postal Life Insurance
PMA	:	Postman Mobile Application
PO	:	Postal Order
POD	:	Pay on Delivery
POS	:	Point of Sale
PPE	:	Personal Protective Equipment
PPP	:	Public–Private Partnership
PRP	:	Postal Resource Planning
PSO	:	Payment System Operator
PSP	:	Payment Service Provider
PTC	:	Postal Training Center
PTD	:	Post and Telecommunication Division
QA	:	Quality Assurance
RAJUK	:	Rajdhani Unnayan Kartripakkha
REC	:	Remote Encoding Center
RFP	:	Request for Proposal
RFQ	:	Request for Quotation
RM	:	Regional Manager
RMS	:	Railway Mail Sorting
RoI	:	Return on Investment
RPATC	:	Regional Public Administration Training Center
RSTP	:	Revised Strategic Transport Plan
RTN	:	Road Transport Network
SDD	:	Software Design Document
SDG	:	Sustainable Development Goal
SME	:	Small And Medium-Sized Enterprises
SO	:	Sub Office
SPCBL	:	The Security Printing Corporation (Bangladesh) Ltd.

SPS	:	Service Process Simplification
SRS	:	Software Requirements Specification
SRTM	:	Shuttle Radar Topography Mission
SSP	:	Site Selection Protocol
STC	:	Surface Transfer Centers
SWOT	:	Strengths, Weaknesses, Opportunities, and Threats
TAITRA	:	Taiwan External Trade Development Council
TIN	:	Taxpayer Identification Number
TOR	:	Terms of Reference
TOWS	:	Threats, Opportunities, Weaknesses, Strengths
TSO	:	Thana Sub Office
UAT	:	User Acceptance Testing
UDC	:	Union Digital Center
UI	:	User Interface
UNCDP	:	UN Capital Development Fund
UNO	:	United Nations Organization
UPU	:	Universal Postal Union
USPS	:	United States Postal Service
UX	:	User Experience
VAT	:	Value Added Service
VPL	:	Value Payable Letter
VPN	:	Virtual Private Network
VPP	:	Value Payable Parcel
WE	:	Women and e-Commerce Forum
WU	:	Western Union

B. BUSINESS MODEL FOR AGRO-BASED PRODUCT

1. SECTION 1: BASIC INFORMATION

1	Name of the Project	:	**Agro-Post Project: A service to deliver agricultural goods from farmer to Consumer. Bangla: (এগ্রো-পোস্ট প্রজেক্ট: কৃষক থেকে ভোক্তার কাছে কৃষি-পণ্য সরবরাহের একটি পরিষেবা।)**
2.	(a) Sponsoring Ministry/Division (b) Implementing Agency	:	a) Ministry of Post, Telecommunication and IT b) Directorate of Posts (DoP)
3.	Project Objectives (Project to be taken based on the study)	:	• To develop an online market place and delivery platform for Agricultural Products; • Enabling farmers to sell perishable goods directly to consumer through postal market place. • To create an eco-system for producers and consumers to achieve a justified/fair price and minimize the postharvest loss. • To Increase revenue income of postal Department
4.	Estimated Project Cost (Taka in Crore)	:	BDT 312.12
5.	Sector & Sub-Sector	:	Physical Infrastructure Division
6.	Project Category (Based on Environment Conservation Rules 1997)	:	Green
7.	Project Geographic Location (a) Countrywide (b) Division (c) District (d) Upazila (e) Others (City Corporation/ Pourashva)	:	(a) Countywide:
8.	Project Duration		Five years

2. SECTION 2: INTRODUCTION

2.1 PROJECT BACKGROUND

As Bangladesh is moving towards digitalization and planning to harvest the benefits of the 4th industrial revolution with the introduction of Robotics, Virtual reality, Artificial intelligence, Internet of things (IOT), Big data, Block chain etc. According to the election manifesto of the present government, the Sustainable Development Goal (SDG) spectrum launched in 2021. Due to technological revolution and the country's economic achievement, time demands to deliver every service with the touch of technology. The government of Bangladesh has taken different steps with DSA, a2i, ICTD to introduce digital services in various offices. As a result, the time and cost of those services have already been reduced, and customers are satisfied with theTOR-RFP-BPO-03.08.21-V1.0-01-03-2022 2 services. BPO is planning to initiate different projects to provide benefits to the customers digitally. Therefore, the Bangladesh Postal Service automation is essential in providing services with ease and speed through digitization. Besides, SDGs targets 5.b, 8.10, 9.c, 17.6 and 17.8 encourage the Post and Telecommunications Division (PTD) to take the new technology through BPO.

On that note, the Bangladesh post office has been keeping itself from carrying perishable goods due to the lack of proper infrastructure to carry them properly from one end to another. However, the rising demand for perishable goods in the D2C (Direct to consumer) market has created a new market opportunity that The Bangladesh Post Office must attend. Thus, this feasibility study wanted to focus on this segment besides other scopes described in the next section.

2.2 OBJECTIVES OF THE TECHNICAL FEASIBILITY STUDY

The objective of the Feasibility Study is to assess business models of BPO branching into eCommerce services, technical and financial aspects few ideas spawn out of DSDL facilitated by DSA, a2i, ICTD and also technical and economic Feasibility of a possible Automated Mail Processing Center (AMPC) for Bangladesh Post Office. These proposed modernizations fueled by emerging technologies and the expansion of Postal services with innovative business models envisioned to be a great enabler of Vision 2041.

The study has been focused on the following areas:

- High-level enterprise architecture design and technical Feasibility on Digitalization/ Automation of BPO
- Business model development for implementing a business service where BPO will sell Agro-based products grown by marginal farmers directly to the end consumer
- Business model development for BPO's mail and parcel services. The business model considered future trends, primarily focusing on the growing digital commerce market.
- Feasibility study on the requirement of the Automation of Mail Processing Center (AMPC)

Business Model Development for Agro Products from Marginal Farmers to consumers.

- While designing the model, the consultant needs to prepare a priority list of Perishable goods based on market analysis with pre-defined criteria and indicators, harvesting time, and location of the BPO logistic network, which BPO will follow during different phases of the business model.

- Identifying stakeholders' value proposition and designing the supply chain of chosen Agro-products.

- Identify critical features and factors required for BPO, which should be mentioned in a sustainable business model based on the e-commerce platforms that hold significant market share and have potential business scopes.

- Also, identify the infrastructure (land, building/shades, transportation, etc.) required by BPO to run this business model.

2.3 APPROACH AND METHODOLOGY OF THE FEASIBILITY STUDY (AGRO-BASED MODEL)

The methodological design of the feasibility study is the combination of quantitative and qualitative research methods such as literature review, data collection and analysis, semi-structured interviews, focus groups discussions, key informant interviews and workshops. The choice of method has been taken into account the needs and capacities of the different target groups and stakeholders (citizen, agencies, companies, local partners, local and district government representatives, etc.). The study team arranged workshops on all components to figure out the ins and outs of that specific component. The design of the workshops ensured 100% participation from all participants. The following important stakeholders participated in the workshops.

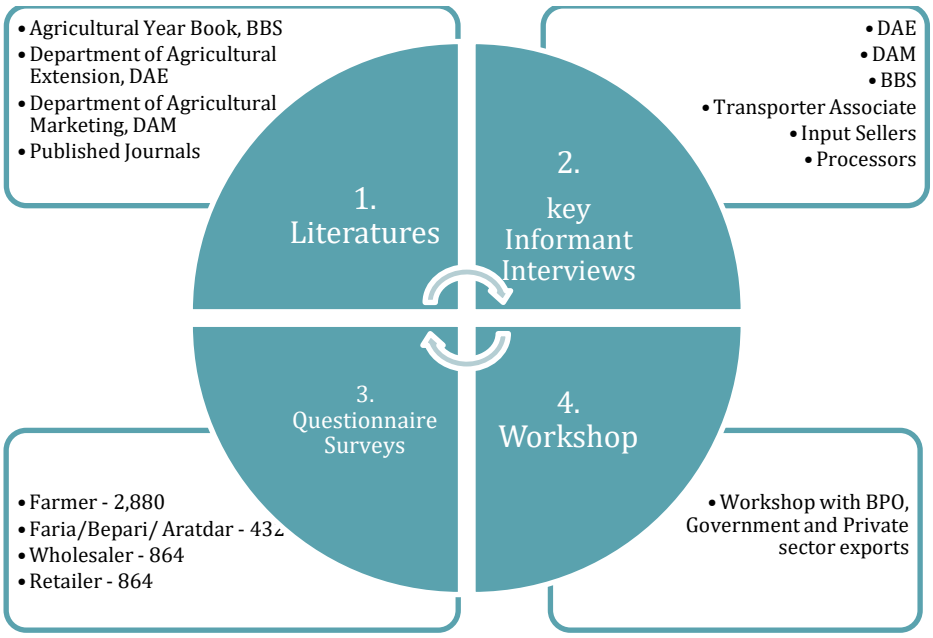
Approach

Following the research scope of this feasibility study, an exploratory approach has been implemented to understand the Agro perishable goods market. A series of quantitative and qualitative have been applied for this research, allowing the researcher to analyze data from different sources.

This study was explorative in nature and collected both primary and secondary data from relevant sources. The research team collected data from all possible and relevant sources to achieve the scope, and an appropriate data collection method was followed.

This specific component of the feasibility study has been constructed upon four specifics pillars.

Figure 1: Major Sources of Information for Agro Business Model



2.3.1.1 Literature Reviews

The consultant team conducted a thorough literature review to set the base of the feasibility study. While doing that, the team reviewed various documents, including government, national, and international publications.

These documents helped the consultants understand the volume of production, area-wise production, seasonality, pricing, and the market's current situation.

Moreover, the national publications helped to understand the various industry constraints, whereas international publications helped to understand the standard practices abroad.

2.3.1.2 Questionnaire and Checklist Preparation

Based on the understanding from the literature reviews, the consultant prepared the Questionnaires and checklist to collect field-level primary data.

While preparing the questionnaires and checklists, the consultant focused on the specific questions that helped understand the current market behavior, market mechanism, and business procedure.

After preparing the questionnaires and checklists, these were validated by the BPO and project authorities.

2.3.1.3 Primary Data Collection

After validating and finalizing the data collection tools, the consultant team started collecting field-level data. Field data were collected in two ways: Key Informant Interview (KII) and a Questionnaire survey.

2.3.1.4 Key Informant Interviews (KIIs):

With industry experts, key informant interviews were conducted using semi-structured checklists. Experts from both the public and private sectors were interviewed:

Table 1: Distribution of KII Participants

Sl.No.	Designation	Organization	Number of Interviews
1.	Deputy Director	DAE	1
2.	Upazila Agriculture Officer	DAE	24
3.	Assistant Director	DAM	1
4.	District Marketing Officer	DAM	24
5.	Director, Agriculture wing	Bangladesh Bureau of Statistics, BBS	1
6.	Director, Computer Wing	Bangladesh Bureau of Statistics, BBS	1
7.	President	Transport Association	24
8.	Owners	Input sellers	24
9.	Processor	Agriculture	3
10.	Exporter	Agriculture	2
	Total		105

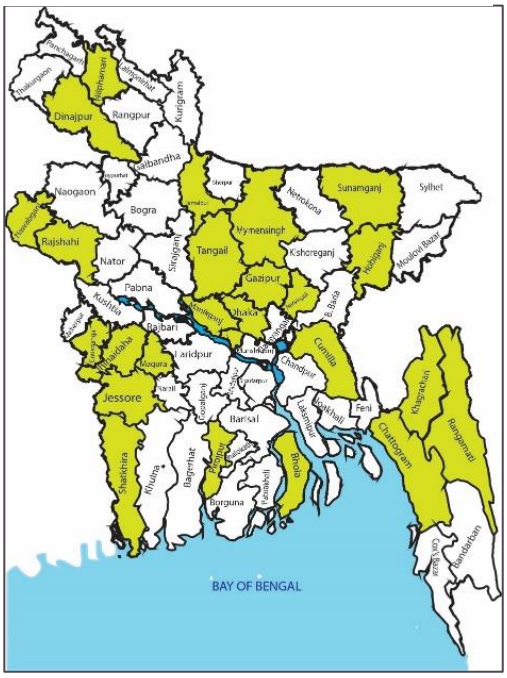
2.3.1.5 Questionnaire Surveys

Field-level quantitative information was collected through a questionnaire survey. A total 5,040 questionnaire survey was conducted with different stakeholders. Below is the breakdown of the questionnaire survey respondents.

Table 2: Distribution of Questionnaire Sample Size

Respondent	Number of Survey
Farmer	2,880
Faria/Bepari/ Aratdar	432
Wholesaler	864
Retailer	864
Total	**5,040**

Figure 2: Survey Area



2.3.1.6 Workshop:

To design the agriculture business model, two workshops were conducted. One is for gathering information, and the other is for validating the draft business model.

Table 3: Participants list for Data Collection Workshop

SL	Name & Designation	Designation	Organization
1	Mohammad Shafiuzzaman	Deputy Director (Horticulture Wing)	Department of Agricultural Extension (DAE)
2	Mitul Kumar Saha	Joint Director	Hortex Foundation
3	Dr. Nasrin Sultana	Assistant Director	Department of Agricultural Marketing (DAM)
4	Md. Harunur Rashid	Director General	Bangladesh Post Office (BPO)
5	MD. Reajul Islam	Additional Director General (A & E)	Bangladesh Post Office (BPO)
6	S. M. Shahabuddin	Additional Director General (Postal Service)	Bangladesh Post Office (BPO)
7	Aloka Rani Roy	Director (Training & Research)	Bangladesh Post Office (BPO)
8	Md. Altafur Rahman	Director (S & R)	Bangladesh Post Office (BPO)
9	S. M. Haroonur Rashid	Director (Mails)	Bangladesh Post Office (BPO)
10	Md. Saleh Ahmed	Director (Planning)	Bangladesh Post Office (BPO)
11	Md. Zahurul Alam	Director (S & P)	Bangladesh Post Office (BPO)
12	Sarif Md. Saifullah	Deputy Project Director (Planning)	Bangladesh Post Office (BPO)
13	Dr. Md. Monirul Islam	Consultant Nutrition	Bangladesh Agricultural Research Council (BARC)
14	Mamunur Rashid	Co-Founder & COO	Fashol™

SL	Name & Designation	Designation	Organization
15	MD. Ashraful Islam	Assistant Vice President	Golden Harvest Group
16	Nahyan Asif Momen	Output Cluster Lead (SCM)	iFarmer Ltd.
17	Sourav Saha	Executive (SCM)	iFarmer Ltd.
18	MD. Mahadi Faisal	Head of Marketing	Shwapno (ACI Logistics LTD.)
19	Tareq Rafi Bhuiyan	Managing Director	New Vision Solutions Limited
20	Atiqul Islam Sadi	Project Manager (Comp-2)	New Vision Solutions Limited
21	Md. Nasir Uddin	Field Coordinator	New Vision Solutions Limited
22	Tahmid Al- Sakib	Data Analyst	New Vision Solutions Limited
23	Maruf Billah	Project Manager (Comp-3)	New Vision Solutions Limited
24	S. M. A Awal	Field Coordinator	New Vision Solutions Limited
25	Md. Rezaul Karim	Chief Project Coordinator	Tri-Vision Limited
26	Md. Abdullah Al Rayhan	Project Manager (Comp-1)	Tri-Vision Limited
27	Md. Rabiul Islam	Consultant	Tri-Vision Limited
28	Md Nahid Kabir	Workshop facilitator	Tri-Vision Limited

Table 4: Participant list of validation workshop

SL	Name & Designation	Designation	Organization
•	MD. Reajul Islam	Additional Director General (A & E)	Bangladesh Post Office (BPO)
•	S. M. Shahabuddin	Additional Director General (Postal Service)	Bangladesh Post Office (BPO)
•	Aloka Rani Roy	Director (Training & Research)	Bangladesh Post Office (BPO)
•	Md. Altafur Rahman	Director (S & R)	Bangladesh Post Office (BPO)
•	S. M. Haroonur Rashid	Director (Mails)	Bangladesh Post Office (BPO)
•	Khondoker Shahanur Sabbir	Trainer, Postal Academy	Bangladesh Post Office (BPO)
•	Md. Saleh Ahmed	Director (Planning)	Bangladesh Post Office (BPO)
•	Md. Zahsurul Alam	Director (S & P)	Bangladesh Post Office (BPO)
•	Md. Shah Alam Bhuiyan	Deputy General Manager	Bangladesh Post Office (BPO)
•	Sarif Md. Saifullah	Deputy Project Director (Planning)	Bangladesh Post Office (BPO)
•	Dr. Md. Monirul Islam	Consultant Nutrition	Bangladesh Agricultural Research Council (BARC)
•	Mamunur Rashid	Co-Founder & COO	Fashol™
•	Tareq Rafi Bhuiyan	Managing Director	New Vision Solutions Limited
•	Md. Rezaul Karim	Chief Project Coordinator	Tri-Vision Limited
•	Atiqul Islam Sadi	Project Manager (Comp-2)	New Vision Solutions Limited
•	Tahmid Al- Sakib	Data Analyst	New Vision Solutions Limited
•	Maruf Billah	Project Manager (Comp-3)	New Vision Solutions Limited

3. SECTION 3: MARKET/DEMAND ANALYSIS

3.1 PROBLEM STATEMENT

Transportation:

Agricultural produce differs from industrial goods and has specific characteristics, making transportation as significant as other aspects. Like – agricultural products are bulky and perishable. However, most of them are consumable goods. Thus, both the number and quality of transportation are very crucial.

Transferring Agricultural goods from farmers/growers' places to market is crucial because improper transportation can increase the wastage of goods.

According to Md. Fakir Ahamed from Bangladesh Agriculture University, the total postharvest loss that occurred in the entire supply chain of jackfruit is due to improper storage, careless handling, and a traditional transportation system (Ahamed, 2010).

Transportation at the private level is also very high, which makes the product price high, and while there are some losses at all transportation stages, efficient transportation can still ensure that unit costs remain low and retain the agriculture value chain at a robust level. In addition, keeping transport costs low helps the farmers earn a margin and make it affordable for the consumer.

On the contrary, if transport costs are high, domestic marketing and the potential for agricultural exports will also decrease compared to countries with more efficient transport.

The rate of Postharvest loss in agricultural goods is very high in Bangladesh. Up to 50% postharvest loss could be found among different agricultural goods, especially fruits and Vegetables. From the primary survey, the consultant found that, on average, around 26.2% of agricultural goods are damaged due to poor transportation systems, which makes it an urgent issue to resolve.

A significant development in the food transport sector is the evolution of reefer vehicles or vehicles with refrigeration facilities. The storage capacity of these vehicles varies from 3 tons to 31 tons. Such a transport system brings down the enormous wastage of fruits and vegetables and, more importantly, poultry, fish, meat, milk, and dairy products.

Market Linkage:

In Bangladesh, agricultural goods reach to consumer's hand after changing five to six hands. Which have been elaborated on and described in the supply chain section. This long supply chain is another reason why farmers are deprived of fair prices, and consumers are spending more than actual.

Storage Facility:

In Bangladesh Facility for agricultural goods storage is not adequate. The proper storage system's unavailability creates problems during peak season. During peak season, farmers could not store their products and had to sell them at a lower rate. Thus, Storage facility is vital in the agriculture sector. In the 8th Five-Year Plan, it is mentioned and recognized as a significant challenge for farmers.

Sorting and Grading:

Sorting and grading is another crucial factor for Bangladeshi Farmers to get a reasonable price. The practice of grading agricultural commodities ensures the farmers adopt the quality specifications for their products, which avoids them being exploited by the traders and obtaining a reasonable price for the produce**.** Moreover, since the graded products possess fixed standards, there is no scope for cheating consumers.

Processing:

This is another challenge in the agriculture sector recognized by the 8th Five-year plan. Food processing has great potential, provided that reasonable quality control is enforced. To ensure that their production and export potential is fully realized, there is a need to invest in appropriate manufacturing capacities and infrastructural facilities. Good Agricultural Practices (GAP) must also be employed for production and postharvest management.

Financing/ Access to Credits:

Agricultural credit plays an essential role in the sector's sustainable development. It is a key to poverty alleviation and livelihood diversification for small farmers and traders, which can contribute to agricultural diversification. Research has shown a positive relationship between institutional credit and agricultural production; therefore, an expansion in the disbursement of agricultural credit, particularly to small farmers, is a priority. However, farmers of Bangladesh face difficulties in accessing credit for agricultural production, crop diversification, processing, value addition, and marketing. The lack of funds and high collateral requirements pose significant hindrances.

Packaging:

Agricultural packaging plays an important role in the transportation, storage, and distribution of agricultural products in Bangladesh. It helps to preserve the quality and freshness of the produce, protect it from damage, and extend its shelf life.

In Bangladesh, agricultural packaging is used for a wide range of products, including fruits, vegetables, grains, and other crops. The most common types of packaging used in the country include jute bags, polypropylene (PP) bags, and crates made from plastic or wood.

Jute bags are a traditional packaging material in Bangladesh and are commonly used for packing agricultural products such as rice, wheat, and pulses. Jute bags are made from natural fibers, which are biodegradable and eco-friendly. They are also strong, durable, and breathable, which helps to keep the produce fresh.

Polypropylene (PP) bags are becoming increasingly popular in Bangladesh due to their durability and low cost. They are commonly used for packaging products such as sugar, salt, and spices. PP bags are made from synthetic fibers, which are not biodegradable, but they can be recycled.

Plastic and wooden crates are also used for packaging fruits and vegetables in Bangladesh. They are durable and reusable, which makes them an eco-friendly option. However, they can be expensive and require more storage space than bags.

In recent years, there has been a growing awareness in Bangladesh about the need for eco-friendly and sustainable packaging solutions. As a result, there is a growing trend towards the use of biodegradable and compostable packaging materials made from materials such as paper, cardboard, and bioplastics. These materials are more sustainable and environmentally friendly than traditional packaging materials and are likely to become more popular in the future.

Source Identification/ Product traceability:

Agricultural goods in Bangladesh are less homogenous. The Same tree or field does not give similar types of fruits or vegetables every year. But customers have specific requirements/preferences. From the same sellers they expect similar types of products every year. Here hyper-personalization services can work better. Hyper-personalization uses AI and real-time data to display highly curated products and content to Customers. It treats customers as individuals with distinct tastes and preferences, enabling brands and retailers to provide a unique customer experience that's different for each shopper.

3.2 RELEVANCE OF THE PROJECT IDEA

The relevance of the project idea covers the most recent national 8th Five Year Plan, Sustainable Development Goal, Bangladesh Perspective Plan 2041. The major project objective is to:

- The overall Digitization/Automation of the Bangladesh Postal Resource Planning, Postal Mail and Parcel Services, and Postal Financial Services;
- Business Model Development for Agro-based product from Marginal Farmers to Consumers;
- A comprehensive Business Model Development for expansion of Mail and Parcel Services;
- Establishment of AMPC or MPC including the application of emerging technologies;

The proposed project has linked the project goals, outcomes and outputs to national perspective plan, five years plan and SDG. The following are the details of relevance with the national development plans:

Relevance with the Perspective Plan 2041

9.2 The State of Progress towards Innovation Economy

"Since 2017, 8500 post offices have been converted into post-e-centers where IT training is being provided."

10.6 Communications

"Bangladesh Post Office offers a range of services, including Express Mail Service, an electronic mail service, e-post for internet and e-mail services. Private providers supply high quality international courier services. All this progress has greatly benefitted trade and commerce, especially online commerce.

This progress has continued during the PP2021 and the strategy is broadly on track. The communications outlets for Bangladesh are multi-faceted and vibrant. The flow of information through social media, video and print media has moved ahead well with huge private investment. This is a major area of success for the PP2021.

PP2041 will build on this success and continue to modernize communications in Bangladesh. The PP2041 strategy will continue to provide policy and institutional support to private investment in expanding telecommunications network and services, boost the expansion of private print, audio and video media, and provide an enabling environment for competitive and healthy expansion of communication services and knowledge and information sharing. Public and national interest will be protected through regulations that ensure that information exchange is fact-based and prevent improper use that fans social unrest or

creates law and order breaches. The PP2041 will implement the provisions of the Right to Information Act that supports the growth of an informed and democratic society.

Postal services will continue to be modernized through faster transfers of mail with greater reliability of services. Private services in partnership with global carriers will continue to be encouraged. Service modernization through the use of digital technology such as mail tracking will be strengthened."

Relevance with the Sustainable Development Goal

Goal-2

"End hunger, achieve food security and improved nutrition and promote sustainable agriculture."

Target-2.3

"By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment."

Target-2.c

"Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility."

Goal-8

"Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all."

Target-8.2

"Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labor-intensive sectors."

Target-8.3

Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the

formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services

Target-8.5

By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value

Goal-16

"Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels."

Target-16.6

"Develop effective, accountable and transparent institutions at all levels."

Relevance with the 8th Five Year Plan

8FYP GOALS, TARGETS AND STRATEGIES FOR POSTAL SERVICES

a) Introducing digital postal services along with traditional postal services;
b) Commercializing postal services;
c) Introducing Domestic and International Financial Services;
d) Bringing Mail transportation, collection and distribution under ICT based strict supervision;
e) Ensuring imparting of high-quality ICT based training;
f) Following international standard in providing customer service and introducing zero tolerance policy;
g) Giving importance to rural people in case of proving improved postal services;
h) Adopting activities for making at least one IT based entrepreneur in each of rural post offices.
i) Increasing the capacity of mailing operator and courier service licensing authority in order to ensure quality service.
j) Expansion Department of Posts digital financial service 'Nagad' provided remote areas across the country.
k) Bringing all the villages of the country under the services of digital post office.
l) Introduction of nationwide ad-mail service by 2021.
m) Establishment of in-house digital commerce hubs across the country.
n) Introduction of education insurance "Sukanya" for school going girls.

3.3 PROPOSED PROJECT INTERVENTIONS

To address the Bangladesh agricultural sector's problems, the Bangladesh post office has to take several initiatives to intervene and solve the problems from the core.

First of all, Bangladesh post office has to introduce a platform where a farmer/ producers can directly get in touch with the end consumers. The Platform will act as a reagent of market linkage.

Then the BPO must introduce a separate and dedicated channel to carry the perishable goods from one place to another.

Thus, to maintain the logistical eco-system, BPO will need to increase intelligent vehicles, IoT devices, and AI-based technological tools to improve the efficiency of the current market mechanism and become a vital part of the supply chain while strengthening it.

3.4 STAKEHOLDERS:

The key stakeholders who will be associated with the project interventions are:

- Farmers/Producers: The farmers will be sold their product directly to the consumers to use the BPO platform site and will gain more benefit.
- Postal Agents: BPO will create an agent service to provide BPO services 24/7. The 8,500 Postal Entrepreneurs can be included as agent. This pool will facilitate the trading between Farmer and consumers.
- Bangladesh Government: Government of Bangladesh, Department Agricultural extension, Department of Agricultural Marketing and Ministry of Fisheries and Livestock etc.

3.5 DEMAND ANALYSIS (AGRO-PRODUCTS)

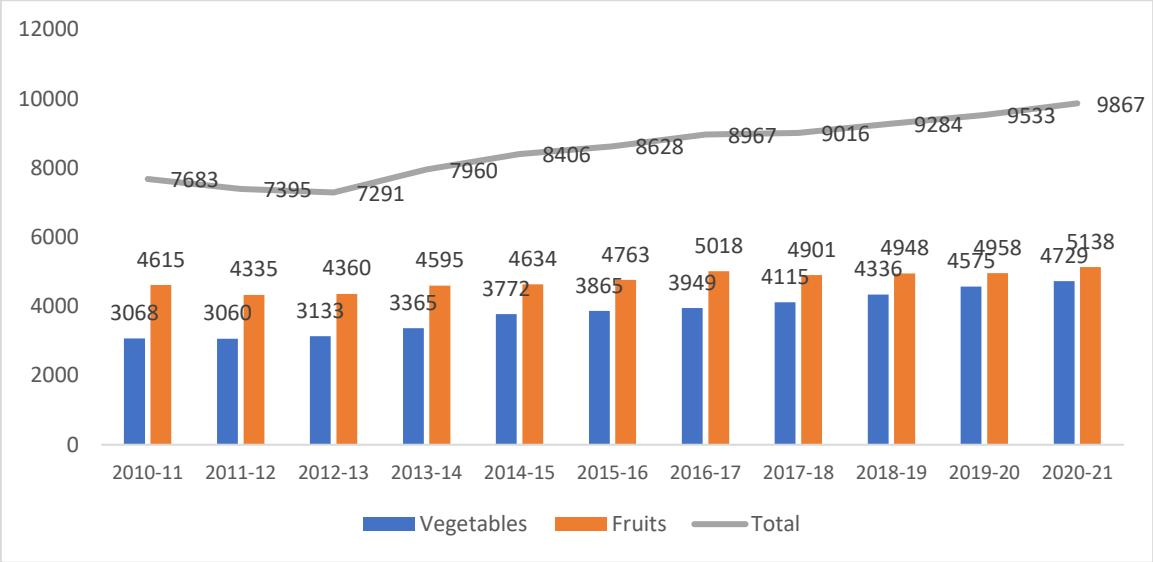
The agriculture sector of Bangladesh consists of several subsectors, like cereal crops, pulses, oil seeds, horticulture, fisheries, livestock's a and Forestry's.

This study going to check the feasibility for The BPO to carry the horticultural, fisheries and livestock goods throughout the country.

Horticulture (Fruits and Vegetables)

Bangladesh is enriched with soil and climate, which favors the cultivation of many horticultural crops. According to the Agriculture Information Service in Bangladesh, around 156 varieties of traditional and non-traditional vegetables are being cultivated (Hasan, 2020)[1]. Among these 35 are majors' vegetables. In the case of vegetables, tomato, brinjal, cabbage, cauliflower, aroids, pumpkin, bottle gourd, cucumber, pointed gourd, bitter gourd, hyacinth bean, and lady's finger are essential. Vegetables are grown in the summer and winter seasons. The summer vegetables are primarily indigenous, while the majority of winter vegetables are exotic.

Figure 3: Fruits and vegetable production in Bangladesh values (in thousands MT

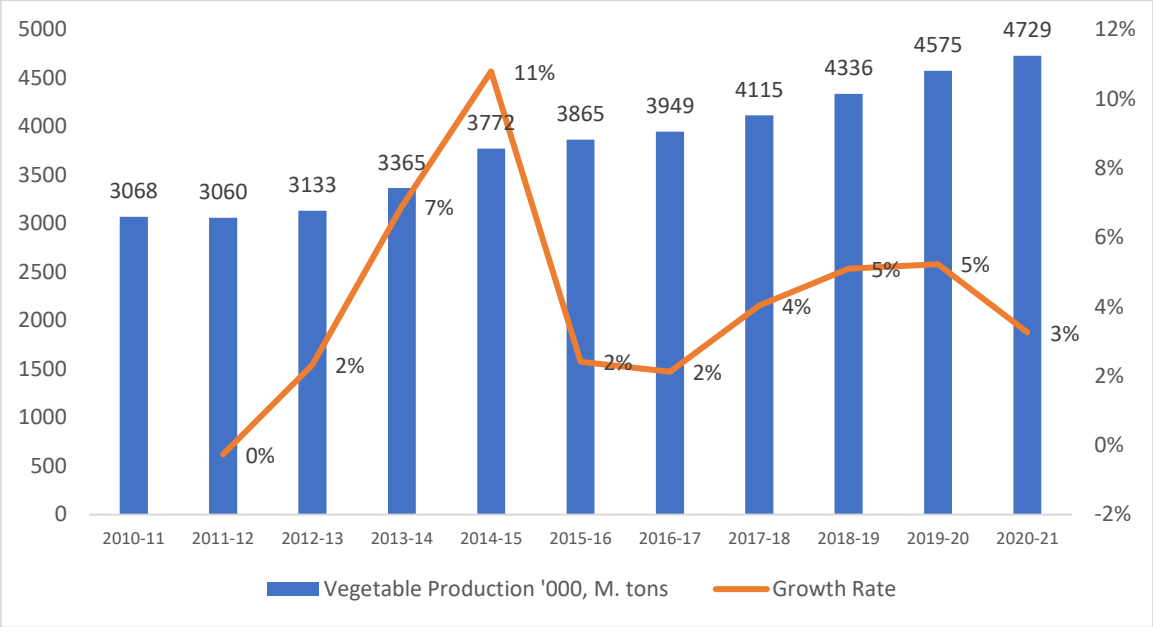


Source: Agriculture Statistical Year book (2012-2020), Bangladesh Bureau of Statistics.

According to the Agriculture statistical yearbook 2020, published by the Bangladesh Bureau of Statistics, Bangladesh's vegetable production grows at a 2% to 5% rate yearly for the last five years. In FY 2020-21, Bangladesh produced 4.7 million M.tons of vegetables, and it was 4.5 million M. tons in FY 2019-20.

[1] *Hasan, K. (n.d.). Vegetable production rises by one-third in 5 years. The Dhaka Tribune. Retrieved from https://www.dhakatribune.com/bangladesh/2020/01/03/vegetable-production-rises-by-one-third-in-5-years*

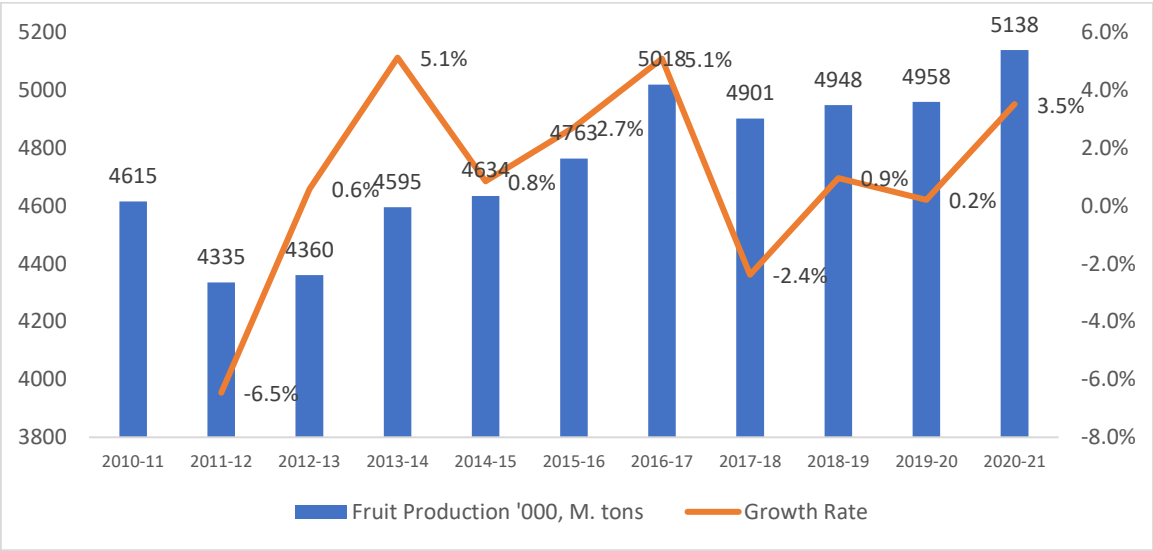
Figure 4: Yearly Vegetable production in Bangladesh (2010- 2021)



Source: Agriculture Statistical Year book (2012-2020), Bangladesh Bureau of Statistics.

Similarly fruits production is also increasing year on year, though the trend was not smooth. In FY 2020-21 total fruits production was 5,138 thousand MT. Which is 11.33 % higher than 2010-11. This was only possible due to technological advancement in Bangladesh agriculture sector.

Figure 5: Yearly Fruits production in Bangladesh (2010- 2021)



Source: Agriculture Statistical Year book (2012-2020), Bangladesh Bureau of Statistics.

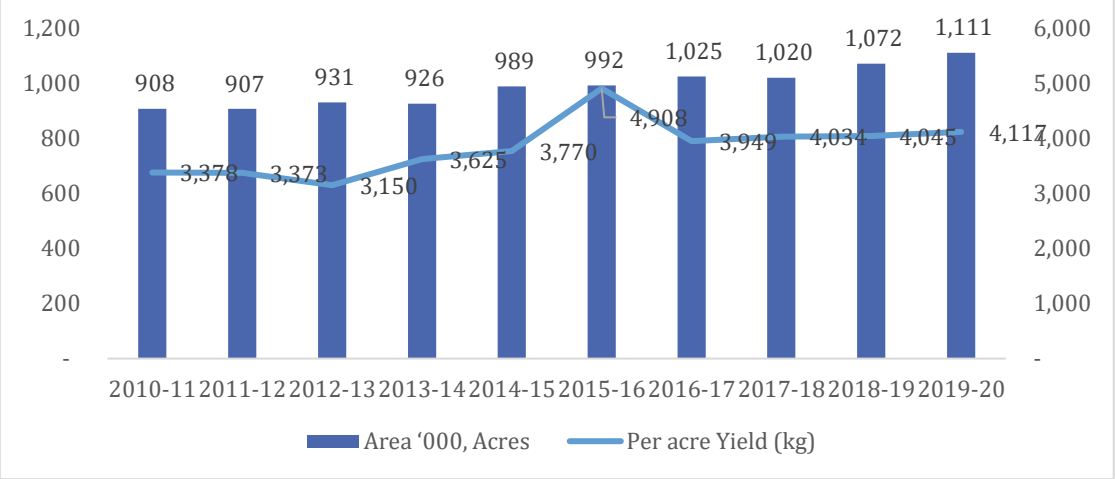
3.5.1.1 The area under vegetable and fruits cultivation

In FY 2019-20, 1,111 thousand acres of land have been used for vegetable cultivation all over Bangladesh, which is only 2.5 to 3 % of the total cultivated land. However, the area under

vegetable cultivation is increasing yearly, and demand for vegetables is also increasing. Five years ago, it was 989 thousand acres.

Along with area, per acre Yield is also increasing. In FY 2019-20 per acre, vegetable yield stands at 4,117 kgs, slightly higher than the previous year's 4, 045 kgs.

Figure 6: Land under Vegetable Cultivation in Bangladesh (2010- 2020)

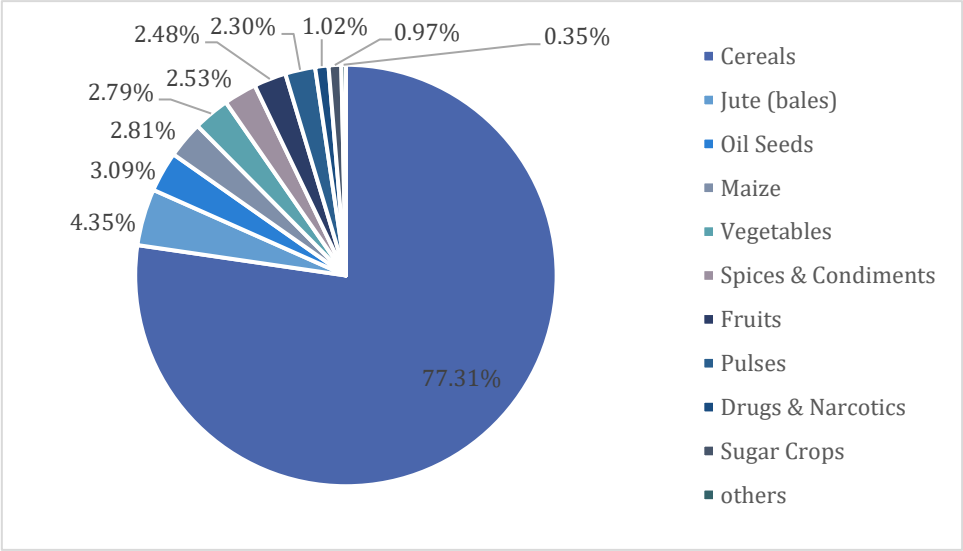


Source: Agriculture Statistical Year book (2012-2020), Bangladesh Bureau of Statistics.

Similarly in FY 2010-11, 4615 thousand MT of fruits was cultivated in only 347 thousand acres of land and in fiscal year 2020-21 on 996 thousand acres of land, 5138 thousand MTs of fruits were grown. Which shows farmers/ growers are using more land to grow fruits then previous years. Though land use has been increased but productivity/ per acre yield has been decreased.

In Bangladesh largest share of cultivable land is being used for cereals (Rice and wheat, maize, oat, barley, jab, jower, etc) cultivation. Up to 78% of the land is used for cereals, where only 5.45% are being used for Fruits (2.80) and vegetables (2.65) combinedly.

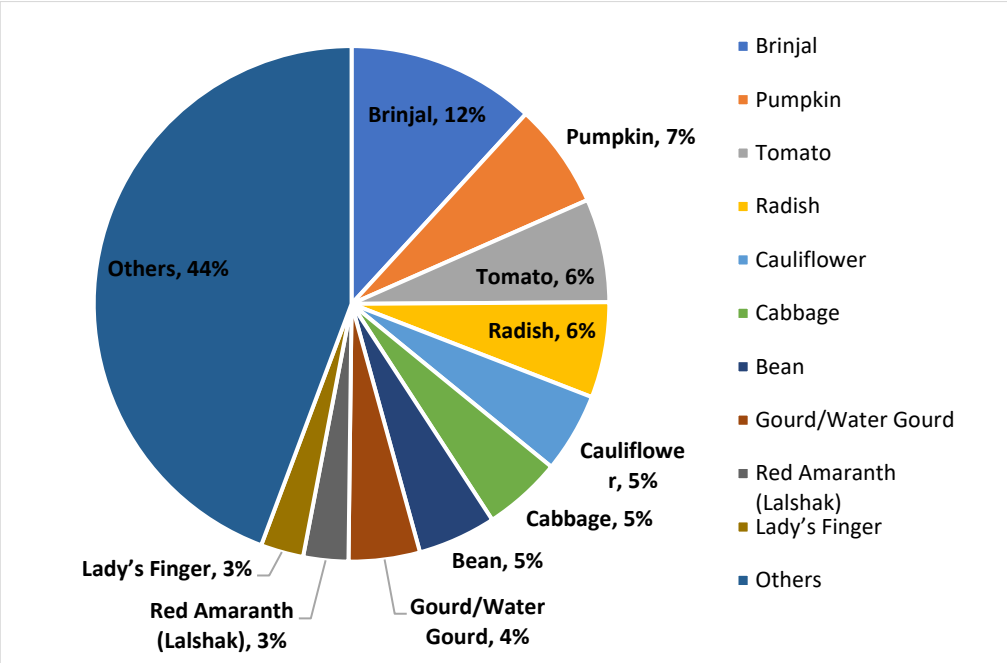
Figure 7: Crop wise land distribution, 2020-21



Source: Agriculture Statistical Yearbook, 2020-21, BBS

Among the vegetables, Brinjal/Eggplant holds the largest share land, around 12% (of 1,111 acre) for cultivation.

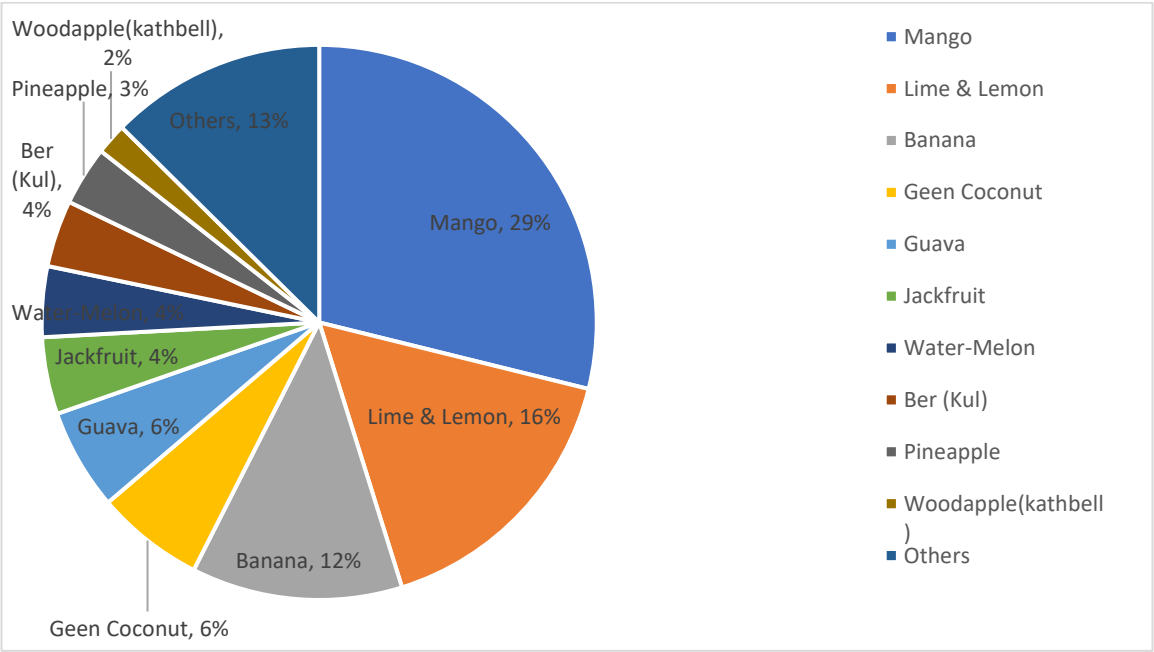
Figure 8: Vegetable wise Land Distribution, 2020-21



Source: Agriculture Statistical Yearbook, 2020-21, BBS

Among the fruits mangoes captures most of the fruits-grown lands, as most mango growers are cultivating mangos in gardens, where most of the other products are being cultivated in scattered lands and in homestead way.

Figure 9: Fruits wise Land Distribution, 2020-21



Source: Agriculture Statistical Yearbook, 2020-21, BBS

3.5.1.2 Perishability of Fruits and Vegetables

Perishability of fruits and vegetable depends on the shelf-life of the products. All agricultural goods are perishable, but not all goods require immediate refrigeration.

Products that require immediate refrigeration and have a shorter life span, like a few days (2-3 days), are highly perishable.

Goods that don't require immediate refrigeration but have a life span of a few weeks fall into the semi-perishable category.

Though the scientific definition of perishability is more complex for simplification, we can go ahead with the upper characterizations.

Table 5: Fruits Categorization in to Perishable and Semi-Perishable

Perishability		Name
Fruits	Perishable	Banana (Ripe), Guava, Pineapple, Ripe Papaya, Litchi, Black Berry, Strawberry, Star apple (Jamrul), Sarifa (Custard apple)
	Semi-perishable	Lime & Lemon, Lotkan (Burmese grape), Mango, Jackfruit, Watermelon, Boroi (Kul), Pomelo, Amra (Hog plum), Tamarind, Chalta (Elephant apple), Malta, Green/ Tender Coconut, Orange, Dalim (Pomegranate), Dragon, Bel (Wood Apple), Tamarind

Source: DAE, BAPA and other Governmental Sources

Sometimes perishability depends on Maturity of the goods, like green Banana or green Papaya can stay good for longer period compare to ripe banana and papaya.

Table 6: Vegetable Categorization in to Perishable and Semi-Perishable

Perishability		Name
Vegetable	Perishable	Cabbage, Radish, Cauliflower, Bottol Gourd, Brinjal, Green Banana, Bean, Taro Root, Patal (Pointed gourd), Puishak (Indian Spinach), Lady's Finger, Lalshak (Red Amaranth), Pani Kachu, Palong shak (Bengal Spinach), Karala, Ridge Gourd (Jhinga), Arum (Lati), Chichinga (Snake Gourd), Kakrol (Spiny gourd), Mura Kachu, Laushak, Cucumber, Chalkumra (Ash Gourd), (Bitter Gourd), Data Sak, Sajna, Carrot, Dundal (Sponge gourd) Owl Kachu, Maan Kachu, Kalmi Sak, Shalgom, Kachu Sak
	Semi-perishable	Potato, Tomato, Pumpkin, Danta (Amaranth), Pat Sak

Source: DAE, BAPA and other Governmental Sources

Degree of perishability is higher in vegetables than fruits. Thus, we can see that more vegetables fall into the perishable category than semi-perishable category.

3.5.1.3 Seasonality

Figure 10: Seasonality of Fruits and Vegetable

Source: Agriculture Statistical Yearbook, 2020-21, BBS

3.5.1.4 Area-wise Major Fruits and Vegetable Production:

Table 7: Area-wise Major Fruits and Vegetable Production.

Division	District	Production of Major Fruits	Production of Major Vegetables
Barishal	Barguna	Water Melon, Green Coconut, Mango, Jack Fruit, Hog plum	Green Papaya, Radish, Brinjal, Pumpkin , Cabbage
	Barishal	Green Coconut, Mango, Guava, Jack Fruit, Banana	Green Papaya, Water Gourd, Pumpkin, Brinjal, Tomato
	Bhola	Water Melon, Green Coconut, Jack Fruit, Melon (Banggi), Banana	Pumpkin, Brinjal, Bean, Radish, Tomato
	Jhallokati	Banana, Green Coconut, Guava, Hog plum (Amra), Jack Fruit	Water Gourd, Pumpkin, Green Banana, Brinjal, Shalgom
	Patuakhali	Jack Fruit, Green Coconut, Mango, Water Melon, Banana	Green Papaya, Pumpkin, Green Banana , Water Gourd, Puishak

Division	District	Production of Major Fruits	Production of Major Vegetables
	Pirojpur	Guava, Green Coconut, Banana, Water Melon, Jack Fruit	Green Banana, Pumpkin, Water Gourd, Cabbage, Green Papaya
Chattogram	Bandarban	Banana, Pineapple, Jack Fruit, Mango, Ripe Papaya	Cucumber, Green Banana, Water Gourd, Radish, Pumpkin
	Brahmanbaria	Jack Fruit, Mango, Green Coconut, Litchi, Lime	Brinjal, Radish, Cauliflower, Tomato, Cabbage
	Chandpur	Jack Fruit, Mango, Banana, Green Coconut, Guava	Tomato, Water Gourd, Radish, Pumpkin, Green Papaya
	Chattogram	Guava, Jack Fruit, Mango, Banana, Green Coconut	Tomato, Brinjal, Radish, Bean, Pumpkin
	Cumilla	Mango, Jack Fruit, Guava, Green Coconut, Boroi/Kul	Tomato, Pumpkin, Water Gourd, Cauliflower, Cabbage
	Cox's Bazar	Water Melon, Mango, Jack Fruit, Green Coconut, Ripe Papaya	Tomato, Radish, Brinjal, Green Papaya, Green Banana
	Feni	Mango, Jack Fruit, Banana, Green Coconut, Guava	Brinjal, Tomato, Water Gourd, Radish, Pumpkin
	Khagrachari	Jack Fruit, Banana, Mango, Pineapple, Ripe Papaya	Mura Kachu, Mukhi Kachu, Mukhi Kachu, Brinjal, Pumpkin
	Lakshmipur	Banana, Green Coconut, Ripe Papaya, Mango, Water Melon	Tomato, Green Banana, Green Papaya, Water Gourd, Pumpkin
	Noakhali	Green Coconut, Water Melon, Mango, Banana, Ripe Papaya	Pumpkin , Brinjal, Radish, Tomato, Water Gourd
	Rangamati	Jack Fruit, Banana, Pineapple, Guava, Mango	Green Papaya, Green Banana , Brinjal, Radish, Pumpkin
Dhaka	Dhaka	Lime, Mango, Banana, Guava, Jack Fruit	Water Gourd, Cauliflower, Pumpkin , Radish, Brinjal
	Faridpur	Jack Fruit, Mango, Green Coconut, Melon (Banggi), Guava	Green Papaya, Brinjal, Tomato, Water Gourd, Radish

Division	District	Production of Major Fruits	Production of Major Vegetables
	Gazipur	Jack Fruit, Pineapple, Banana, Mango, Guava	Water Gourd, Cabbage, Tomato, Cauliflower, Radish
	Gopalganj	Water Melon, Banana, Mango, Melon (Banggi), Green Coconut	Pumpkin , Tomato, Water Gourd, Cabbage, Green Banana
	Kishoreganj	Jack Fruit, Banana, Mango, Green Coconut, Litchi	Tomato, Radish, Pumpkin, Water Gourd, Brinjal
	Madaripur	Banana, Green Coconut, Mango, Jack Fruit, Melon (Banggi)	Tomato, Water Gourd, Brinjal, Pumpkin , Radish
	Manikganj	Green Coconut, Jack Fruit , Mango, Banana, Ripe Papaya	Brinjal, Pumpkin , Carrot, Radish, Bean
	Munshiganj	Mango, Green Coconut, Jack Fruit , Melon (Banggi), Banana	Pumpkin , Water Gourd, Cauliflower, Radish, Khirai
	Narayanganj	Green Coconut, Jack Fruit , Mango, Banana, Ripe Papaya	Water Gourd, Pumpkin , Tomato, Bean, Brinjal
	Narsingdi	Jack Fruit , Banana, Mango, Guava , Lime	Brinjal, Bean, kakrol, Water Gourd, Green Papaya
	Rajbari	Jack Fruit , Mango, Green Coconut, Banana, Black Berry	Brinjal, Green Banana , Pumpkin , Cabbage, Cauliflower
	Shariatpur	Green Coconut, Mango, Boroi/Kul, Ripe Papaya , Wood Apple	Tomato, Pumpkin , Radish, Water Gourd, Green Banana
	Tangail	Pineapple , Banana, Jack Fruit , Mango, Ripe Papaya	Cabbage, Brinjal, Radish, Cauliflower, Water Gourd
Khulna	Bagerhat	Green Coconut, Banana, Water Melon , Jack Fruit , Mango	Tomato, Cabbage, Brinjal, Radish, Pumpkin
	Chuadanga	Banana, Water Melon , Mango, Jack Fruit , Green Coconut	Pumpkin , Brinjal, Green Banana , Cabbage, Cauliflower
	Jashore	Green Coconut, Jack Fruit , Banana, Mango, Guava	Cabbage, Brinjal, Patal, Green Papaya, Pumpkin

Division	District	Production of Major Fruits	Production of Major Vegetables
	Jhenaidah	Banana, Mango, Jack Fruit , Green Coconut, Guava	Brinjal, Green Banana , Pumpkin , Cabbage, Cauliflower
	Khulna	Water Melon , Green Coconut, Mango, Banana, Jack Fruit	Pumpkin , Cabbage, Green Banana , Cauliflower, Green Papaya
	Kushtia	Jack Fruit , Mango, Banana, Green Coconut, BlackBerry	Brinjal, Pumpkin , Green Banana , Cabbage, Radish
	Magura	Banana, Mango, Green Coconut, Guava , Ripe Papaya	Green Papaya, Brinjal, Pumpkin , Green Banana , Radish
	Meherpur	Banana, Mango, Jack Fruit , Ripe Papaya , Green Coconut	Mukhi Kachu, Mukhi Kachu, Cabbage, Brinjal, Cucumber
	Narail	Green Coconut, Jack Fruit , Mango, Banana, Guava	Brinjal, Green Papaya, Pumpkin , Water Gourd, Green Banana
	Satkhira	Green Coconut, Mango, Banana, Jack Fruit , Boroi/Kul	Brinjal, Cabbage, Green Banana , Cauliflower, Pumpkin
Mymensingh	Jamalpur	Jack Fruit , Mango, Banana, Green Coconut, Guava	Brinjal, Tomato, Cauliflower, Cabbage, Radish
	Mymensingh	Banana, Jack Fruit , Mango, Green Coconut, Pineapple	Brinjal, Green Papaya, Cabbage, Tomato, Cauliflower
	Netrokona	Jack Fruit , Mango, Green Coconut, Banana, Boroi/Kul	Brinjal, Pumpkin , Tomato, Green Papaya, Cabbage
	Sherpur	Jack Fruit , Mango, Banana, Green Coconut, Boroi/Kul	Radish, Cauliflower, Brinjal, Tomato, Cabbage
Rajshahi	Bogura	Jack Fruit , Mango, Banana, Green Coconut, Ripe Papaya	Brinjal, Radish, Green Papaya, Cabbage, Mukhi Kachu
	Joypurhat	Mango, Banana, Jack Fruit , Boroi/Kul, Guava	Pani Kachu, Brinjal, Arum (Lati), Cabbage, Bitter Gourd

Division	District	Production of Major Fruits	Production of Major Vegetables
	Naogaon	Mango, Banana, Jack Fruit , Boroi/Kul, Green Coconut	Brinjal, Cauliflower, Radish, Cabbage, Green Banana
	Natore	Mango, Jack Fruit , Banana, Green Coconut, Ripe Papaya	Green Papaya, Green Banana , Cauliflower, Cabbage, Brinjal
	Chapai Nawabganj	Mango, Guava , Banana, Jack Fruit , Boroi/Kul	Brinjal, Tomato, Cabbage, Green Papaya, Cauliflower
	Pabna	Mango, Jack Fruit , Green Coconut, Litchi , Guava	Brinjal, Cauliflower, Patal, Cabbage, Green Papaya
	Rajshahi	Mango, Banana, Green Coconut, Jack Fruit , Boroi/Kul	Tomato, Green Papaya, Brinjal, Cabbage, Pumpkin
	Sirajganj	Mango, Jack Fruit , Banana, Green Coconut, Guava	Brinjal, Radish, Arum (Lati), Khirai , Cauliflower
Rangpur	Dinajpur	Mango, Jack Fruit , Banana, Litchi , Ripe Papaya	Tomato, Cabbage, Cauliflower, Brinjal, Pumpkin
	Gaibandha	Banana, Mango, Jack Fruit , Green Coconut, Ripe Papaya	Brinjal, Pumpkin , Radish, Cabbage, Cauliflower
	Kurigram	Mango, Jack Fruit , Banana, Black Berry , Ripe Papaya	Brinjal, Cauliflower, Radish, Cabbage, Pumpkin
	Lalmonirhat	Jack Fruit , Mango, Banana, Guava , Litchi	Cauliflower, Cabbage, Brinjal, Tomato, Radish
	Nilphamari	Jack Fruit , Mango, Banana, Boroi/Kul, Green Coconut	Cabbage, Brinjal, Cauliflower, Radish, Pumpkin
	Panchagar	Jack Fruit , Mango, Banana, Water Melon , Litchi	Tomato, Radish, Brinjal, Cabbage, Cauliflower
	Rangpur	Mango, Jack Fruit , Banana, Litchi , Green Coconut	Cabbage, Cauliflower, Brinjal, Pumpkin , Tomato
	Thakurgaon	Mango, Jack Fruit , Water Melon , Banana, Litchi	Brinjal, Tomato, Cabbage, Pumpkin , Cauliflower

Division	District	Production of Major Fruits	Production of Major Vegetables
Sylhet	Habiganj	Mango, Jack Fruit , Green Coconut, Guava , Pineapple	Water Gourd, Radish, Tomato, Bean, Cabbage
	Moulvibazar	Lime, Jack Fruit , Pineapple , Mango, Green Coconut	Radish, Water Gourd, Brinjal, Tomato, Pumpkin
	Sunamganj	Mango, Jack Fruit , BlackBerry , Pomelo (Jambura/ Batavilabu) , Green Coconut	Tomato, Bean, Brinjal, Cauliflower, Cabbage
	Sylhet	Jack Fruit , Mango, Banana, Water Melon , Boroi/Kul	Tomato, Radish, Cauliflower, Cabbage, Pumpkin

Source: Agriculture Statistical Yearbook, 2020-21, BBS

3.5.1.5 Fruits and Vegetable wise Major Area:

(A) FRUITS

Fruits	Major Production Area (District Wise)
Amra (Hog plum)	Barishal Pirojpur Jhallokati Barguna Jhenaidah Narail
Banana	Tangail, Gaibandha, Jhenaidah, Rajshahi, Rangamati, Meherpur, Mymensingh, Khagrachari, Narsingdi, Bogura
Black Berry	Kushtia Mymensingh Sunamganj Rajbari Jamalpur Netrokona
Boroi (Kul)	Rajshahi, Khulna, Cumilla, Chattogram, Kushtia, Tangail, Cox's Bazar, Magura, Chuadanga, Shariatpur
Dalim (Pomegranate)	Jashore Rajshahi Tangail Magura
Dragon	Natore, Jhenaidah, Nilphamari, Thakurgaon, Bagerhat, Rajshahi, Dinajpur, Narsingdi, Rangamati, Chuadanga,

Fruits	Major Production Area (District Wise)
Guava	Chattogram, Pirojpur, Barishal, Rajshahi, Jashore, Kushtia, Pabna, Rangamati, Gazipur, Cumilla
Jackfruit	Gazipur, Kushtia, Tangail, Netrokona, Rangamati, Khagrachari, Chattogram, Dinajpur, Nilphamari, Pabna
Litchi	Dinajpur Pabna Rangpur Kushtia Rajshahi Kishoreganj
Lotkan (Burmese grape)	Narsingdi Thakurgaon Sherpur Jamalpur Gazipur
Malta	Magura, Rajshahi, Chattogram, Tangail, Rangamati, Bandarban, Khagrachari, Jhallokati, Dinajpur, Jashore
Mango	Rajshahi, Chapai Nawabganj, Natore, Kushtia, Dinajpur, Naogaon, Habiganj, Pabna, Thakurgaon, Netrokona
Pineapple	Tangail, Rangamati, Gazipur, Khagrachari, Chattogram, Bandarban, Mymensingh, Narsingdi, Moulvibazar, Sylhet
Ripe Papaya	Natore Kushtia Tangail Bogura Mymensingh Rangamati
Star apple (Jamrul)	Magura Barishal Jashore Jhenaidah Patuakhali Noakhali
Tamarind	Mymensingh Jamalpur Narsingdi Netrokona Lalmonirhat Tangail
Watermelon	Khulna, Bhola, Barguna, Noakhali, Cox's Bazar, Chuadanga, Gopalganj, Thakurgaon, Natore, Pirojpur

Source: Agriculture Statistical Yearbook, 2020-21, BBS

(B) VEGETABLE:

Vegetable	Major Production Area (District Wise)
Cabbage	Jashore Dinajpur Meherpur Mymensingh Tangail Nilphamari Rajshahi
Radish	Rajshahi Chattogram Mymensingh Tangail Panchagar Bogura Sherpur Jamalpur
Cauliflower	Dinajpur Mymensingh Lalmonirhat Pabna Rajshahi Tangail Jamalpur Rangpur
Bottol Gourd	Dhaka, Mymensingh, Cumilla, Tangail, Jamalpur, Habiganj, Narsingdi, Gazipur, Rajshahi, Chattogram
Brinjal	Rajshahi Mymensingh Jamalpur Jashore Jhenaidah Thakurgaon
Green Banana	Jhenaidah Rajbari Chuadanga Rajshahi Jashore Satkhira Kushtia Naogaon
Bean	Sunamganj, Chattogram, Narsingdi, Jashore, Jhenaidah ,Mymensingh, Meherpur, Cumilla, Sylhet, Habiganj
Taro Root	Meherpur, Khagrachari, Chattogram, Bogura, Kushtia, Chuadanga, Panchagar, Tangail, Rajshahi, Jhenaidah
Puishak (Indian Spinach)	Jashore Kushtia Jhenaidah Meherpur Rajbari Pabna Satkhira
Cucumber	Meherpur Jamalpur Mymensingh Sherpur Bandarban Chattogram Jashore
Chalkumra (Ash Gourd)	Mymensingh Pabna Rajshahi Dhaka Tangail Sherpur
Lady's Finger	Rajbari Brahmanbaria Jashore Kushtia Pabna Tangail Mymensingh
Lalshak (Red Amaranth)	Dhaka Rajshahi Rajbari Cumilla Jashore Chattogram
Palong shak (Bengal Spinach)	Jhenaidah Rajbari Chuadanga Rajshahi Jashore Satkhira Kushtia Naogaon

Vegetable	Major Production Area (District Wise)
Karala (Bitter Gourd)	Jhenaidah Rajbari Chuadanga Rajshahi Jashore Satkhira Kushtia Naogaon
Ridge Gourd (Jhinga)	Jhenaidah Rajbari Chuadanga Rajshahi Jashore Satkhira Kushtia Naogaon
Sajna	Jhenaidah Rajbari Chuadanga Rajshahi Jashore Satkhira Kushtia Naogaon
Carrot	Manikganj, Pabna, Dhaka, Jamalpur, Bogura, Mymensingh, Panchagar, Sherpur, Rangpur, Rajshahi, Jashore
Potato	Bogura, Naogaon, Rangpur, Dinajpur, Rajshahi, Joypurhat
Tomato	Rajshahi Dinajpur Cumilla Mymensingh Chattogram Panchagar
Pumpkin	Satkhira, Chuadanga, Sirajganj, Thakurgaon, Sherpur, Jashore, Sylhet, Pabna, Jamalpur, Rajbari
Danta (Amaranth)	Jashore Tangail Mymensingh Sherpur Rajshahi Jhenaidah

Source: Agriculture Statistical Yearbook, 2020-21, BBS

3.5.1.6 Pricing of the horticultural goods

Various factors, including supply and demand, production costs, transportation costs, and market competition, determine the prices of fruits and vegetables in Bangladesh. In addition, the supply of fruits and vegetables is influenced by factors such as seasonality, weather conditions, and the availability of inputs, such as seeds and fertilizers.

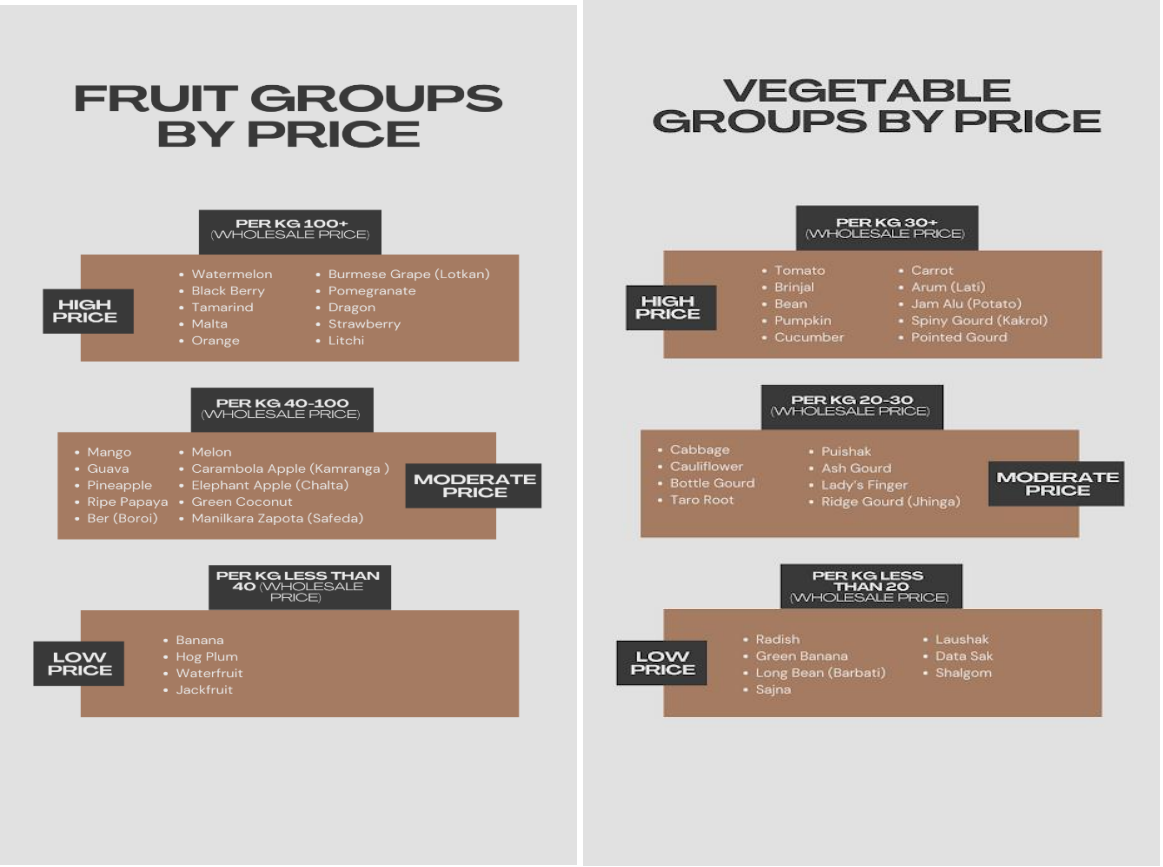
Meanwhile, demand is driven by population growth, changes in consumer preferences, and income levels.

In Bangladesh, the prices of fruits and vegetables are primarily set by the market forces of supply and demand. The prices are typically set by auction or negotiation between sellers and buyers at different levels of the supply chain, from farmers to wholesalers to retailers. However, there are instances where prices may be influenced by government policies such as subsidies or price controls.

Factors such as post-harvest losses, inadequate storage facilities, and transportation inefficiencies also affect the prices of fruits and vegetables in Bangladesh.

Overall, the prices of fruits and vegetables in Bangladesh are subject to fluctuation based on a variety of economic and environmental factors.Below, fruits and vegetables are categorized in to three groups base on market price in FY 2020-21

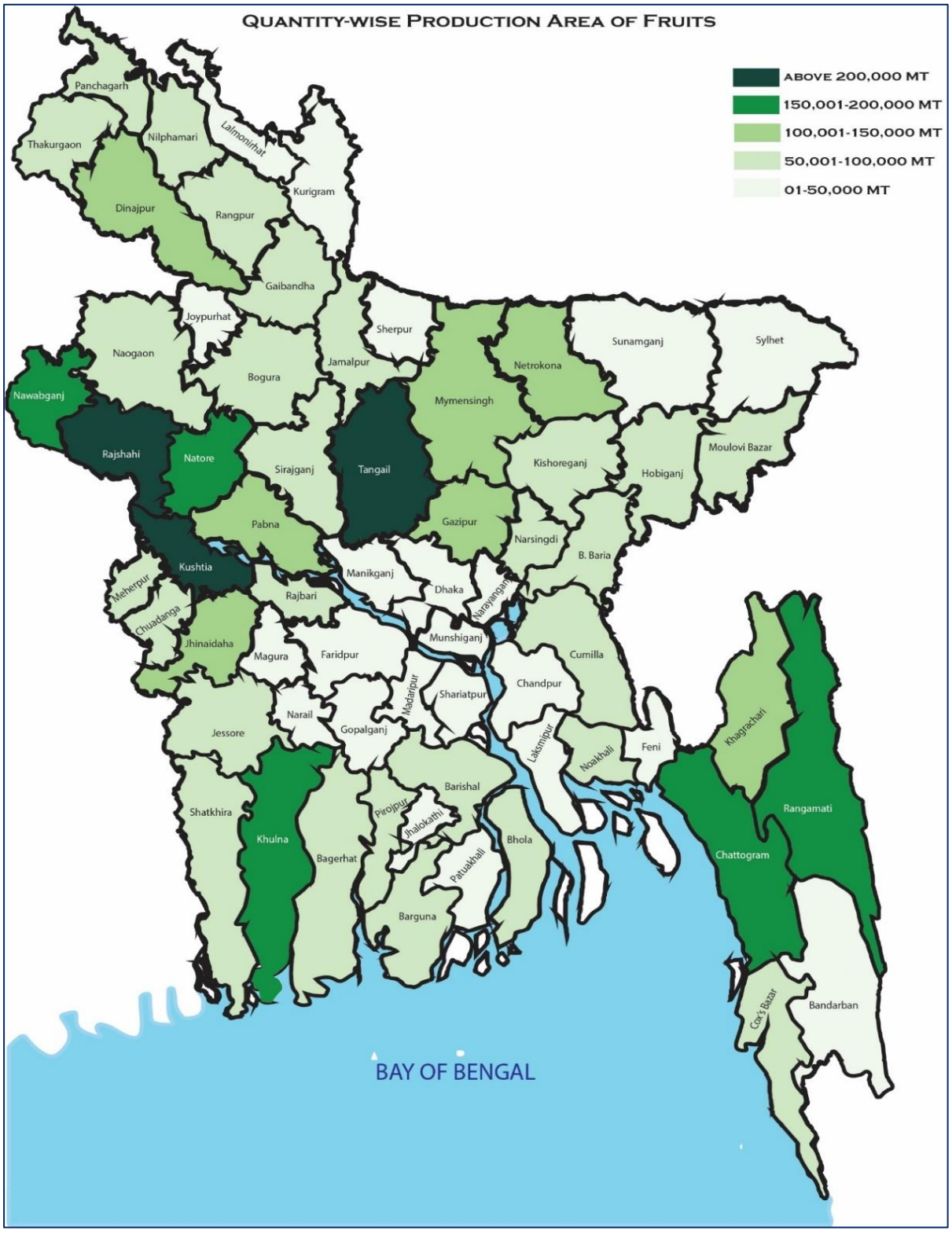
Figure 11: Fruit and vegetable Groups by Price (In BDT)



Source: Agriculture Statistical Yearbook, 2020-21, BBS

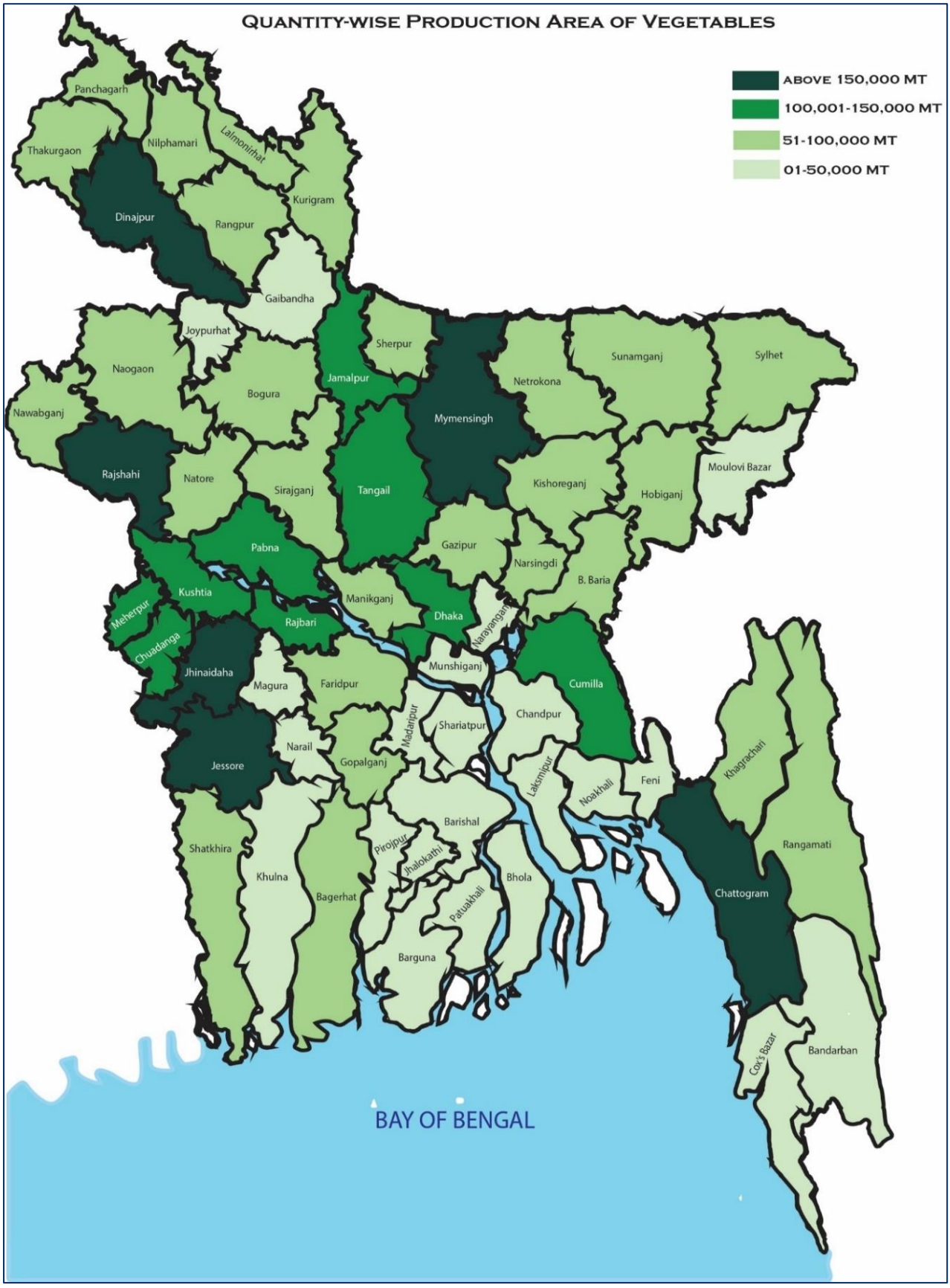
3.5.1.7 Production Heat Map

Figure 12: Fruits Production Areas



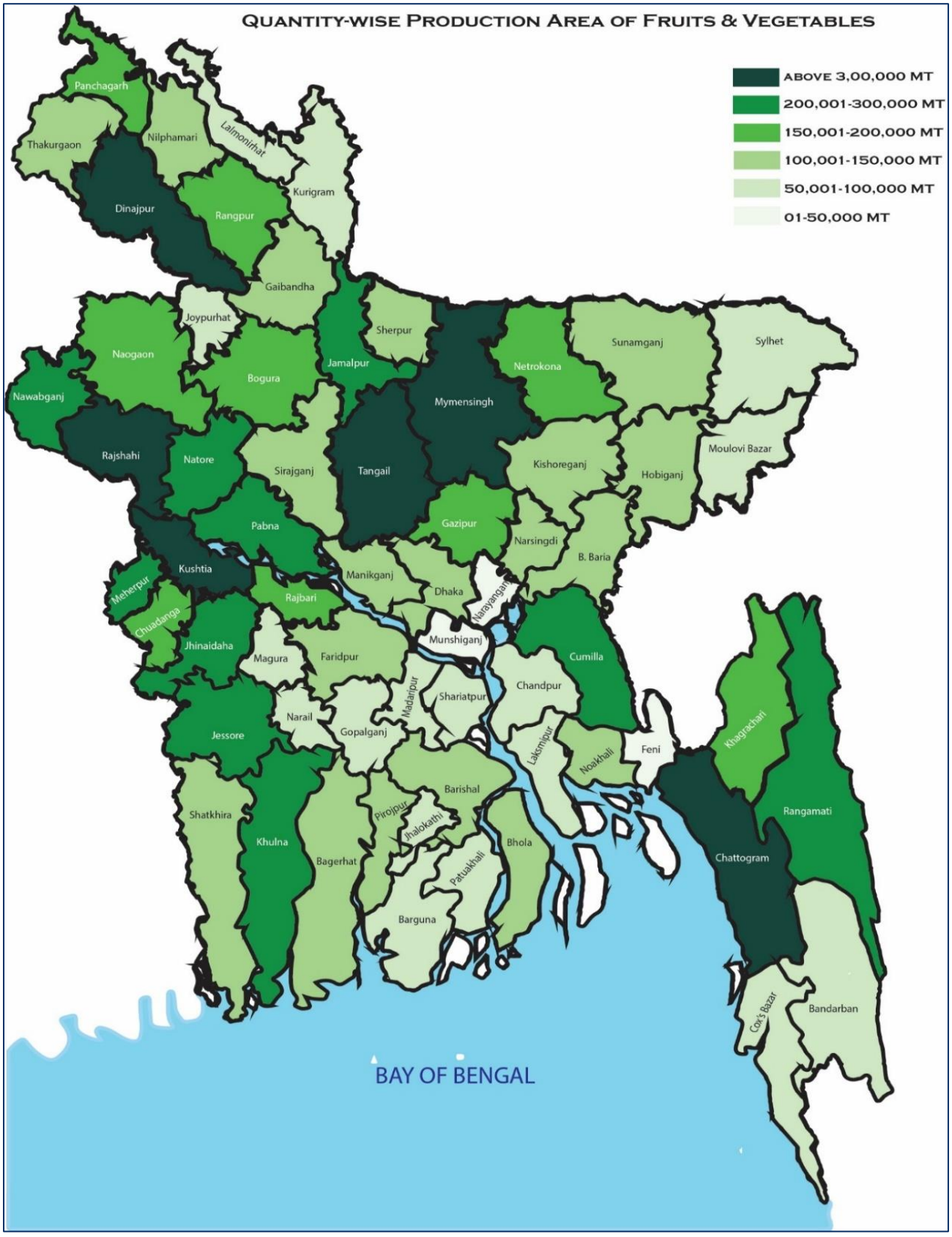
Source: Agriculture Statistical Yearbook, 2020-21, BBS

Figure 13: Vegetable Production Area



Source: Agriculture Statistical Yearbook, 2020-21, BBS

Figure 14: Fruits+ Vegetable Production Area



Source: Agriculture Statistical Yearbook, 2020-21, BBS

3.5.1.8 Supply Chain

Supply chain is the process of planning, implementing and controlling the operations of the supply chain as efficiently and effectively as possible from point-of-production to point-of-consumption. Supply chain development is a market-oriented approach.

Supply chain analysis is precondition for preparation of activity schedule for specific intervention area. All activities of a particular chain are directed towards the market. If farms/enterprises cannot satisfy the needs (or requirements, preferences, desires) of their buyers, the buyers will sooner or later turn to another reliable supplier. It is, therefore important to understand that all stakeholders along a particular supply chain/value chain need to cooperate and coordinate their activities to satisfy the needs of the end consumer.

Majority of the horticulture products specially fruits and vegetables are produced by marginal farmers/growers in Bangladesh and due to poor and shattered supply chain, only a small percentage of farmers reach in the urban market (Minten et al., 2010).

The Fruits and Vegetable Market in Bangladesh are handled by various market players at each layers performing major activities. These group of people are called market intermediaries. Market intermediaries are individuals, groups of people, or firms who assist in the flow of goods and services from producer to end-users2. These bodies act in transacting the products from the producers until the time it gets purchased by the ultimate consumer3.

A market intermediary is a nod in the supply chain that connects the producers with the end-users. In Bangladeshi fruit and vegetable markets, we usually see five types of intermediaries who are known as bepari, baria, aratdar, wholesaler, and retailer (Islam et al., 2017).

Appropriate marketing and transportation infrastructure are very important for marketing of fruits and vegetable in the market. Adequate transportation and product handling are also important for the trade of agricultural products and important factors in assuring good prices and poverty alleviation (Khandaker et al. 2009).

Beparies are the licensed traders who can buy from anywhere in the country but can only sell in the area specified on their license. They usually deal with multiple products. Beparies buy products in a bulk amount from the farmers/growers and sell them through aratdar or farias.

Farias are non-licensed traders usually operated in local markets. Sometimes they act as a middleman between farmer/growers and beparies and wholesalers/retailer/end-user.

Aratdars usually have a warehouse in the market where beparies keep their stock for a fixed period and the products are sold through them. They get a commission from the beparis according to their contracts. Sometimes aratdars also buy fruits and vegetables from beparis sell to other beparis, wholesalers etc of different districts.

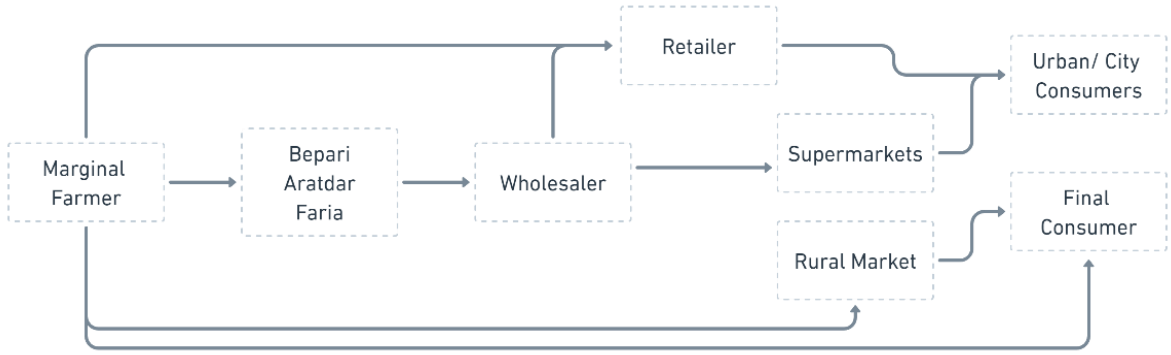
[2] Source: Monash University website
[3] MBAskool Online platform.

Wholesalers are traders who buy from beparies in bulk and resale them in the market. They sell their products to both retailers and end-users at a minimum profit margin.

Retailers are the last link in the supply chain, they directly reach the products to end-users. They can be a small unit in the market or a supper shop chain who buy the products from the wholesalers and sell them in the smallest units[4].

The supply chain of agricultural good are more complex than what we think. The complexity comes when multiple players are engaging behind one single product and creating small values which in the end becomes a large value addition. Due to unavoidable circumstances eliminating any player from the chain is very difficult as they have created a strong consortium among themselves which is difficult to break or disrupt.

Figure 15: Supply Chain Model in Bangladesh (Complex)

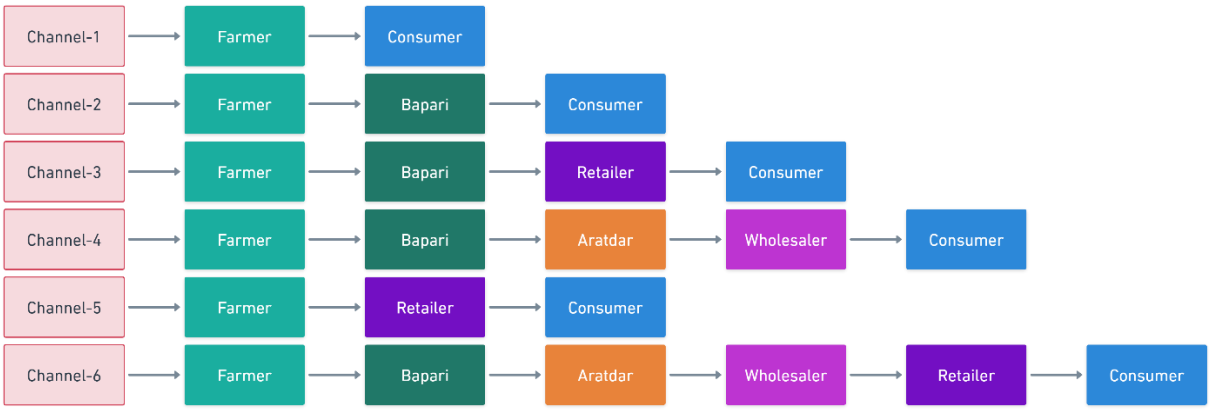


Source: Primary research by the consultant

While we break this complex Supply chains into simple channels, we found that there are six different channels in this complex environment.

Different channels are:

Figure 16: Supply Chain Model in Bangladesh (simplified)



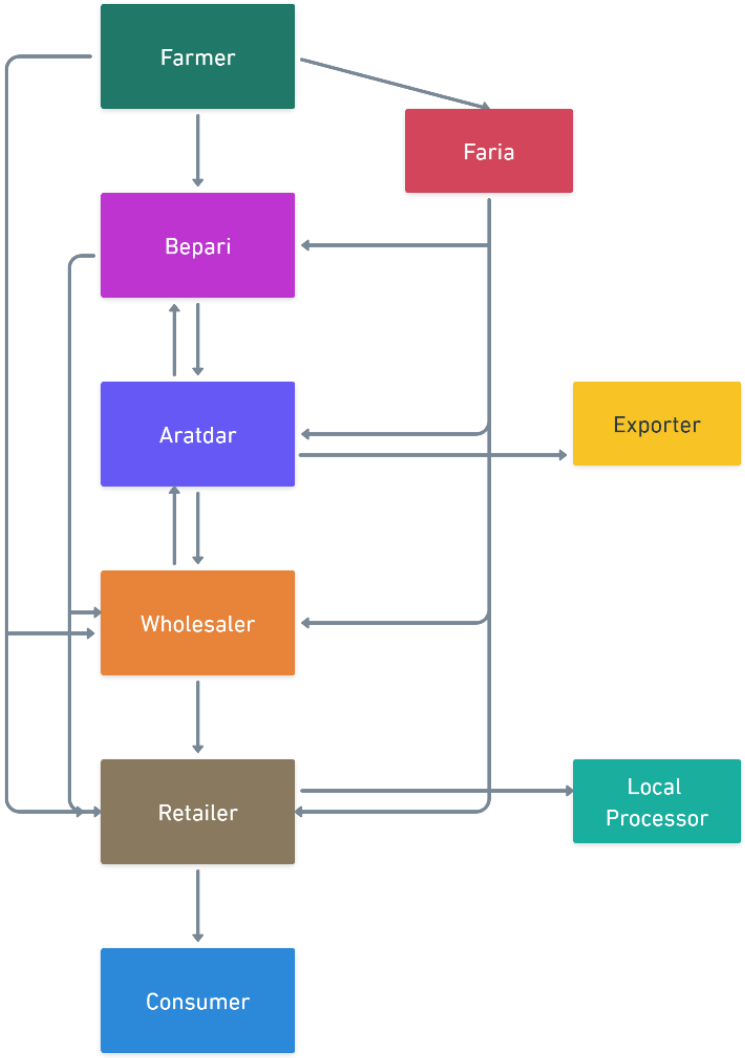
Source: Primary research by the consultant

[4] Definitions are gathered from different literatures like, (quasem, 1979; Islam et al., 2001, MBAskool Online platform etc.) by author.

Among the different channels, channel-6 which is the longest but majority of the products are passes through this channel.

3.5.1.9 Supply Chain of jackfruit:

Figure 17: Supply Chain (Jackfruit)



Source: Primary research by the consultant

As mentioned, in Bangladesh, agriculture supply chain is dominated by intermediaries. As most of the farmers and growers are marginal / small in size, most of the time it becomes difficult for them to reach to the terminal /urban centric markets. For this reason, products usually go through via the hands of beparis, aratdars, wholesalers and retailers.

The present marketing channel of the jackfruit market in Bangladesh is quite complex. The farmers/growers usually sell their products to beparis. Almost 88% of the products are sold through beparis. Sometimes farmer/growers sell their products directly to farias,

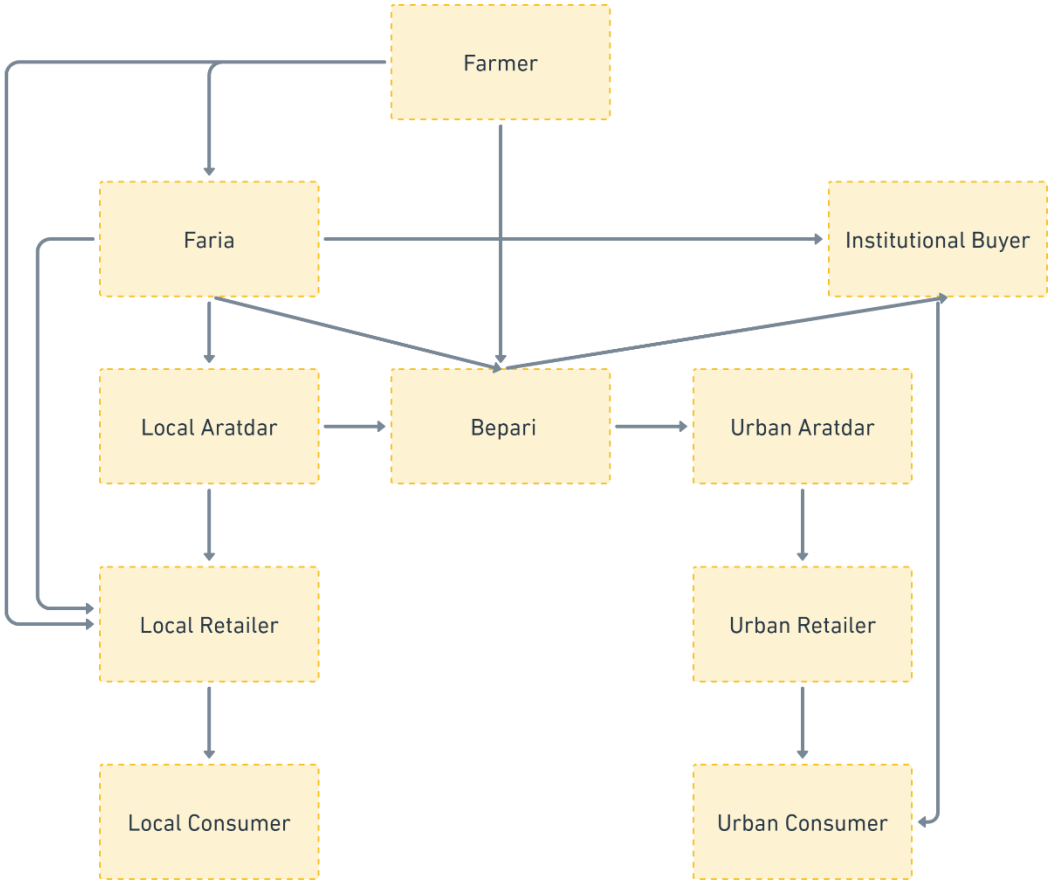
wholesalers, or retailers. Some small farmers also sell their jackfruits by themselves in the market to consumers.

Beparis sell their major number of products through aratdars or directly to wholesalers and retailers. Aratdars in exchange for commission deliver products to wholesalers and retailers. Sometime Aratdars also sell jackfruits to other beperis as well.

Wholesalers usually sell their products to retailers. Large wholesalers also sell their products to beparis of different districts. Finally, through the retailer's jackfruit reaches consumers' hands. In short below is the major supply chain of jackfruit in Bangladesh.

3.5.1.10 Supply Chain of Mango

Figure 18: Supply Chain (Mango)



Source: Primary research by the consultant

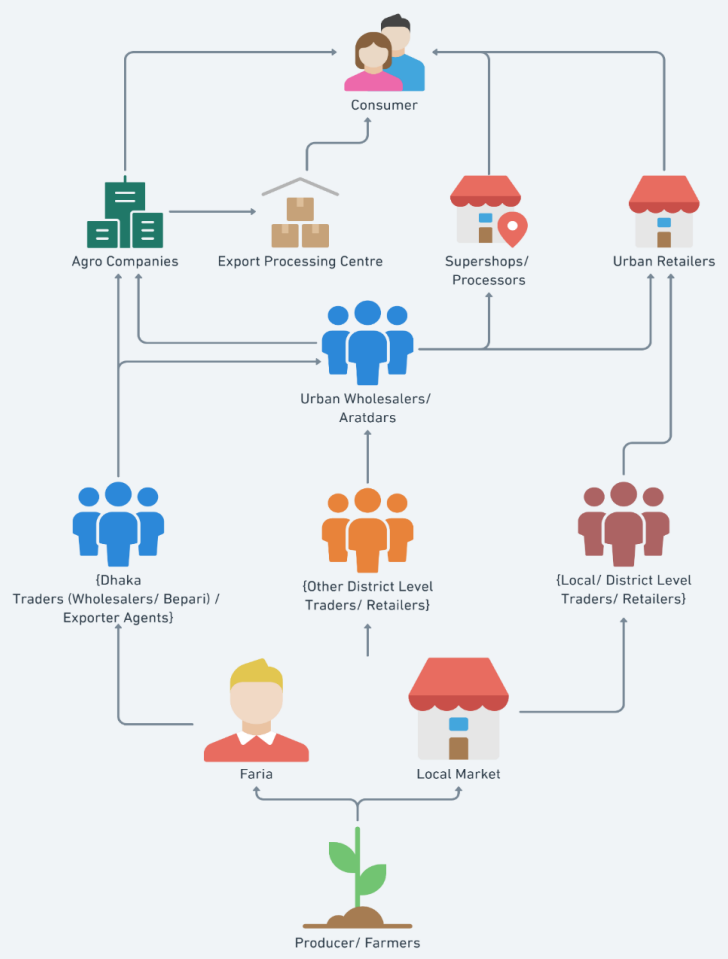
Traders involved in the mango supply chain in Bangladesh from smaller scale to larger scale are intermediaries (faria, bepari and arathdar), wholesalers (local, divisional and regional) and retailers (local and urban). In Bangladesh, the major channel (85%) used for mangoes is: agricultural producer/advance buyer → bepari → urban arathdar → urban Retailer → urban consumer. Though in some areas, the major supply channel was Grower to customer (D2C).

3.5.1.11 Supply Chain of Brinjal:

In different district, farmers bring their brinjal to the faria/local hat/bazar where a large number of paiker/traders/exporters agents procure them for Dhaka city markets and supply to consumers. Along with this traditional concept, farmers in a group often carry these vegetables to Dhaka wholesale market and other city markets. About 90% of the vegetables from different district are distributed to Dhaka City, 5% of the same are destined to other districts. 5% of the vegetables are consumed at local market through local traders.

Outside districts, the primary destinations of the vegetables are the wholesale market of Dhaka city and the different marketing companies, super stores, processors and exporters. The retailers collected vegetables mostly from the Dhaka whole sale markets. Marketing companies and super stores are also collected brinjal from City traders/suppliers who other way around collected vegetables from different districts through traders.

Figure 19: Supply Chain (Brinjal)

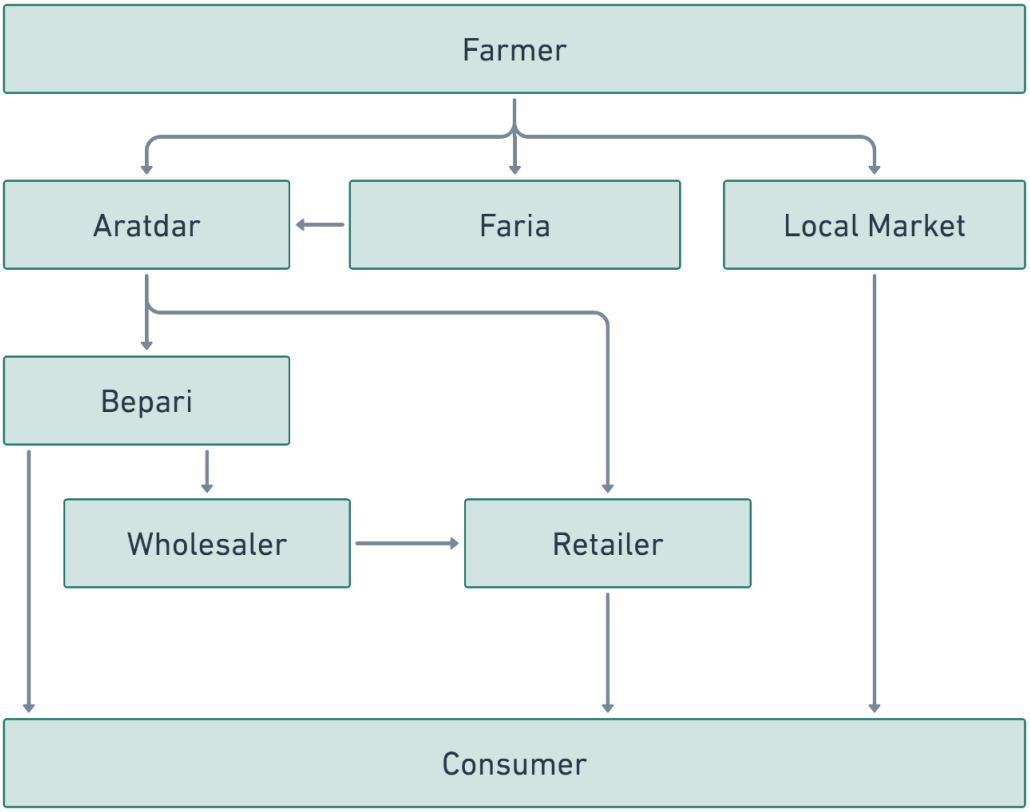


Source: Primary research by the consultant

3.5.1.12 Supply Chain of Pumpkin:

From the study it has been revealed that after farmers use 10-15 percent of pumpkin for family consumption and rest 80-90 percent for selling to local market. In terms of post-harvest, almost every farmer clean and grade their pumpkin according to size (big, medium and small) after harvest. The process is mostly done by family labor. Almost 100 percent farmers stated that they don't need to store pumpkin as it is not perishable like other vegetables. Without support they can store pumpkin for at least 3-5 months at home. In terms of processing, there is 0% processing in pumpkin market.

Figure 20: Supply Chain (Pumpkin)



Source: Primary research by the consultant

In peak season the traders/middle man come to the community and buy the pumpkins from the farmers intermittently and in smaller amount. Transport through vans.

Whereas in off peak season the regarding the wholesale business, men come to the community (either in the "village market center" or separately) and buy pumpkins in bulk amount. The buyers pay the transport cost and the mode of transport is truck.

3.5.1.13 Introduction:

Though, as per the agreement and proposal, fish was not subject to this feasibility study, as per direction from the honorable Minister of Posts and Telecommunications of Bangladesh, the consultant team has included the data related to fisheries in the study.

Transporting fish can be challenging due to the product's perishable nature, as fish are susceptible to temperature changes and require careful handling to maintain their freshness and quality. Here are some of the difficulties that can arise during fish transportation:

- Fish must be kept at a consistent temperature throughout transportation to prevent spoilage and maintain quality. Even small temperature fluctuations can cause fish to spoil quickly, so it is essential to have proper refrigeration or cold storage facilities in place.
- Fish are delicate and require careful handling to prevent physical damage or bruising. For example, rough handling or stacking fish too tightly can cause the fish to become damaged and spoil more quickly.
- Proper packaging is essential to prevent damage and contamination during transportation. Fish should be packed in airtight, waterproof packaging designed to keep the fish cold and fresh.
- The longer the transportation time, the greater the risk of spoilage. Therefore, it is crucial to minimize the transportation time as much as possible and ensure that the fish are transported in the fastest and most direct route.
- Transporting fish often requires compliance with various regulations, such as health and safety standards, regulations, and procedures by **BSTI and Bangladesh Food Safety Authority**. Failure to comply with these regulations can result in delays, fines, and other legal issues.

3.5.1.14 FISH CARRIER /TRANSPORT VAN Code of Conduct:

Department of Fisheries of Government of Bangladesh has specific code of conduct to carry fish products, they are:

9. SHRIMP OR FISH CARRIER /TRANSPORT VAN

9.1 DESIGN AND CONSTRUCTION

9.1.1 For transportation of iced products, insulated van and for frozen products refrigerated van shall be used

9.1.2 Fresh and chilled fish products must be kept at melting ice temperature or at or below 5°C.Frozen products (at its core) at or below minus (-) 18°C, a temperature fluctuation of only 2 degree shall be allowed.

9.1.3 Fish transport van or vehicle must be suitably constructed and equipped to maintain a constant low temperature throughout the period of transport.

9.1.4 The transport vehicle should be designed and constructed to minimize sharp inside corners and projections in order to avoid dirt traps.

9.1.5 The inside surfaces of the fish hold must be smooth and should be made of materials that are non-absorbent, non-corrodible and can be easily cleansed and sanitized.

9.1.6 Fish should never be transported exposed to the sun.

9.2 REGISTRATION WITH AND LICENSE FROM AN APPROPRIATE ORGANIZATION

9.2.1 The transport vehicle must be registered with and licensed by the Department of Fisheries or any GoB authorized organization.

9.2.2 The refrigerated or insulated motor vehicle shall be registered with Bangladesh Road Transport Authority (BRTA) and must have fitness certificate.

9.2.3 Licenseto the transport vehicle must only be issued, or renewed provided the vehicles complies applicable regulations on food safety and hygiene standards.

9.2.4 Consignment of shrimps must be accompanied by valid animal health and veterinary certificates issued by the Competent Authority.

9.3 LABOUR LAW

9.3.1 The transport vehicle operators will comply with the National Labour Law and shall not use child labour.

9.4 WORKERS' HEALTH AND HYGIENE ISSUES

9.4.1 **Medical fitness:** All workers handling fish or shrimp during transportation must have a valid and current medical certificate that they are physically fit to handle fish.

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9.4.2 **Restrictions related to worker's health:** A person with a contagious disease and any open wounds on hands or limbs should not be permitted to handle fish during transportation.

9.4.3 **Dress:** Workers should wear neat and clean dress while handling fish during transportation.

9.4.4 Workers should not wear jewelry while handling fish during transportation and hair should be covered.

9.4.5 Training: (i) The transport operators must be trained in food hygiene and sanitation matters related with their work and (ii) Personal cleanliness and hygiene.

9.5 FOOD QUALITY AND SAFETY

9.5.1 Keep fish transport vehicles, vessels and containers, boxes and other implements clean and in good repairs and hygienic condition all the time; fish must be transported in such a way as not adversely to affect food safety or their viability

9.5.2 Shrimp exported to be sold as fresh or cooked shrimp must remain compliant at all times during transport with relevant quality (e.g. freshness) standards applicable in the country of exportation

9.5.3 All precautions must be taken so that the shrimp will remain safe for human consumption at all stages.

9.5.4 **Routine cleaning and sanitization at the end of day's operation:**

- At the end of day's operation, brush all parts of the fish carrier vehicle or vessel, fish handling implements, fish boxes, etc. with food grade detergent, thoroughly wash with potable water
- Disinfect all parts with sanitizing agents
  - Shelves, shovels, boxes, etc.: 100-200 ppm chlorine or 200 ppm quat sanitizer (quaternary ammonium)
  - Interior part of the fish hold that does not come in contact with fish: Sanitizer concentration could be doubled
- After cleaning and sanitizing, completely dry all parts.
- No body with any contagious disease or wounds in hands should be allowed to handle fish.
- Parking place of shrimp or fish carrier van must be clean and well maintained.

9.5.5 **Transportation of non-fish items:**

- Where transport carrier vehicle or vessel and/or containers have been used for transporting anything other than fish, there is to be effective cleaning and disinfecting between loads to avoid the risk of cross contamination.

9.6 TRACEABILITY

[Traceability is a system by which shrimp (or any other food products) and any inputs that may have been incorporated into the shrimp can be traced from its origin to the consumer level. In order to accomplish this, all links in the supply chain must keep sufficiently detailed records, as summarised below.]

9.6.1 The transport operator must obtain the following information from the supplier:

- Name and address of the fish/shrimp depot/landing center/supplier
- Licence number of the fish/shrimp depot/landing center/supplier.
- Shrimp/fish iced or frozen
- Date and time of receiving the shrimp/fish
- Full traceability particulars of the shrimp or fish

9.6.2 The transport operator, on the other hand, must provide to the next buyer of the fish the above and the following information:

- Name and address of the vehicle operator
- Registration (BRTA) and licence (Fish Inspection & Quality Control) numbers.
- Care provided to the fish
- Date and quantities of fish or shrimp by species delivered to the buyer
- Name and address of the buyer

9.6.3 Transport operator shall maintain records on:

- Any relevant reports on checks carried out on fish or shrimp (For instance, checks on fish or shrimp temperature, shrimp adulteration, etc.)

9.7 BIOSECURITY

9.7.1 Shrimp/fish carrier transport owners are to ensure that shrimp/fish are protected against contamination

9.7.2 Shrimp/fish carrier transport vans/vessels, includingequipment, containers and crates used therein, shall be kept clean anddisinfected

9.7.3 Take account the results of any relevant analyses carried out on samples taken from shrimp/fish or other samples that have importance to food safety

9.7.4 Take appropriate corrective actions when informed of problems identified during official controls

Overall, transporting fish can be challenging and requires careful planning, preparation, and execution to ensure they arrive at their destination fresh and in good condition. Transportation companies specializing in fish transportation often have specialized expertise and equipment to handle these challenges and ensure that the fish are transported safely and efficiently.

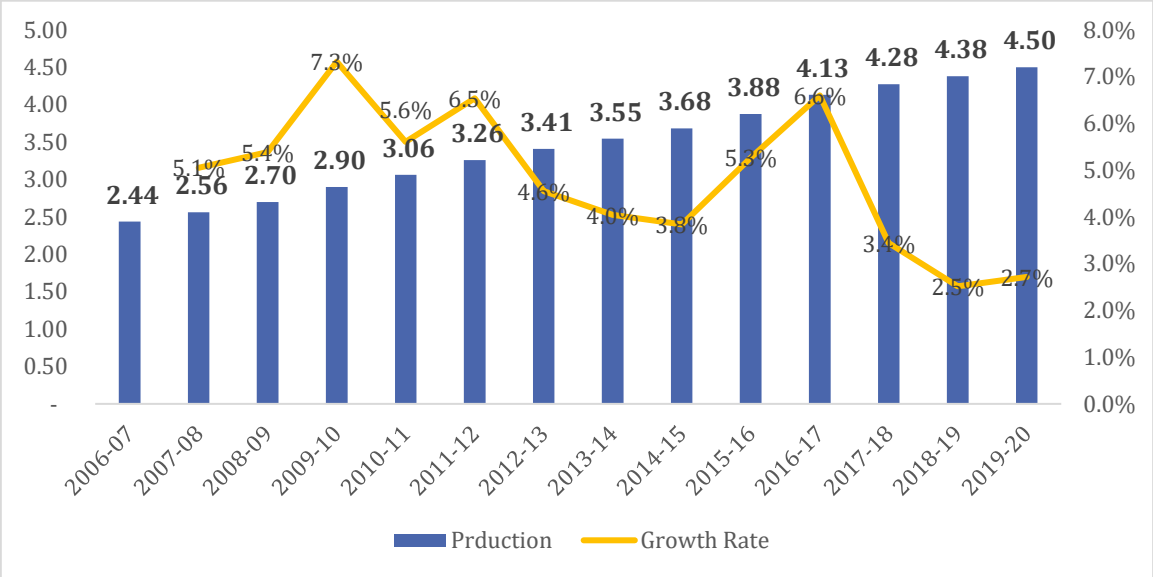
For Bangladesh post, arranging or managing these facilities will be pretty tricky, and it is perilous without proper piloting or proof of concept work.

Thus, instead of carrying live or fresh fish, Bangladesh post can focus on frozen fish, which is less temperature and time-sensitive. Again, the demand for frozen fish is not very significant in Bangladesh. Fish production is a significant economic activity in Bangladesh, and the country is one of the largest producers of fish in the world. The country's geographic location, fertile land, and abundant water resources have contributed to the growth of the fishing industry.

3.5.1.15 Baseline Information:

The consultant still included the basic information for Bangladesh Post to understand the nature of the Market.

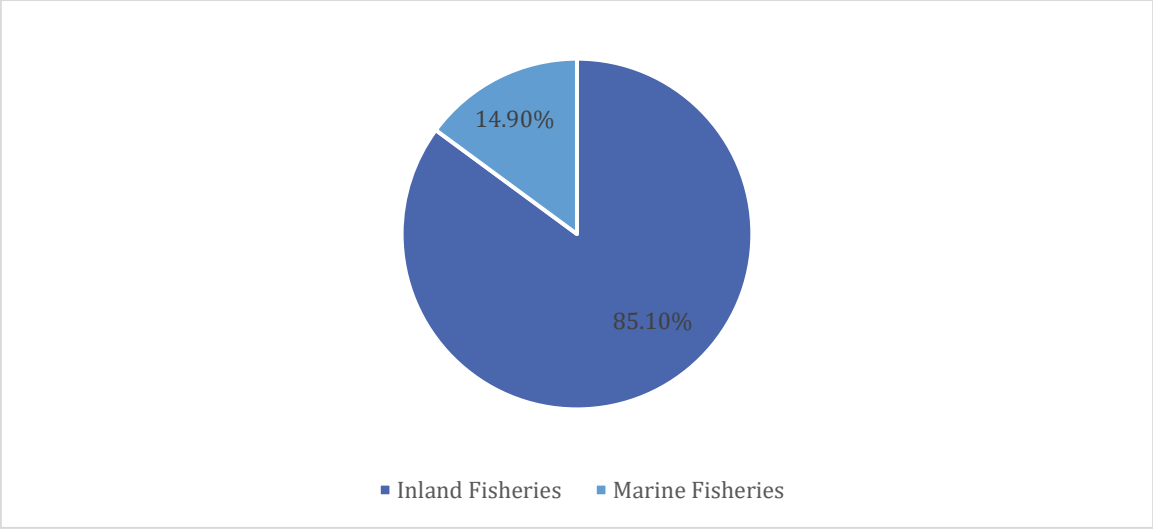
Figure 21: Fish production in Bangladesh (Inland+Marine) (value in Million MT)



Source: Agriculture Statistical Year book (2012-2020), Bangladesh Bureau of Statistics.

According to the Bangladesh Bureau of Statistics (BBS), Bangladesh produced 4.50 million tonnes of fish in 2019-20, which accounted for approximately 2% of global fish production. In recent years, the production of fish in Bangladesh has been growing at an average rate of around 4.8% per year, which is higher than the global average growth rate for fish production.

Figure 22: Share of Inland and Marine fish prodcution in Bangladesh, Year 2019-20



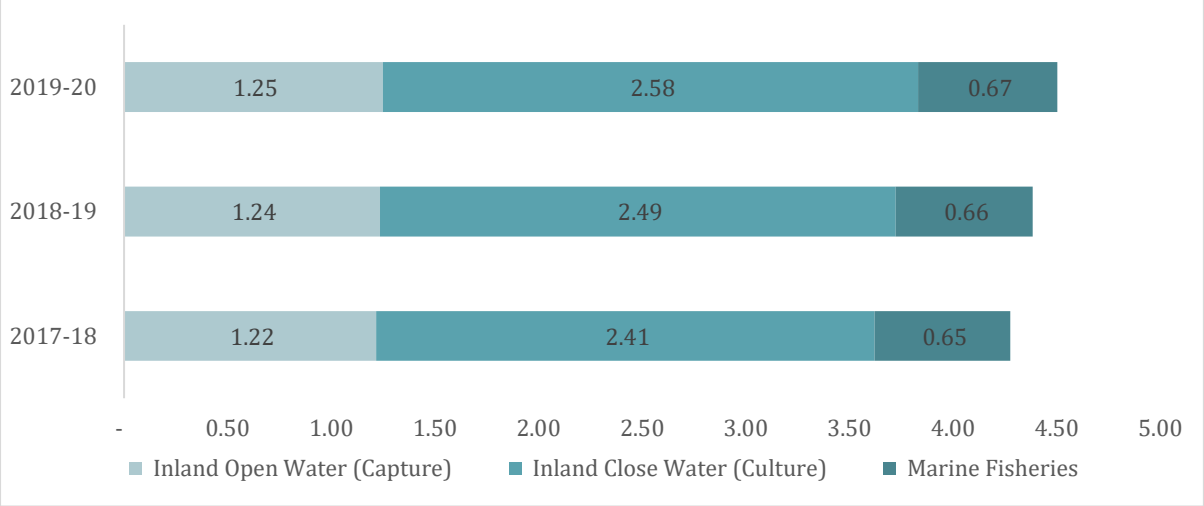
Source: Agriculture Statistical Year book (2012-2020), Bangladesh Bureau of Statistics.

The fish production in Bangladesh is dominated by inland fish, which account for 85.1% of total production. The most common species of inland fish produced in Bangladesh are carp,

catfish, tilapia, and shrimps. In addition to inland fish, marine fish are also produced (14.9%) in the country, but their production is relatively small compared to inland fish.

In Bangladesh Fish production is categorized in three sections, Inland open water/ capture fish, Inland Closed water/ culture fish and Marine Fish.

Figure 23: Source-wise Fish production in Bangladesh (Values in Million MT)



Source: Agriculture Statistical Year book (2012-2020), Bangladesh Bureau of Statistics.

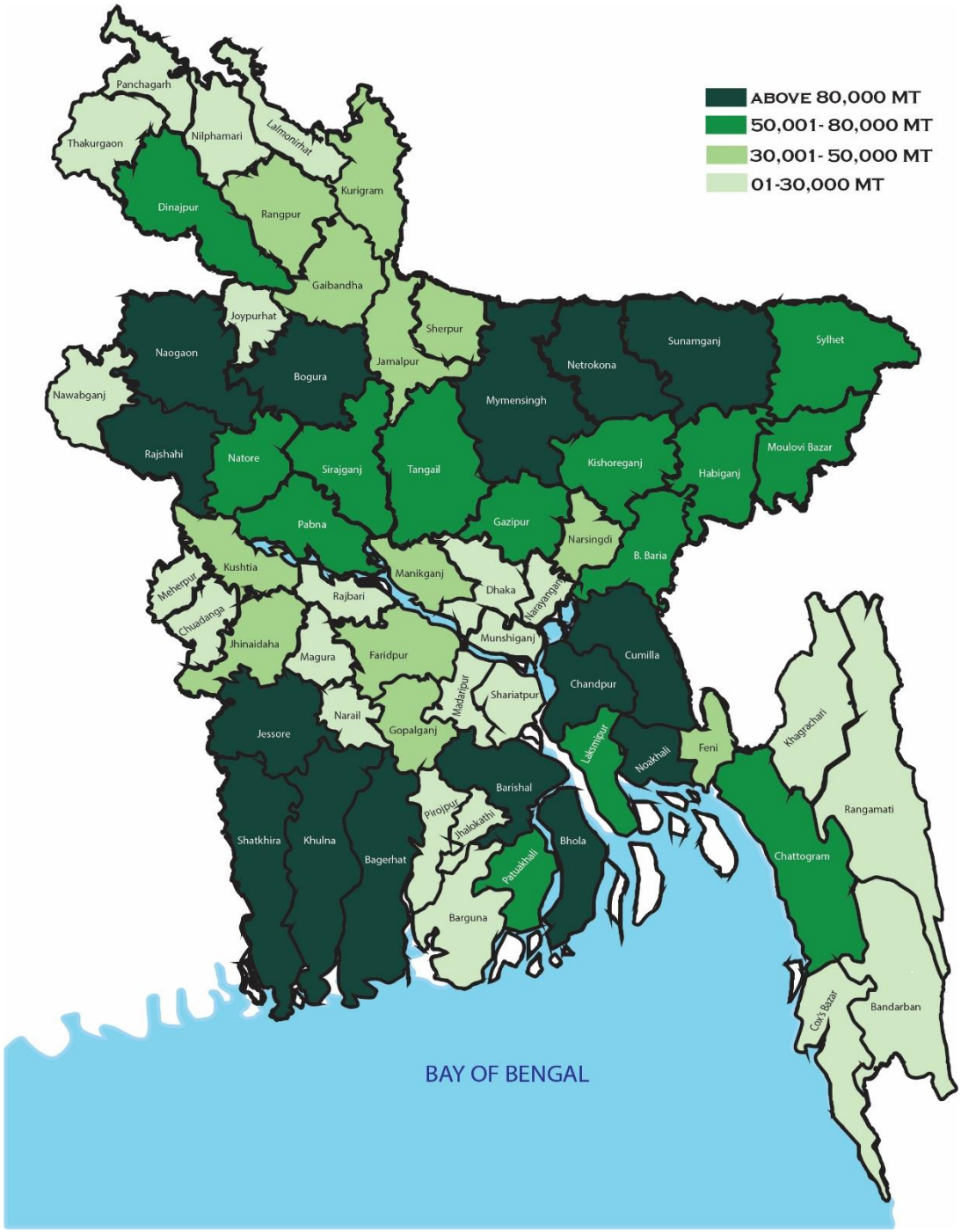
The fishing industry in Bangladesh is an important source of employment and income for millions of people, especially those living in rural areas. It is estimated that around 18 million people are directly or indirectly involved in the fishing industry in Bangladesh. The country also exports a significant number of fish, with frozen shrimp being the major export item.

(A) AREA WISE FISH PRODUCTION (INLAND):

Khulna and Chattogram are the highest fish-producing divisions in Bangladesh. Each division supplies 19% of the total fish produced in Bangladesh. Dhaka, Rajshahi, and Mymenshingh each supply 13% of the inland fish in Bangladesh.

Half of the districts (i.e, 32) supply more than 80% of fish in Bangladesh. Mymensingh, Cumilla, and Jessore supply 9%, 7%, and 6% of the total fish, respectively.

Exhibit 1: Area wise fish production in Bangladesh



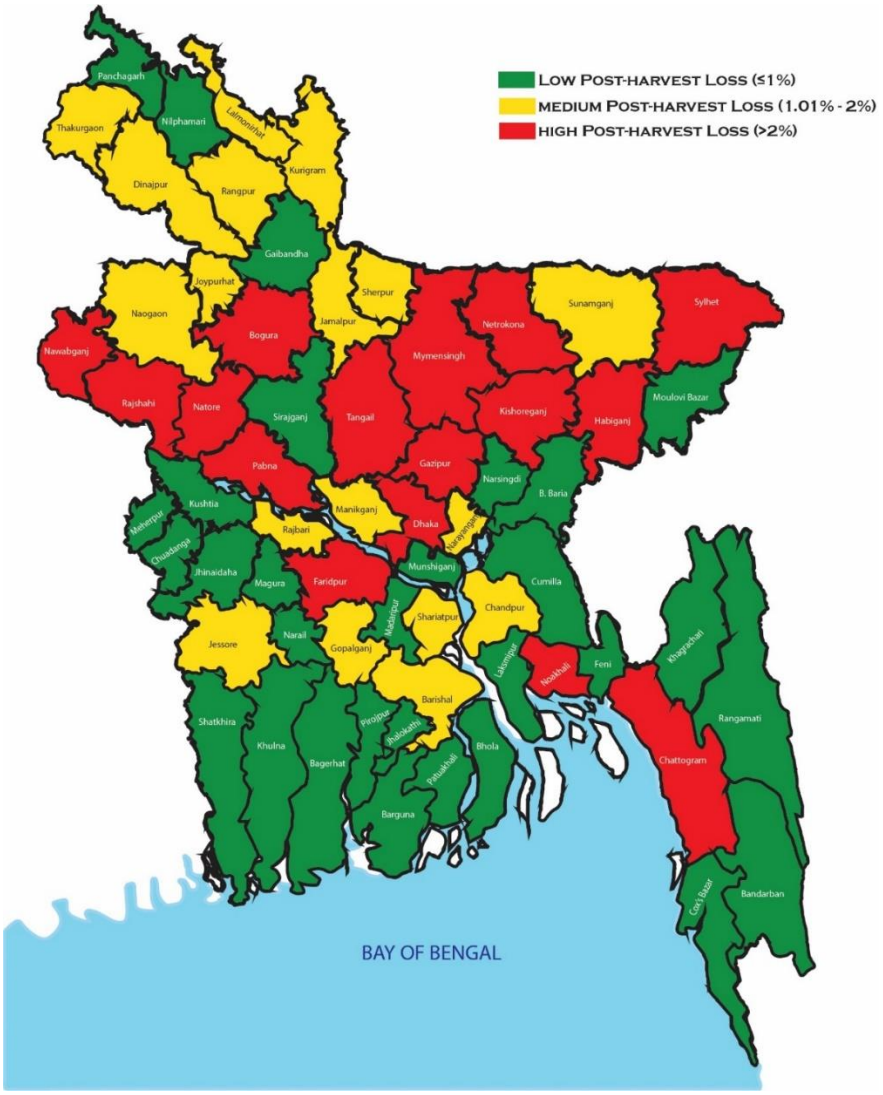
Source: Agriculture Statistical Yearbook, 2020-21, BBS

(B) AREA WISE POSTHARVEST LOSS IN FISHERIES

Every year, the fisheries sub-sector in Bangladesh experiences significant post-harvest loss (PHL) due to neglect and oversights in processing and handling during the supply chain, from harvesting to retail distribution. This results in a substantial economic loss for fishers, fish farmers, and other stakeholders in the supply chain. In light of this, it is crucial to develop policy recommendations for implementing appropriate interventions to decrease PHL in the fisheries sub-sector. According to a study named, "Post-harvest Losses, Supply and Value Chain Analysis of Fisheries Sub-sector in Bangladesh" implemented by Department of

Agricultural Finance & Banking Faculty of Agricultural Economics and Rural Sociology Bangladesh Agricultural University, the fisheries sub-sector of Bangladesh lost about BDT 2940 crore every year in terms of PHL.

Exhibit 2: District wise post-harvest loss (PHL) in Bangladesh



Source: Fisheries Division, Bangladesh Agricultural Research Council (BARC)

Mymensingh, the highest fish-producing district, also bears the highest postharvest loss rate. In contrast, despite Jassor and Cumilla's higher production rate, their postharvest loss is also very low.

(C) SUPPLY CHAIN OF FISHERIES:

In the fisheries sub-sector, it is essential to map out the supply chain as it illustrates the process by which fish are traded from producers to consumers through various intermediaries. Therefore, the initial step of the study was to identify the individuals and groups involved in the fish transaction, from the point of harvesting to the point of consumption.

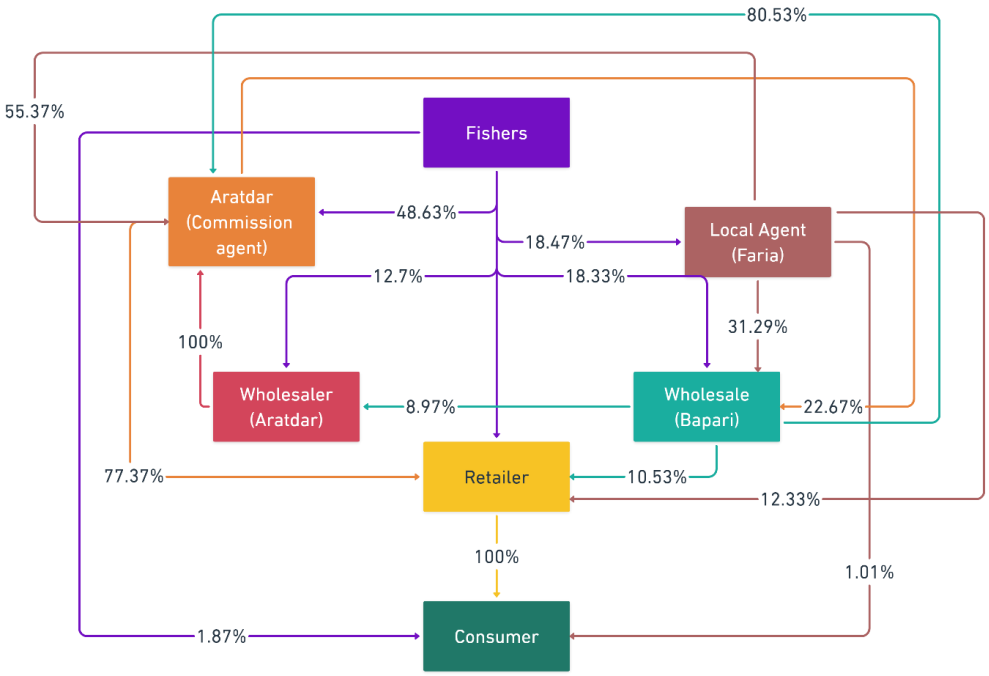
Once this was done, the study created a diagram of the supply chain to determine the volume of fish exchanged among the stakeholders involved in the capture, culture, and

marine fisheries. The focus was on the stakeholders' most significant chain of fish transactions, and the study developed a supply chain network for both inland and marine fisheries. This network was mainly based on the primary distributor of fish transactions. However, the study also evaluated how this distributor was linked to other traders and institutions through backward and forward linkages.

(D) SUPPLY CHAIN MAPPING OF CAPTURE FISHERIES

The marketing system for capture fish in Bangladesh is rapidly changing due to high demand, scarcity of riverine fish, and improved communication methods. However, the lack of a proper marketing system negatively impacts fishers' livelihoods and other individuals involved in fishing and selling fish from the rivers, as they are not receiving fair prices for their products (Amin & Nabi, 2019). In light of this, efforts have been made to analyze the supply chain of captured fish in Bangladesh. The study identified fifteen supply channels through which capture fish flow from fishers to consumers, with ten of these channels shown in Figure 24. These ten channels account for approximately 81% of the total captured fish in Bangladesh.

Figure 24: Supply Chain of Capture Fish



Fisheries Division, Bangladesh Agricultural Research Council (BARC)

(E) SUPPLY CHAIN MAPPING OF CULTURE FISHERIES

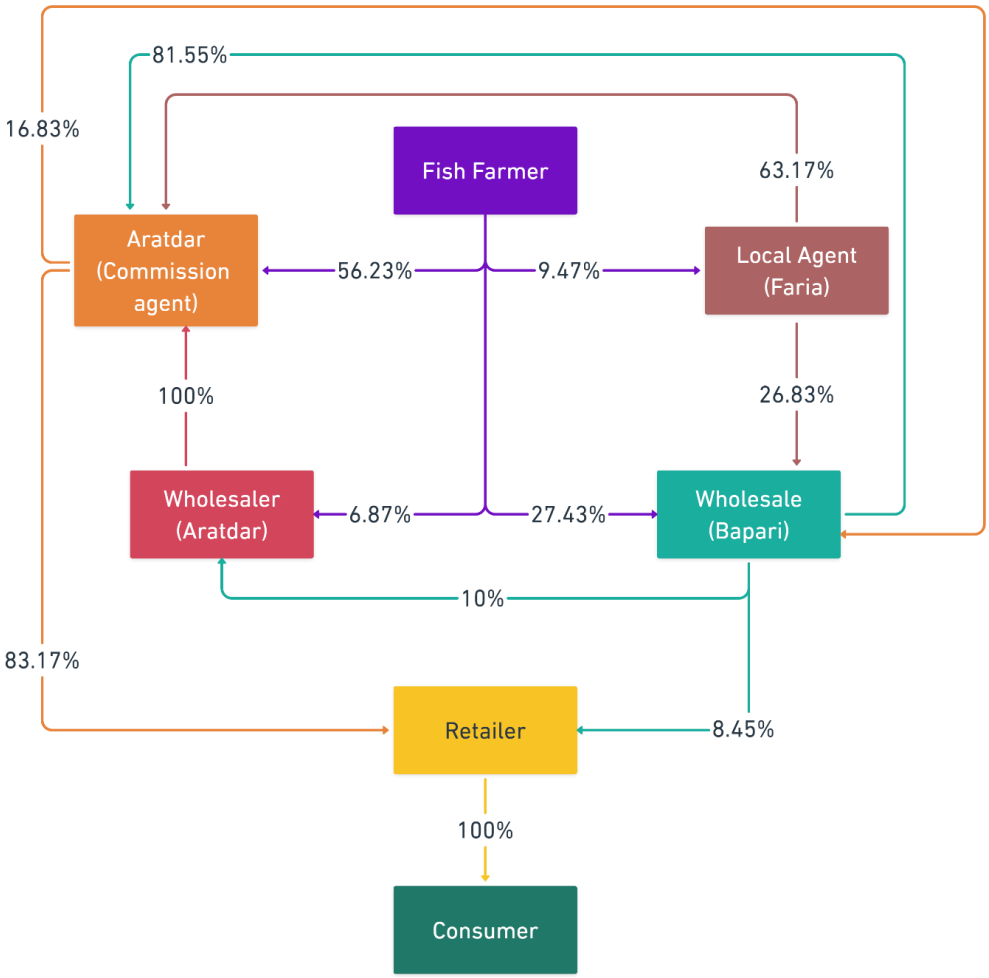
The structure of fish farming supply chains in Bangladesh is rapidly developing, as noted by Hernandez et al. (2018)5. These supply chains can be analyzed regarding the individuals and activities involved in moving culture fish species from producers to consumers. The supply chain actors in Bangladesh's culture fisheries include fish farmers, local agents (faria),

[5] Hernandez, R., Belton, B., Reardon, T., Hu, C., Zhang, X. and Ahmed, A. (2018). The "quiet revolution" in the aquaculture value chain in Bangladesh. Aquaculture, 493, 456-468.

wholesalers (bepari), wholesalers (paikar), wholesalers (aratdar), aratdar (commission agent), retailers, and consumers.

By examining the actions of these actors, a binary is created which provides a dual perspective of the supply chain. We have identified 12 channels through which producers supply fish to consumers, with 82% of culture fishes distributed through seven of these channels. Figure 25 illustrates the interlinking of these different actors throughout the supply chain process.

Figure 25: Supply Chain of Cultural Fish



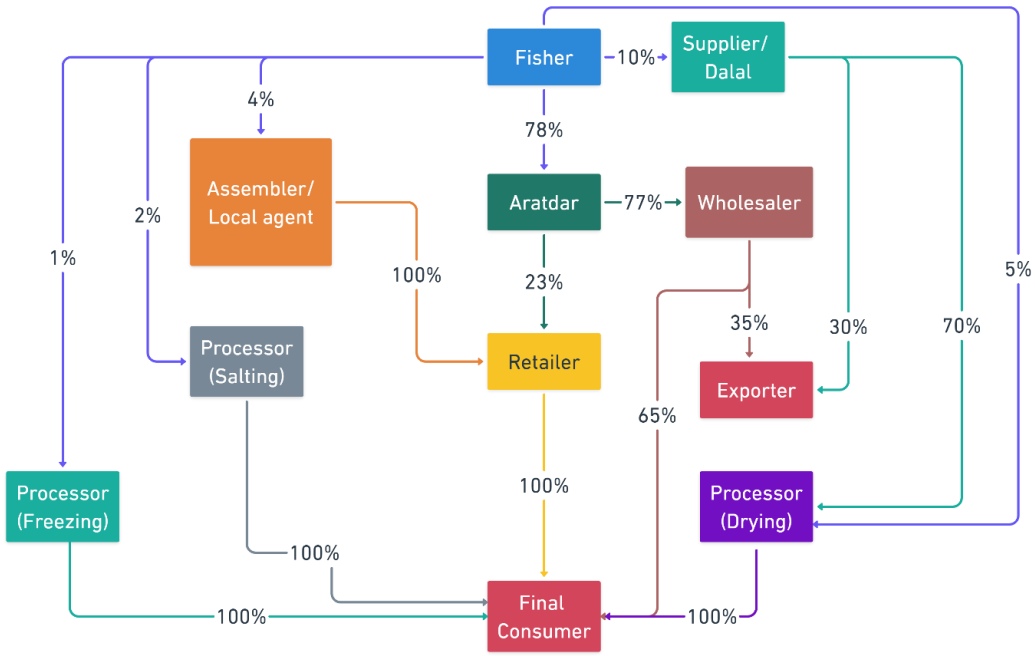
Fisheries Division, Bangladesh Agricultural Research Council (BARC)

(F) SUPPLY CHAIN MAPPING OF MARINE FISHERIES (ARTISANAL)

Artisanal is a kind of subsistence fishing that provides food directly to the concerned family or community (Akhtar et al., 2017)[6]. It requires minimum capital and simple technology or traditional techniques prevailing from generation to generation. The supply chain mapping and networking of artisanal marine fisheries are presented in Figure 26. Artisanal marine fisheries maintain both backward and forward linkage.

[6] Akhtar, A., Bhuiyan, M.A., Mia, M.M., Islam, M.S., and Bhuyan, M.S. (2017). Fishermen in and Around Chittagong Coastal area of Bangladesh. Social Change, 7(1): 97-113.

Figure 26: Supply chain of Marine fish (artisanal marine fisheries)

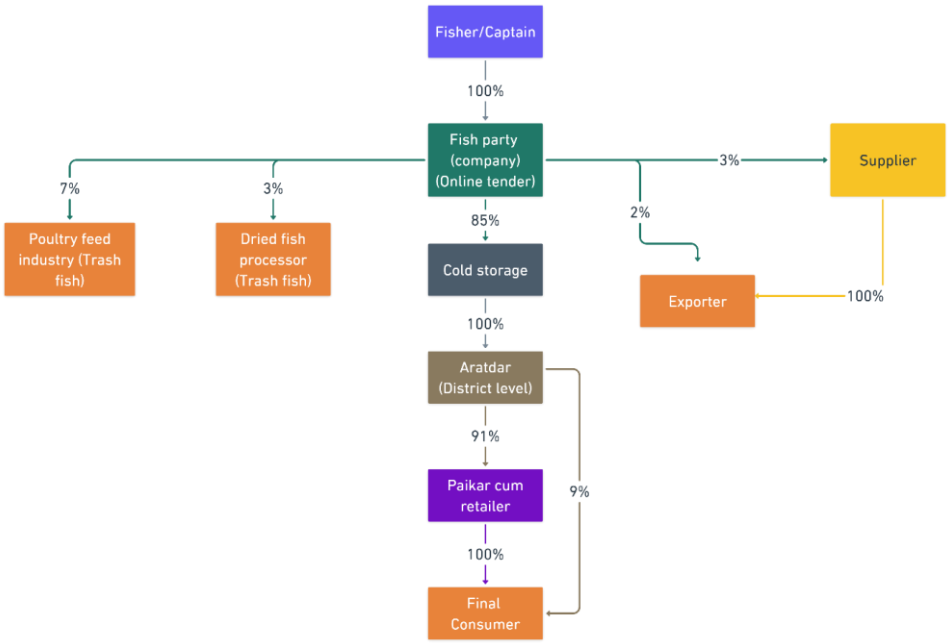


Fisheries Division, Bangladesh Agricultural Research Council (BARC)

(G) SUPPLY CHAIN MAPPING OF MARINE FISHERIES (INDUSTRIAL)

The industrial marine fisheries in Bangladesh have enormous potential, and its supply chain network is essential because it includes many essential middlemen. In order to build backward and forward supply chain linkage/networks, the participants in this sector used a variety of methods, including contracts, managed (relations), and not managed, as shown in Figure 27.

Figure 27: Supply Chain of industrial marine fisheries

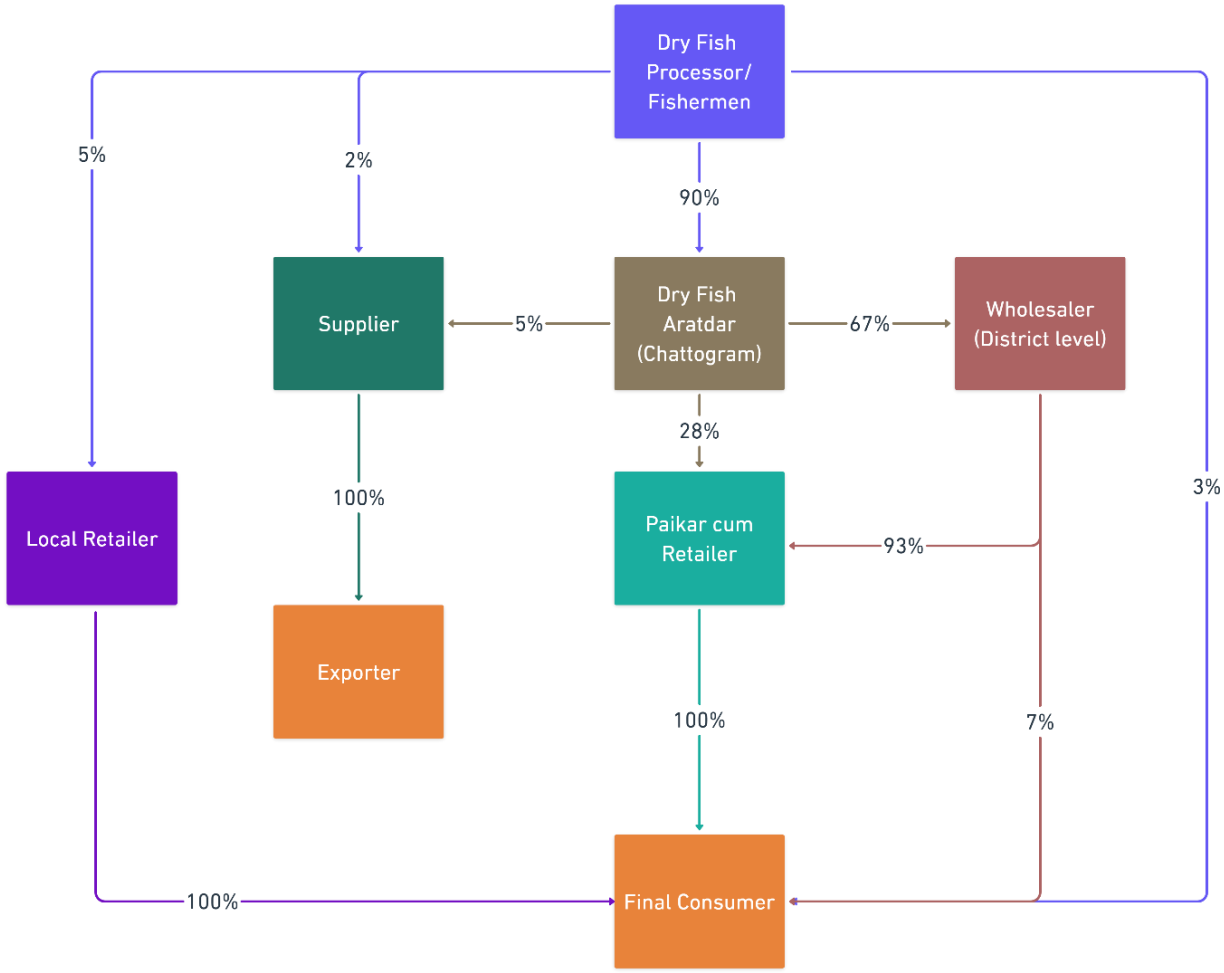


Fisheries Division, Bangladesh Agricultural Research Council (BARC)

(H) SUPPLY CHAIN MAPPING OF DRIED FISH

The entire coastline of Bangladesh is covered in marine fish drying operations, and both domestic and international markets are interested in these dried fish products (Hossain & Masud, 2012). The supply chain for dried fish includes a number of players connected in a variety of ways, including contracts, manage relationships, and not manage relationships through backward and forward linkages. Figure 30 shows the mapping and networking of the dried fish supply chain in Bangladesh, which consists of the seven main supply routes described in the dried fish marketing system.

Figure 28: supply chain of Marine dry fish processor



Fisheries Division, Bangladesh Agricultural Research Council (BARC)

Livestock:

3.5.1.16 Introduction:

Similar to Fish, Transportation of fresh meat I also very difficult. The challenges in transportation of fresh meat are:

- Fresh meat requires specific temperature conditions during transportation to maintain quality and prevent spoilage. Any fluctuations in temperature during transportation can result in bacteria growth, causing the meat to spoil and, thus, can be unsafe for consumption.
- Fresh meat must be transported under strict hygiene conditions to prevent contamination, which can result in foodborne illnesses. Hygiene measures such as wearing gloves, sanitizing the transport vehicle, and using suitable packaging can help maintain fresh meat quality during transportation.
- Fresh meat is delicate and requires careful handling and packaging to avoid damage, punctures, or exposure to contaminants. Special packaging, such as vacuum-sealed bags and insulated containers, can help preserve the meat's freshness and quality during transportation.
- Fresh meat has a limited shelf life, and transportation must be done within a specific time, less than 2 hours, to ensure it remains fresh and safe for consumption. This may involve coordinating the delivery logistics, including transportation time, distance, and delivery schedules
- Fresh meat transportation is subject to strict regulatory compliance requirements, including food safety regulations, transport and logistics regulations, and environmental regulations by Bangladesh Standards and Testing Institution (BSTI) and Bangladesh Food Safety Authority. Therefore, Bangladesh post must comply with these regulations to ensure the safe and legal transportation of fresh meat.

Fresh meat transportation guideline of Bangladesh Food Safety Authority Ministry of Food, Govt. of Bangladesh.

12. TRANSPORTATION

171. The guidelines presented in this section are supplemental to the objectives and guidelines in Section VIII of the *General Principles of Food Hygiene* (CAC/RCP 1-1969).

172. Due to the potential for growth of pathogenic and spoilage micro-organisms under conditions of inadequate temperature control, meat should be transported at temperatures that achieve safety and suitability objectives. Equipment for continuous monitoring and recording of temperatures should accompany transport vehicles and bulk containers wherever appropriate. Additionally, the conditions of transport should provide adequate protection from exogenous contamination and damage, and should minimise growth of pathogenic and spoilage micro-organisms.

173. If meat is inadvertently exposed to adverse temperature conditions or sources of contamination that may affect safety and suitability, an inspection should be carried out by a competent person before further transport or distribution is allowed.

Source: CAC/RCP 58-2005

On the other hand, carrying frozen meat is easier and have some advantages over carrying fresh meat, they are:

- Frozen meat can last for months when stored properly, whereas fresh meat has a much shorter shelf life and must be consumed or sold within a few days.
- Frozen meat is less likely to spoil during transportation because it is frozen solid, which slows down bacterial growth and enzymatic activity.
- Frozen meat can be transported over longer distances and in larger quantities since it does not require refrigeration during transit. This can reduce transportation costs and allow for more efficient distribution.
- Frozen meat is typically processed and packaged at a centralized facility, which allows for better quality control measures to be implemented. This can help ensure that the meat is free from contaminants and has consistent quality.
- Frozen meat is convenient for consumers since it can be stored in their freezers for extended periods and used as needed. This allows them to stock up on meat when it is on sale or when they have the time to shop, then use it later when needed.

Price of frozen meat is also very then fresh meat, perhaps demand for frozen meat is low, only restaurants and commercial buyers have demand for frozen meat. Before doing any large investment Bangladesh post need to do piloting before do the exact planning. The consultant still included basic information for proper planning.

The livestock sector in Bangladesh plays a significant role in the country's economy, providing livelihoods for many people and contributing to the country's food security. Livestock includes cattle, goats, sheep, pigs, poultry, and other animals.

According to the Bangladesh Bureau of Statistics, the livestock sector contributes about 1.76 % of the country's Gross Domestic Product (GDP)[7] and employs over 20% of the country's population. In addition, the sector is also vital for food security, as it provides a significant portion of the country's animal protein requirements.

The most common types of livestock in Bangladesh are cattle, goats, and poultry. The country is one of the world's largest cow milk producers and has a significant export market for raw hides and skins. The poultry sector is also a major player, with a significant export market for frozen chicken.

The government of Bangladesh has taken various steps to promote the development of the livestock sector. For example, the government provides subsidies for animal feed, veterinary care, and breeding and has also established a range of research and training institutions to improve livestock productivity and quality.

Despite the government's efforts, however, the sector still faces several challenges, including inadequate infrastructure, poor access to credit, and a lack of coordination among different actors in the sector. In addition, climate change and natural disasters also pose significant threats to the sector, as they can cause loss of livestock and damage to infrastructure.

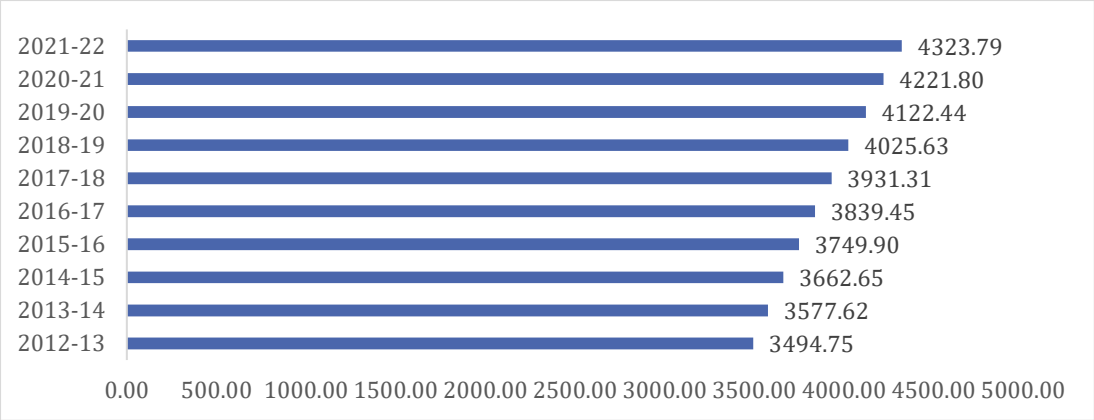
[7] Gross Domestic Product (GDP) of Bangladesh 2021-22, Bangladesh Bureau of Statistics

3.5.1.17 Baseline information:

(A) LIVESTOCK PRODUCTION IN BANGLADESH:

In FY 2021-22, total livestock population was 43.2 Crores, which was 2.4 higher than the previous fiscal year.

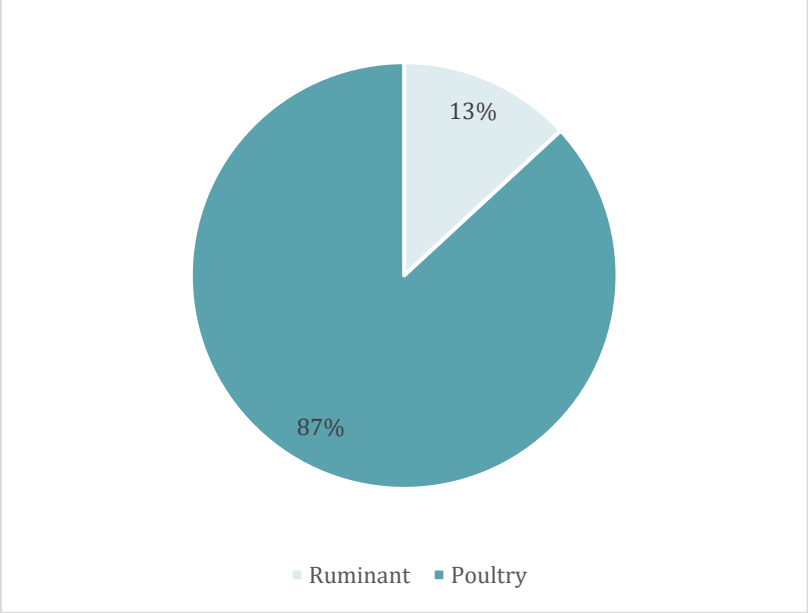
Figure 29: Livestock population of Bangladesh (in lakh number)



Source: Livestock Economy at a Glance 2021-22, Department of Livestock Services

Among the total livestock population 87% is poultry (Duck and Chicken) and the rest of the population are Ruminant (cattle, buffalo, sheep and goat).

Figure 30: Share of Poulty and Ruminant, 2021-22



Source: Livestock Economy at a Glance 2021-22, Department of Livestock Services

(B) MEAT PRODUCTION IN BANGLADESH

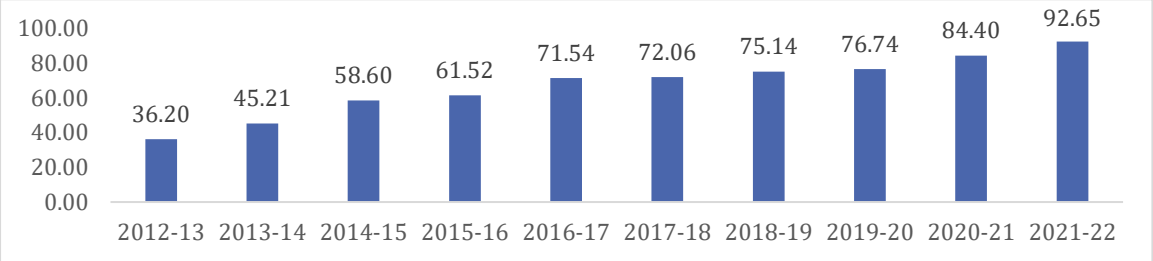
Meat production in Bangladesh is an important sector of the country's economy and plays a vital role in meeting the protein requirements of the population. The meat industry in Bangladesh comprises poultry, beef, and mutton.

Poultry is the most popular meat in Bangladesh and accounts for around 90% of the country's total meat consumption. The poultry industry has experienced significant growth over the past few years, with many small and large-scale poultry farms across the country. The country is also self-sufficient in broiler meat production. The largest poultry companies in Bangladesh include CP Bangladesh, Kazi Farms Group, and Aftab Bahumukhi Farms.

Beef and mutton are also consumed in Bangladesh, but their production is relatively low compared to poultry. The beef industry is mainly dominated by small-scale farmers who rear cattle for both meat and dairy production. However, the government has recently taken initiatives to increase beef production and improve the industry's efficiency. Similarly, the mutton industry is also small and mostly dominated by small-scale farmers.

Overall, meat production in Bangladesh is expected to grow in the future, driven by increasing demand for protein, rising incomes, and government initiatives to support the industry's growth. Currently production is growing at averge rate of 11% over the past 10 years. in FY 2021-22 Bangladesh produced 92.56 Lakh MT Meat, which was 84.40 lakh MT in FY 2020-21.

Figure 31: Meat Prodcution over the Year (in lakh MT)



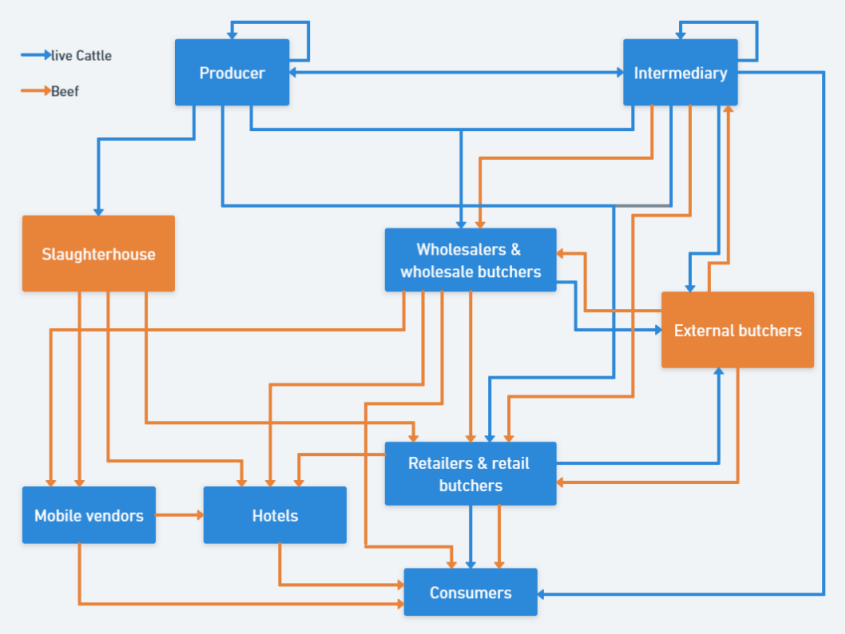
Source: Livestock Economy at a Glance 2021-22, Department of Livestock Services

(C) SUPPLY CHAIN OF BEEF:

This Section outlines the seven main actors in the beef food system, including agricultural producers, intermediaries, wholesalers, retailers, mobile vendors, institutional users, and abattoirs. The largest purchasers of live cattle were wholesalers and wholesale butchers, with most of the slaughtering taking place at this stage of the supply chain.

Agricultural producers and intermediaries who breed or fatten the cattle experience average mortality rates of 7% and 15% respectively. However, actors who only trade cattle without fattening them were not considered since they only care for the cattle for a brief period. The overall amount of beef lost is less than 5%. Each actor in the supply chain adds value to the product by performing different activities to differentiate themselves from their competitors, increase their product margins, and minimize losses and costs. Figure 6 illustrates the product flow of live cattle and beef.

Figure 32: Supply Chain of Beef



Source: Wageningen Food & Biobased Research and FAO Bangladesh[8]

[8] Kok, M. G., Soethoudt, J. M., Vernooij, D. M., & Chowdhury, K. B. (2021). Analysis of the beef value chain in Bangladesh : Towards a strategic action agenda for the Dhaka City Corporations. https://doi.org/10.18174/557278

Fruits and Vegetables are common food in the daily food basket of Bangladeshi People. According to the Household Income Expenditure Survey-2016, People in Bangladesh consumes 167-gram vegetable and 35.78-gram Fruits per day. Vegetable consumption has been increased over the years whereas fruits consumption decreased from 2010 to 2016.

Table 8: Food intake (Gram per capita per day)

Food	2005	2010	2016
Rice	439.64	416.01	367.19
Wheat	12.08	26.09	19.83
Pulses	14.2	14.3	15.6
Vegetables	157	166.08	167.3
Fish	42.1	49.5	62.58
Meat	15.6	19.07	25.42
Egg	5.2	7.25	13.58
Milk & Milk Product	32.4	33.72	27.31
Fruit	32.5	44.7	35.78
Protein	**62.52**	**66.26**	**63.8**

Source: Comparative Matrix of Household Income and Expenditure Survey (HIES) (2005 – 2016)[9]

By doing simple multiplication calculation we can identify the total demand of Fruits and Vegetables in Bangladesh.

Table 9: Demand of Agricultural Products in Bangladesh

Type of Product	Per capita per day Consumption (in KG)	Total Number of Days	Total Population	Total Demand (in MT)
Vegetable	0.167	365	165,158,616	10,067,243
Fruits	0.035	365	165,158,616	2,109,901
Fish	0.06258	365	165,158,616	3,772,504
Meat	0.02542	365	165,158,616	1,532,391

Sources: Calculation of Consultants

[9] *Comparative Matrix of Household Income and Expenditure Survey (HIES) (2005 – 2016) (Rep.). (n.d.). Retrieved http://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/5695ab85_1403_483a_afb4_26dfd767df18/Comparative%20Matrix%20HIES_fnl.pdf*

The Demand for vegetable is about 10 million MT whereas production is only 4.7 million MT. Whereas fruits production is at 5.1 million MT but demand is only 2.1 million MT.

Similarly demand of Meat and Fish in Bangladesh is around 1.5 million MT and 3.7 million MT.

Current Market Trend Analysis

The current market mechanism of Agricultural goods in Bangladesh vastly depends on the traditional marketing system (wet market) where Farmers grow crops and sell them to local traders. From local traders, crops/goods reach consumers' hands by changing 4-5 different hands.

Consumers also purchase agricultural goods by testing them and checking them by hand. Thus, the traditional wet market system is still the first choice for consumers to purchase Agricultural goods, especially vegetables.

On the other hand, Fruits are most sold in the fruit shops, which are not inside the wet markets but outside and are pretty available in the city areas.

Figure 33: City Market of Agricultural Goods

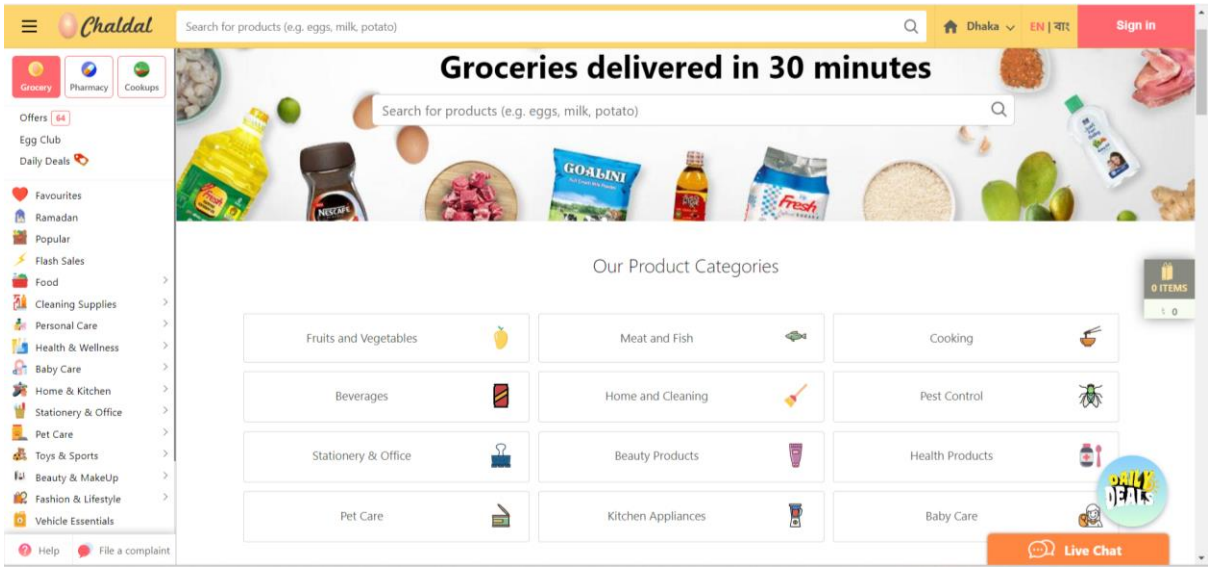
Source: Market Survey by consultant

Fruits and Vegetables are also sold in the van (Three Wheelers) in societies nowadays, which is convenient for consumers as they don't have to travel to the wet markets.

Super shops also sell fruits and vegetables at their outlets, where upper-middle class or rich people usually do shopping.

Some E-commerce sites are also selling fruits and vegetables through their online portals. Companies like Chaldal, Panda Mart, Shobjibazar, Hortex are selling Fruits and Vegetables and trying to deliver them quickly to consumers.

Figure 34: Chaldal Homepage



Future demand (Target Market Analysis)

3.5.1.18 Future Market Trend Analysis

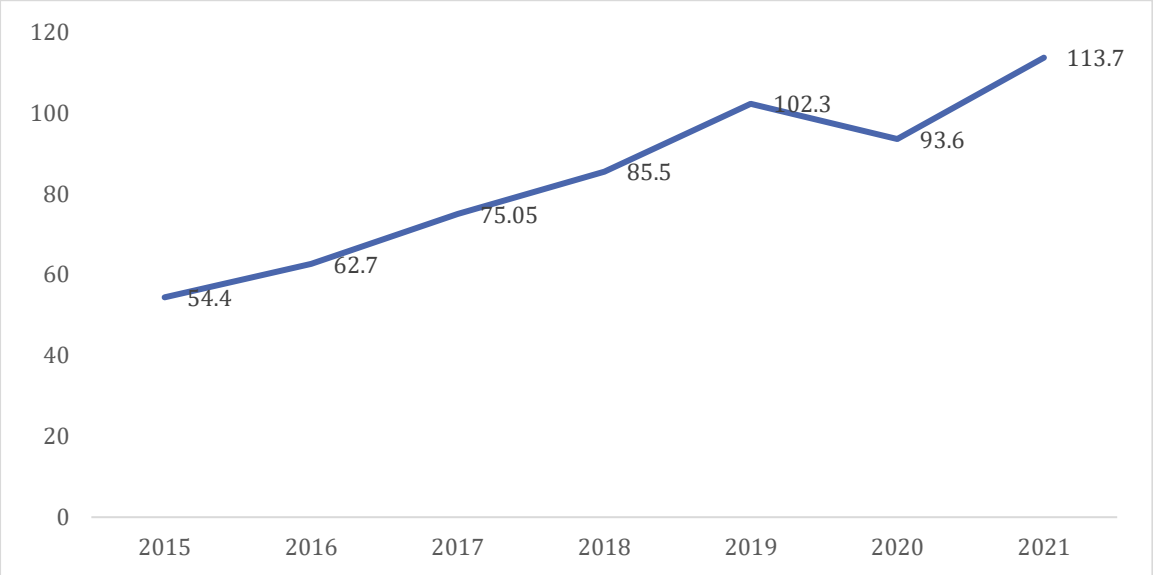
The growth of e-commerce and online shopping has been significant in recent years in Bangladesh. With the increasing availability of smartphones and the internet, more and more consumers are turning to online grocery shopping for convenience and accessibility. The trend is expected to continue, and online grocery shopping is likely to become more popular in the future.

There are other factors which are working as major catalyst to e-commerce market places in Bangladesh:

(A) GROWING INTERNET PENETRATION:

Bangladesh has seen a significant increase in internet penetration in recent years. As more and more people have access to the internet, the potential customer base for e-commerce marketplaces has expanded.

Figure 35: Internet (Mobile) Subscriber in Bangladesh (in million)



Source: BTRC

(B) INCREASING USE OF SMARTPHONES:

Along with internet penetration, the use of smartphones has also increased in Bangladesh. Smartphones make it easier for people to access e-commerce platforms and make purchases from anywhere at any time. Currently in Bangladesh 41% of mobile phone holders are using smartphone (GSMA. 2021). Which is predicted to be more than 60% by 2025.

(C) CONVENIENCE:

E-commerce marketplaces offer convenience to consumers by allowing them to shop from the comfort of their homes without needing to visit a physical store. This saves time and effort for consumers who may have busy schedules or live far away from physical stores. Currently families are becoming smaller, in a large portion of the households both husband and wife are doing jobs. For them, E-commerce market being more convenient.

(D) WIDE VARIETY OF PRODUCTS:

E-commerce marketplaces offer a wide variety of products, from household items to electronics, clothing, and more. This makes it easier for consumers to find the products they need in one place.

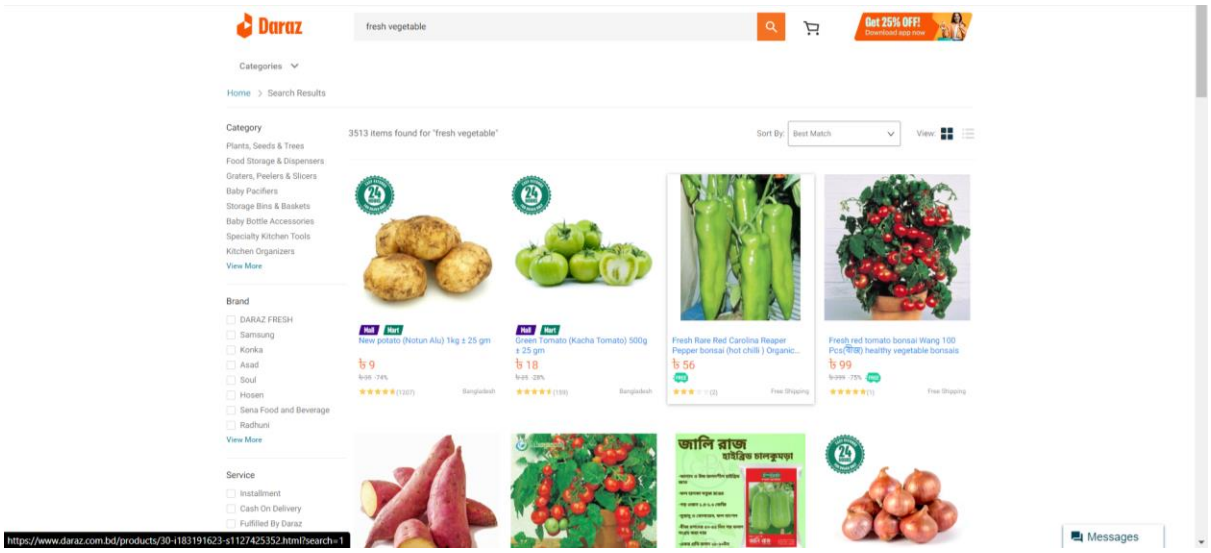
(E) COMPETITIVE PRICING AND DISCOUNTS:

E-commerce marketplaces often offer competitive pricing on products, which can attract consumers looking for good deals and value for their money. Also e-commerce market places offers different ranges of discounts which attracts customers.

(F) CASH-ON-DELIVERY OPTION:

Many e-commerce marketplaces in Bangladesh offer cash-on-delivery as a payment option, which is convenient for consumers who may not have access to online banking or credit cards.

Figure 36: Daraz Homepage



Overall, the growing popularity of e-commerce marketplaces in Bangladesh is a combination of factors such as growing internet penetration, increasing use of smartphones, convenience, wide variety of products, competitive pricing, and cash-on-delivery option.

Also, People look for convenience now a days, they do not care about the logistics charges as soon as their time and effort is saving. One of the reasons for E-commerce industry boom is door to door delivery. As soon as good quality products are at their door step without any hassle people are happy to purchase them.

Perishable goods i.e., Fruits are vegetable, Meat and Fish are still sold in the physical markets, but as people are moving towards the e-commerce industry, in near future people will vastly purchase these items from e-commerce sites.

3.6 SWOT ANALYSIS

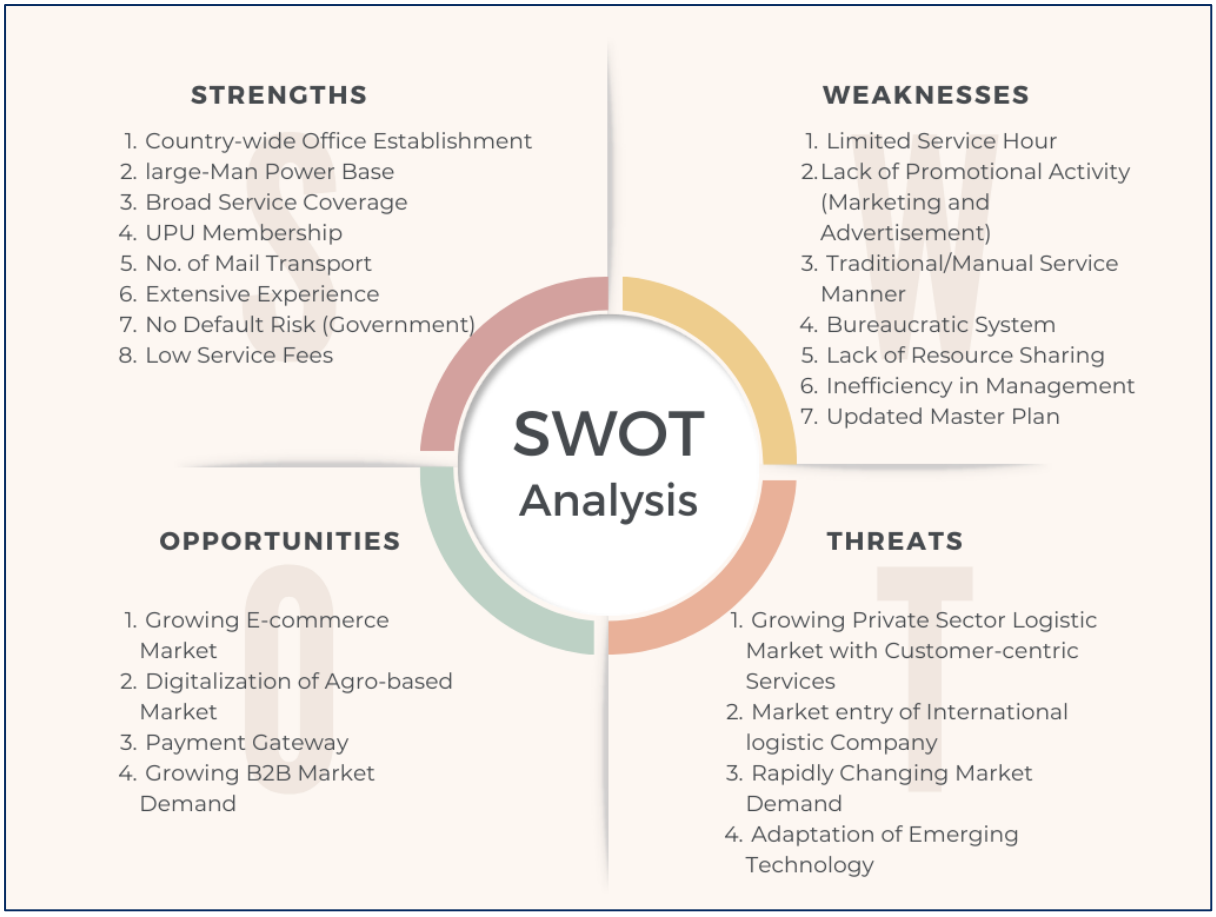
Bangladesh-post office (BPO), one of the oldest and largest government-owned organizations in Bangladesh, has been providing citizen-centric services since its inception. The organization derives its competitive advantage from its national footprint.

Even in the private/ open market competition, the organizations survive due to government support and an extensive network of infrastructures.

But BPO could not afford to ignore the emerging market threats from a wide range of global, regional, and local players.

The market has vast opportunities and threats that BPO has to grab and avoid. However, despite its strengths, it also has many weaknesses. Addressing these weaknesses is very important. Otherwise, the growing competition and existing/ new market players will override BPO's Market position. The following figure shows the brief of the SWOT analysis of the Bangladesh Postal Department:

Figure 37: SWOT Analysis of the BPO.



Below we have discussed the Strengths, Weaknesses, Opportunities, and Threats in more detail:

Strengths

BPO being one of the oldest and government-owned organizations, has several strengths. Below Strengths of BPO are discussed.

- ✓ **Country-wide Office establishment:**

  BPO has 9,886 offices all over Bangladesh.

  - These offices are branched out from Divisions, Districts, Upazilas, and most of Bangladesh's unions. Among these offices, 1,111 can book any letter and parcels from all the offices (9,886) letter, and parcels can be delivered.
  - One of the core strengths of BPO is that it has at least one office per 15 square km, and for 15,000 People, it has one official.

- ✓ **A large number of Manpower**:

  BPO has a workforce of 39,888, including officers and staff; currently, each employee serves 3,760 customers.

- ✓ **Service coverage**:

  According to BPO's Mandate, each citizen is under service coverage in Bangladesh. No citizens are left, even those living in remote areas like char. No private company in Bangladesh has such extensive service coverage.

- ✓ **UPU Member**:

  Bangladesh is a Universal Postal Union (UPU) member. Being a member of BPO's International postal wing is very compliant and has connectivity with all the UPU Members worldwide.

- ✓ **Mail Transport**:

  Bangladesh post office has more than 500 mail motor vans nationwide. No other companies have such a number of self-owned vehicles in Bangladesh. On top of that, BPO has excess to the Bangladesh Railway's Mail train, through which they can transport mail and parcels at a meager cost.

- ✓ **Extensive Experience**:

  BPO has more experience than any other logistics/ mail and parcel delivery company in Bangladesh. Due to this vast experience, they could manage to solve and also have solutions for any challenges they face.

- ✓ **No Default Risk**:

  BPO has zero default risk being a government institute. Recently we have seen many private companies committing fraud/ escaping with public money. BPO has that

advantage over any other company; due to this superiority, they also have the highest reliability among domestic and international customers.

✓ **Low Service Fees**:

BPO is a highly subsidized service-providing institute in Bangladesh. Due to its mandate of non-excluding any citizen of Bangladesh, the service fees of BPO are low and, in some cases, below market prices.

Weaknesses

With strengths, BPO also has significant weaknesses, which are not letting BPO go to its optimum potentiality. Below the weaknesses are discussed in detail.

- **Limited-Service Hours**:
  - BPO's Office hours are limited compared to other private sector companies. Where all the mail and parcel delivery offices work beyond regular office hours, BPO booking and delivery offices operate from 9 to 5, sometimes even less.
  - Thus, working-class people working 9 to 5 and trying to book parcels in the evening or night-time are not getting this facility.
  - So, they are moving to private companies.
- **Lack of Promotional Activity**:
  - Bangladesh Post Office has no marketing and promotional activities budget. Thus, they are not getting new customers even after introducing new services and activities.
  - Ultimately, their new services become obsolete due to a lack of demand. One example is "speed post."
- **Traditional and Manual Service Manner**:
  - Most of the services of Bangladesh postal are still running on a manual process, though they have recently introduced some automation in some offices, but that automation is not integrated and shareable.
  - According to government policy ICT Budget should be at least 2% of the total budget, whereas BPO has only 0.31%.
  - Automation still requires human effort, making things more complicated and lengthier.
  - All the mail sorting centers are human-intensive workplaces; thus, things are taking more time, and delivering mail and parcels is taking time.

- **Bureaucratic System**:

  Being a government institution, the Bangladesh Post Office has to maintain a bureaucratic system. Where all the private companies can make the decision quickly, BPO takes time to approve them. Due to this system, BPO cannot take the fast-movers advantage.

- **Lack of Resource Sharing**:

  The resource-sharing tendency is significantly less among government institutes. Though it takes less effort to share resources among public institutes, BPO's resources are not adequately shared with others.

- **Management Inefficiency**:
  - Bangladesh Post Office is one of the largest and oldest public institutes, but there are many scopes to increase efficiency in human resources management.
  - According to consultant analysis, a large amount of money is spent on EDSOs and EDBOs every year, but not enough outputs are generated from their services.
  - Again, in the booking and delivery offices, people are not cooperative with customers; sometimes, customers are dissatisfied and not returning for BPOs service again.

- **Master Plan:**

  During the feasibility study, the consultant could not find any master plan or perspective plan of BPO to understand their long-term vision/goal. For an institute like BPO, there should be a Master plan or specific target plan which will work as their sacred book.

Opportunity

With the advent of urbanization and globalization, many opportunities are coming up for BPO. With enough preparedness and competence, BPO has to utilize these opportunities; otherwise, in the long run, BPO's remaining or current market position will be overthrown. Below the opportunities are discussed.

- **Growing E-commerce market:**
  - During the study, we understand that both global and national E-commerce market is expanding. Nationally the market is growing by around 20% per year, which opens up an excellent opportunity for BPO.
  - Apart from that, the largest E-commerce company in Bangladesh Daraz is suffering from logistics facilities to maintain delivery all over Bangladesh.
  - Whereas most e-commerce, F-commerce, and SMEs use third-party delivery Services.
  - Thus, increase Digital-Commerce Industry is an excellent opportunity for Bangladesh Post Office.

- **Digitalization of Agro-Market in Bangladesh:**
    - Though it is a part of the E-commerce Market, one of the fast-growing segments is the agro-market.
    - People are moving from the traditional to the digital agro-market, where daily agro-products are purchased from digital platforms.
    - With BPO's newly built MPC and Chiller Chambers, the opportunity to work in this Market increases.
- **Growing Digital Payment facility**:
    - With the change in consumer behavior, the landscape is becoming digital —moving towards contactless and cashless transactions. The country has made notable improvements in many development areas – recording **a 57 percent increase in financial inclusion between 2013 and 2018 and a 31.5 percent internet penetration as of the beginning of 2022.** As a result, the country is experiencing tremendous growth in digital services as the current generation is tech-savvy and relies on online services for convenience.
    - Within two years, MFS transactions **grew more than 46 percent** while the transaction values in internet banking have **increased by 59 percent.** At the same time, credit card payments have **increased by 53 percent,** and debit card transactions **surpassed a whopping 175 percent.**
    - In the past two years, most extensive and medium-sized shops have quickly adapted to digital POS systems. Almost all e-commerce and social media sites have integrated digital payments through debit/credit cards, bank transfers, and MFS payments. In addition, payment gateway systems such as PSO and PSP have further eased the payment procedures for online merchants.
    - Thus, BPO has an excellent opportunity to increase its consumer base by adopting the digital payment system.
- **B2B Market Demand:**
    - Nationally and Globally, B-2-B Business is increasing yearly.
    - According to DHL, the B2B E-commerce Market will be increased by 70% by 2027.
    - Some of the biggest retail brands and Businesses create a demand for B2B Services. Bangladesh post could avail of this opportunity.

Threats

With excellent opportunities and potentiality, there are many threats for the Bangladesh post office in the current and coming days.

- **Growing Private Sector Logistic Market with Customer-centric Services:**
  - In Bangladesh, there are more than 1,000 logistics/ mail and Parcel delivery companies.
  - They are providing customer-centric service, which provides convenience to customers. BPO's services must be customer-friendly; otherwise, the private sector will capture customer segments.
- **Market entry of International logistic Company:**
  - Bangladesh's logistics scene has been getting much attention from multinational players of late.
  - Several multinational players have entered the market in the last two years. Hong Kong-based logistics startup Lalamove officially launched its operation this year. Lalamove is the second multinational logistics startup to enter Bangladesh in 2022.
  - In addition, early this year, Indian logistics startup Delhivery launched in Bangladesh. Previously, another Indian logistics company Ecom Express invested in Bangladeshi logistics startup Paperly.
  - Competition has already been growing in the vertical, with companies raising new investments. These new developments have intensified the competition and created new market realities.
- **Rapidly Changing Market Demand:**

  The demand for services is changing rapidly in Bangladesh. Like people prefer pickup services for delivering mail and parcels, but the Bangladesh Post office has no such facility. Thus, BPO has to change its service patterns and adopt demand-driven services.
- **Adaptation of Emerging Technology:**

  Currently, technology is changing very quickly, and the private sector is adopting them quickly. If BPO does not adopt these technologies quickly, its services will be outdated.

3.7 TOWS ANALYSIS

A TOWS analysis is **a planning tool that examines a company's threats, opportunities, weaknesses, and strengths**. Using this analysis, the consultant prepares strategies for BPO for future challenges and initiatives.

TOWS Matrix Canvas

	Internal Strength	Internal-Weakness
External Opportunities	1. Strengths-Opportunity Strategies	3. Strengths-Threats Strategies
External Threats	2. Weakness- Opportunities Strategies	4. Weakness- Threats Strategies

The above matrix helps you to plan the strategies. **The First Quadrant** will identify, which of the strengths can be used to maximize the opportunities we identified during the SWOT analysis.

The Second Quadrant tells you; how can you use the company's strengths to minimize the threats the consultant identified?

The Third Quadrant suggests you 'What action(s) can you take to minimize the company's weaknesses using the consultant's identified opportunities?

And finally, **The Fourth-One** tells you; how can you minimize the company's weaknesses to avoid the threats that consultant identified.

TOWS Matrix Analysis for BPO

	Internal Strength	***Internal-Weakness***
	• Country-wide Office Establishment • Large-Man Power Base • Broad Service Coverage • UPU Membership • No. of Mail Transport • Extensive Experience • No Default Risk (Government) • Low Service Fees	• Limited-Service Hour • Lack of Promotional Activity (Marketing and Advertisement) • Traditional/Manual Service Manner • Bureaucratic System • Lack of Resource Sharing • Inefficiency in Management • Updated Master Plan
External Opportunities • Growing E-commerce Market • Digitalization of Agro-based Market • Payment Gateway • Growing B2B Market Demand	• Deliver E-commerce and Agro-Based Products Country wide, using broad service coverage, existing manpower and vehicles. • Using governmental strengths, incorporate a payment gateway, to include more customer, who prefer online payment. • Using low fees rate capture, the B2B market, and transport mail in bulk.	• Increase service hour, automate service processes, use technology for efficiency to deliver products faster for the e-commerce industry and agro-based perishable goods. • Do more promotional activities so that more customers like e-commerce, agro-market and B2B market come to BPO • Empower management level employees and prepare a strategic paper like masterplan, so that management level employee could take decision faster and provide faster services
External Threats • Growing Private Sector Logistic Market with Customer-centric Services • Market entry of International Logistic Company • Rapidly Changing Market Demand • Adaptation of Emerging Technology	• Prepare MPCs/ AMPC to facilitate private and international market players to delivery products in remote areas with existing strengths.	• Making public-private partnerships to reduce inefficiency and open-up resource sharing opportunities to overcome threats from private and international companies. • Adopt digitalization initiatives to adopt emerging technologies faster to cope up with rapidly changing market demand.

- Deliver E-commerce and Agro-Based Products Country wide, using broad service coverage, existing manpower and vehicles.
- Using governmental strengths, incorporate a payment gateway, to include more customer, who prefer online payment.
- Using low fees rate capture, the B2B market, and transport mail in bulk.
- Prepare MPCs/ AMPC to facilitate private and international market players to delivery products in remote areas with existing strengths.
- Increase service hour, automate service processes, use technology for efficiency to deliver products faster for the e-commerce industry and agro-based perishable goods.
- Do more promotional activities so that more customers like e-commerce, agro-market and B2B market come to BPO.
- Empower management level employees and prepare a strategic paper like masterplan, so that management level employee could take decision faster and provide faster services.
- Making public-private partnerships to reduce inefficiency and open-up resource sharing opportunities to overcome threats from private and international companies.
- Adopt digitalization initiatives to adopt emerging technologies faster to cope up with rapidly changing market demand.

4. SECTION 4: TECHNICAL/TECHNOLOGICAL & ENGINEERING ANALYSIS

4.1 TECHNICAL DESIGN:

4.1.1.1 Agricultural Services

(A) TRANSPORTATION:

Agricultural produce differs from industrial goods and has specific characteristics, making transportation as significant as other aspects. Like – agricultural products are bulky and perishable. However, most of them are consumable goods. Thus, both the number and quality of transportation are very crucial.

Transferring Agricultural goods from farmers/growers' places to market is crucial because improper transportation can increase the wastage of goods.

According to Md. Fakir Ahamed from Bangladesh Agriculture University, the total postharvest loss that occurred in the entire supply chain of jackfruit is due to improper storage, careless handling, and a traditional transportation system (Ahamed, 2010).

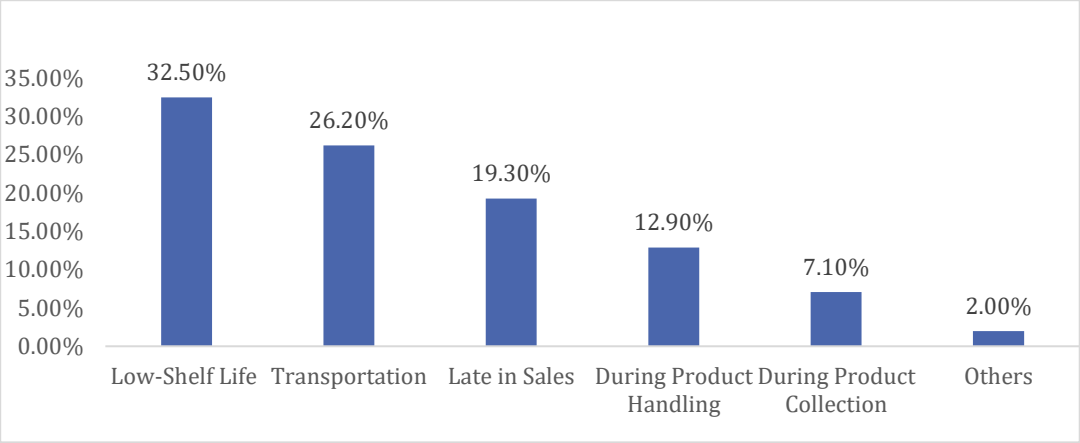
Transportation at the private level is also very high, which makes the product price high, and while there are some losses at all transportation stages, efficient transportation can still ensure that unit costs remain low and retain the agriculture value chain at a robust level. In addition, keeping transport costs low helps the farmers earn a margin and make it affordable for the consumer.

On the contrary, if transport costs are high, domestic marketing and the potential for agricultural exports will also decrease compared to countries with more efficient transport.

The rate of Postharvest loss in agricultural goods is very high in Bangladesh. Up to 50% postharvest loss could be found among different agricultural goods, especially fruits and Vegetables. From the primary survey, the consultant found that, on average, around 26.2% of agricultural goods are damaged due to poor transportation systems, which makes it an urgent issue to resolve.

A significant development in the food transport sector is the evolution of reefer vehicles or vehicles with refrigeration facilities. The storage capacity of these vehicles varies from 3 tons to 31 tons. Such a transport system brings down the enormous wastage of fruits and vegetables and, more importantly, poultry, fish, meat, milk, and dairy products.

Figure 38: Reason behind High Postharvest Loss[10]



(B) MARKET LINKAGE:

In Bangladesh, agricultural goods reach to consumer's hand after changing five to six hands. Which have been elaborated on and described in the supply chain section. This long supply chain is another reason why farmers are deprived of fair prices, and consumers are spending more than actual. Rather than this traditional system, farmers should be trained and directly linked with consumers through a minimal channel.

(C) STORAGE FACILITY:

In Bangladesh Facility for agricultural goods storage is not adequate. The proper storage system's unavailability creates problems during peak season. During peak season, farmers could not store their products and had to sell them at a lower rate. Thus Storage facility is vital in the agriculture sector. In the 8th Five-Year Plan, it is mentioned and recognized as a significant challenge for farmers.

(D) SORTING AND GRADING:

Sorting and grading is another crucial factor for Bangladeshi Farmers to get a reasonable price. The practice of grading agricultural commodities ensures the farmers adopt the quality specifications for their products, which avoids them being exploited by the traders and obtaining a reasonable price for the produce**.** Moreover, since the graded products possess fixed standards, there is no scope for cheating consumers.

(E) PROCESSING:

This is another challenge in the agriculture sector recognized by the 8th Five-year plan. Food processing has great potential, provided that reasonable quality control is enforced. To ensure that their production and export potential is fully realized, there is a need to invest in appropriate manufacturing capacities and infrastructural facilities. Good Agricultural Practices (GAP) must also be employed for production and postharvest management.

[10] *Primary Survey*

(F) FINANCING/ ACCESS TO CREDITS:

Agricultural credit plays an essential role in the sector's sustainable development. It is a key to poverty alleviation and livelihood diversification for small farmers and traders, which can contribute to agricultural diversification. Research has shown a positive relationship between institutional credit and agricultural production; therefore, an expansion in the disbursement of agricultural credit, particularly to small farmers, is a priority. However, farmers of Bangladesh face difficulties in accessing credit for agricultural production, crop diversification, processing, value addition, and marketing. The lack of funds and high collateral requirements pose significant hindrances.

(G) SOURCE IDENTIFICATION/ PRODUCT TRACEABILITY:

Agricultural goods in Bangladesh are less homogenous. The Same tree or field does not give similar types of fruits or vegetables every year. But customers have specific requirements/preferences. From the same sellers they expect similar types of products every year. Here hyper-personalization services can work better. Hyper-personalization uses AI and real-time data to display highly curated products and content to Customers. It treats customers as individuals with distinct tastes and preferences, enabling brands and retailers to provide a unique customer experience that's different for each shopper.

4.1.1.2 Priority of the Services

Using the Eisenhower Matrix, based on the urgency of intervention and BPO's Capacity and Capabilities, the consultant prioritized the services which BPO can provide or facilitate through their agency services.

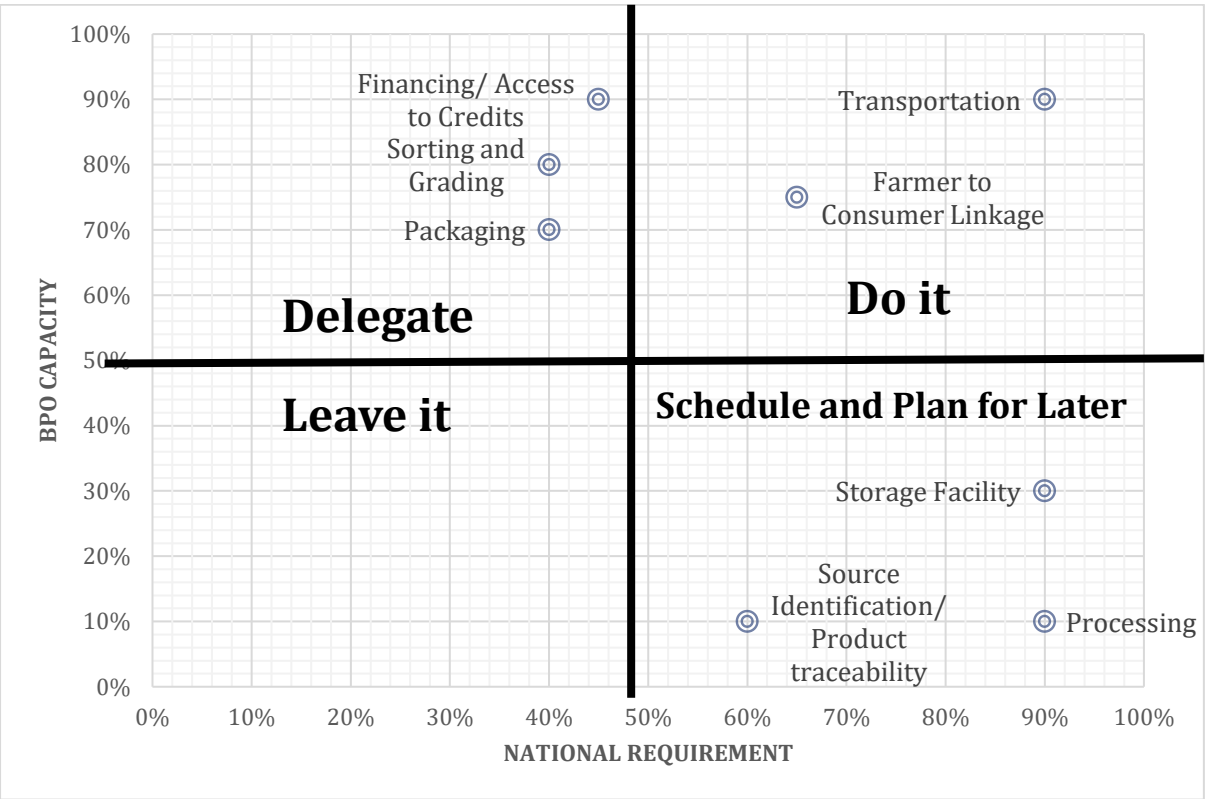
Table 10: Analysis of Prioritization Matrix

Services	National Importance	Urgent for the Business	Eisenhower Priority Matrix
	Scale	Scale	Decision
Transportation	High	High	Do it
Market Linkage	High	High	Do it
Storage Facility	High	Low	Schedule and Plan for Later
Sorting and Grading	Low	High	Delegate
Processing	High	Low	Schedule and Plan for Later
Financing/ Access to Credits	Low	High	Delegate
Packaging	Low	High	Delegate
Source Identification/ Product traceability	High	Low	Schedule and Plan for Later

4.1.1.3 Eisenhower Matrix

Now if we put this information in to the matrix diagram it will look like this:

Figure 39: Eisenhower Prioritization Matrix



4.2 AGRO-BASED BUSINESS MODEL

Bangladesh Post Office currently carry perishable good in very limited manner. The limitation is due to lack of readiness of Bangladesh post office. Currently Bangladesh Post office:

- Lack suitable packaging solution for Agro-products
- Lack direct route (hub to hub) to carry perishable goods
- Lack person with knowledge of Good Handling Practices
- Lack resources to carry perishable goods properly

As Bangladesh post office has distribution network to reach maximum number of households in Bangladesh, by introducing an E-commerce platform and solving the above issues, Bangladesh post office can start carrying perishable goods quickly.

For initial stage Bangladesh post office could start with Fruits and Vegetables like Watermelon, Hog Plum, Jackfruit, Malta, Potato, Pumpkin and Danta etc.

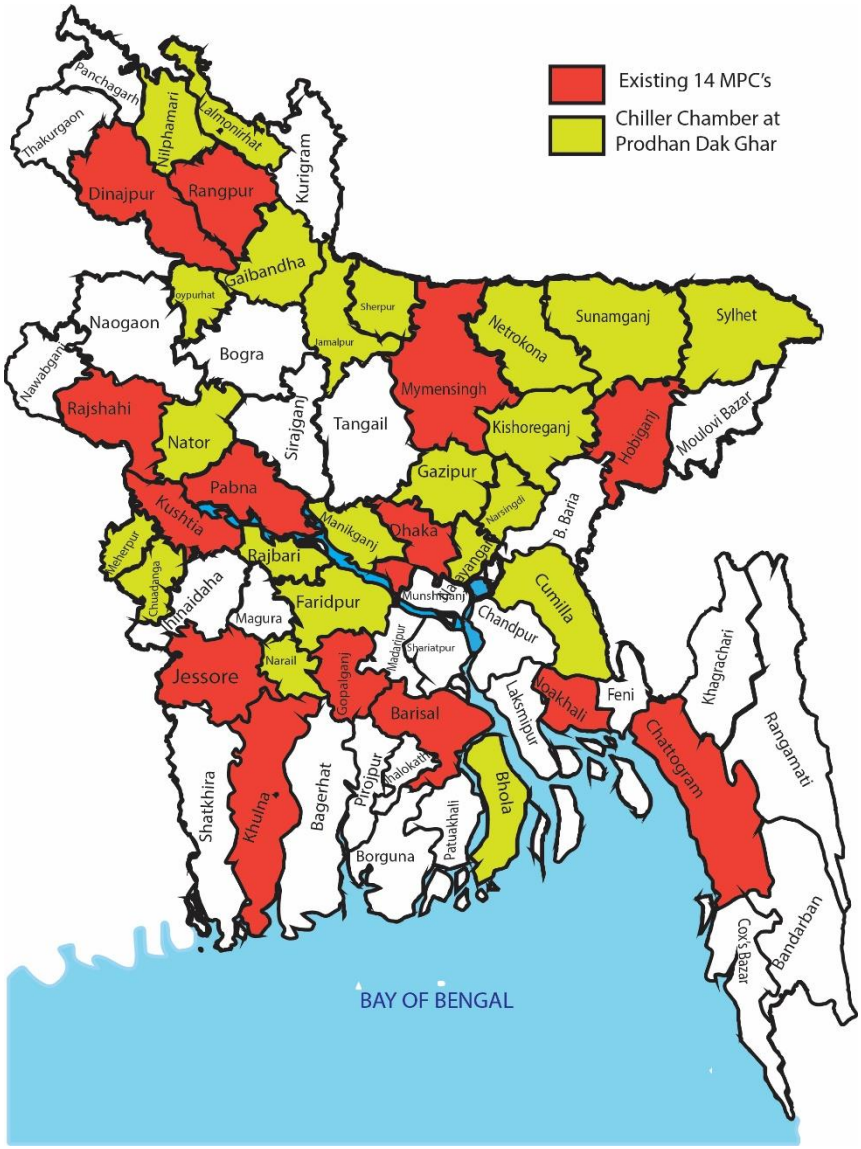
But Demand for Perishable goods in (Direct to Consumer, D2C) E-commerce Platform very low in Bangladesh. For which the Business could not grow very much and is going to be stagnant very soon. E-commerce sector generates around only 9,500 orders daily.

Type of Product	Per capita per day Consumption (in KG)	Total Number of Days	Total Population	Total Demand (in MT)
Vegetable	0.167	365	165,158,616	10,067,243.4
Fruits	0.035	365	165,158,616	2,109,901.3
Fish	0.06258	365	165,158,616	3,772,503.6
Meat	0.02542	365	165,158,616	1,532,391.2
Total perishable goods				17,482,039.5
0.1% in E-Commerce			**0.1%**	**17,482.0**
Daily Demand of perishable goods in E-commerce				**47.9**
Number of Customer				**9,579.2**

Thus Consultant is proposing a Direct to Retail Business model for Bangladesh post office. Though Direct to Consumer Business model creates maximum profit margin scopes, but maintaining large consumers demand and orders are difficult. As Bangladesh Post office is not an Agro-based company and this is the first-time initiatives for Bangladesh post to introduce an Agro-based business model and carry agricultural goods, thus direct to retail channel would be more convenient for them.

Business Expansion Plan:

Before any massive investment Bangladesh post office should start with small initiatives. Specially for Meat and Fish. Meat and fishes start to deteriorates within hours of production. Being super sensitive in nature without doing proper piloting study, Bangladesh post office should not start doing the business.



Area wise expansion is also very important. The Bangladesh Post office should start the business focusing on their Existing 14 MPCs which have Chiller Chamber. Then they should Focus on the areas where BPO is Establishing Chiller Chambers at the Prodhan Dak Ghar's (Which are currently under construction).

Proposed Expansion Plan

1st Year: 14 MPCs → 3rd Year: Add 23 prodhan dak-ghar Chiller chamber → After 5 Year: MPC/AMPC wise expansion is suggested

Business Model Canvas (9-Box model) for Agriculture Products

Key Partners 🔗	**Key Activities** ✅	**Value Propositions** 🎁	**Customer Relationships** 🤝	**Customer Segments** 👥
1.1.1.1 E-commerce Site Managing firm/ department 1.1.2.1 Entrepreneur Recruitment Agency 1.1.2.2 / 7.1.1.1/ 7.2.1.1/7.2.2.1/ 7.2.4.1 Small Entrepreneur/ E-dak Ghar Entrepreneur 1.1.2.3 / 7.2.4.1 Farmers 1.2.2.1 Agriculture Training Institute (ATI)- MOA 1.2.2.2 NGOs 1.2.3.1 / 1.3.1.1 Department of Agricultural Extension/ Department of Agricultural Marketing- officers at field level may help the entrepreneurs with adequate information.	1.1.1 Maintaining an E-commerce platform 1.1.2 Enlisting/ Appointment retailers (Customers) and entrepreneurs and Farmers from all over Bangladesh 1.1.3 Attract customer (Retailers) from all over Bangladesh to sell farmers products directly irrespective of the existing supply chain. 1.2.2Training and inspire rural entrepreneurs in the agriculture business. 1.2.3 Entrepreneurs will do the market watch to get current market price and supply information for farmers and Retailers. 1.3.1 BPO will have a pricing mechanism by which they will set the price 1.4.1 Entrepreneurs will collect working capital loan request from enlisted farmers for cultivation and harvesting. 1.5.1 BPO will have some dedicated emergency funds, in case of late payment from retailer or other issues BPO will pay from their Fund to farmer 1.6.1 If Farmer's Products are unsold/ undelivered/ damaged after receiving any	1.1 Enhanced Coverage 1.2 Market Intelligence 1.3 Justified Price 1.4 Access to Finance 1.5 On Time Payment 1.6 Payment guarantee/ Compensation in case of un-delivered/ un-sold/ damaged goods 7.1 Share profits made through elimination of middleman with retailers 7.2 Quality-Product 7.3 Timely delivery 7.4 Compensation in case of damaged products	1. E-dak Ghar will act as customer relationship agent 2. Mobile App 3. Web Application 4. Call Center	1. Producer/Farmer 2. Small Retailers 3. Consumers

1.2.3.2 Pricing tool Management company/ department 1.4.4.1 Micro-finance Institutes (MFIs)/ Operators 1.5.1.1 BPO Treasury Department 1.5.1.2 Financial Service Providers/ MFS (Payment Gateway) 1.6.1.1 / 7.4.1.1 Insurance Operators (BPO/ third-party) 7.2.3.1 BPO MPC/ AMPC Operators 7.2.5.1 Packaging Manufacturer/ suppliers (package/ Crate/ Sack) 7.3.1.1 BPO Transportation / 3rd party Transport service providers	commitment from BPO, Farmer will get 100% compensation against his product. In this case BPO will have insurance against farmers agricultural products. 7.1.1 By eliminating/ bypassing the middle man BPO will have generate some extra value/money, a portion of that BPO will share with retailers. 7.2.1 Identification of good agricultural product sources 7.2.2 Quality Checking by Entrepreneur and farmers before sending the products 7.2.3 BPO's MPC will be upgraded for logistics handling agricultural goods 7.2.4 Meet with producers/farmers regularly to give feedback from retailer/ customers. 7.2.5 Using smart packaging (innovative containment Solutions i.e, easy to open/ easy to empty) for protection from any physical, chemical or biological contamination of the agricultural goods. 7.3.1 BPO will deploy dedicated vehicles for agro product movement, dedicated vehicles will ensure timely movement and delivery. 7.3.3 Unified/ Standardized packaging size to maximum utilization of vehicle/ container space. 7.4.1 BPO will insured their fleet and logistic handling, so that incase of any accident or			

	occurrence they can compensated the retailers against damaged goods.			
	Key Resources 🏭 1.1.1.1.1 E-commerce Platform 1.1.2.1.1 Recruiters/agency 1.1.1.1.2 UDC/ E-post centers 1.1.1.1.3 Entrepreneurs with Agricultural Expertise. 1.1.1.1.4 Farmer's Agro-based Goods 1.2.3.1.1/ 1.3.1.1.1 Government- DAE/ DAM 1.2.2.1.1/ 1.2.2.2.1 Agribusiness Trainers 1.5.1.1.1 BPO treasury funds 1.6.1.1.1/7.4.1.1.1 Fund to pay compensation/ Insurance 1.2.2.3.1 System applications/ Platform/Pricing tool (AI)/ Automatic Decision Support System 7.2.3.1.1 Transportations/ MPC 7.2.5.1.1 Uniform Package/ Crate/sack 7.3.1.1.1 AI Based Fleet Management System		**Distribution Channels** 🚚 1. Producer ↔ Entrepreneur* ↔ Online App (BPO) ↔ Retailer ↔ Consumer *NGO Entrepreneur: Definition, Commission Agent	

Cost Structure 🏷 1. E-commerce platform management cost/ Solutions Management/ Pricing Tool Cost 2. UDC/E-post center management cost 3. Entrepreneur Recruiting Cost / Relationship Management	**Revenue Streams** 💰 1. Advertisement fees on e-commerce platform 2. Commission from Entrepreneurs Earning 3. Interest (1%-2%) from Farmers/ MFIs (MFIs will take 5%-7% interest from Farmer)

4. Commission of Entrepreneurs 5. Training/ Capacity Development Cost (subsidized courses fees/ 30%-50% cost will be shared by Entrepreneurs) 6. Treasury fund/ Cost of Financing 7. Logistic Insurance Cost 8. Transportation cost/ Logistics Handling cost 9. MPC Cost 10. Packaging Cost	4. Profit from Insurance (in case of Successful sale /delivery) 5. Transportation Charges 6. Money Transaction Fee/ Service charge from financial services 7. Data Selling to Private Companies 8. Packaging fees

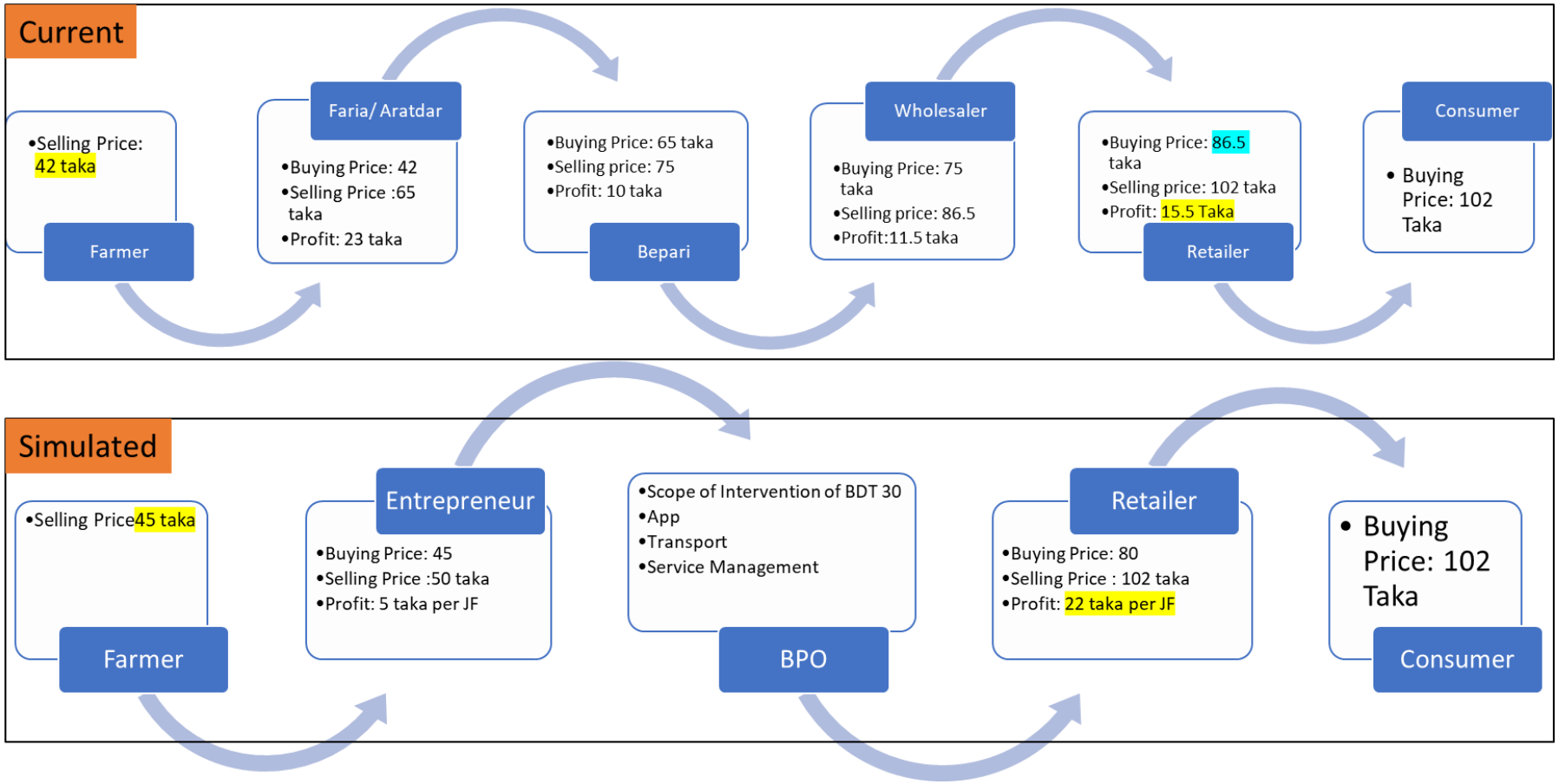
4.2.1.1 Target Customers:

During the supply chain analysis, we have seen that quite a few players get involved in transferring agricultural goods from farmers to consumers. Therefore, at each stage, the value also gets increased based on the activities performed by the players.

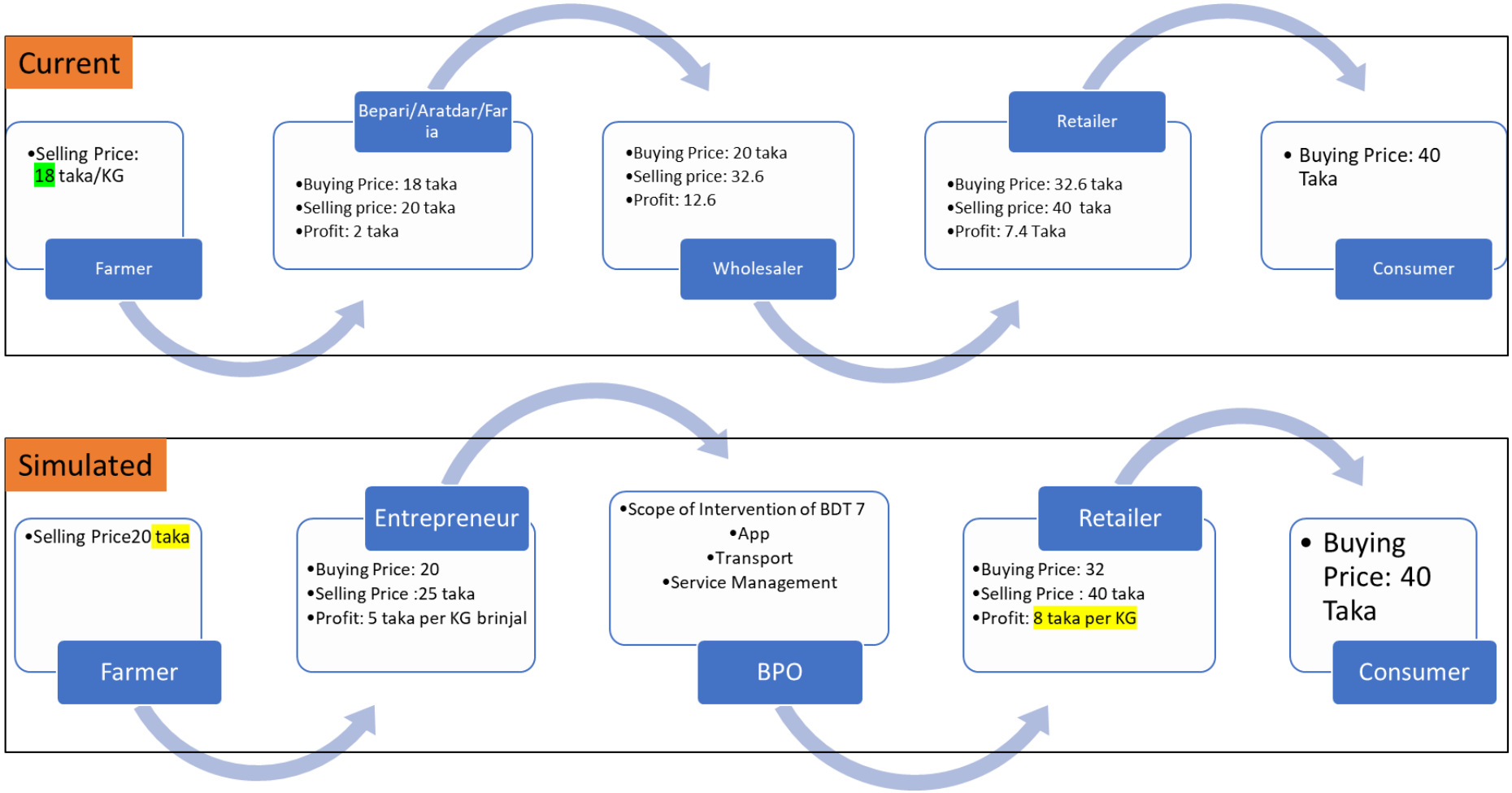
At the same time, this business model aims to connect farmers directly to consumers by bypassing the existing actors and involving new ones. As a result, there will be a scope of value (Gap between farmer's price and consumer's) for which the new actors need to perform some activities.

This additional value will be redistributed among the new players like farmers, agents, the BPO, and Retailers/Consumers. Below we have done Four exercises where we found how the values could be redistributed.

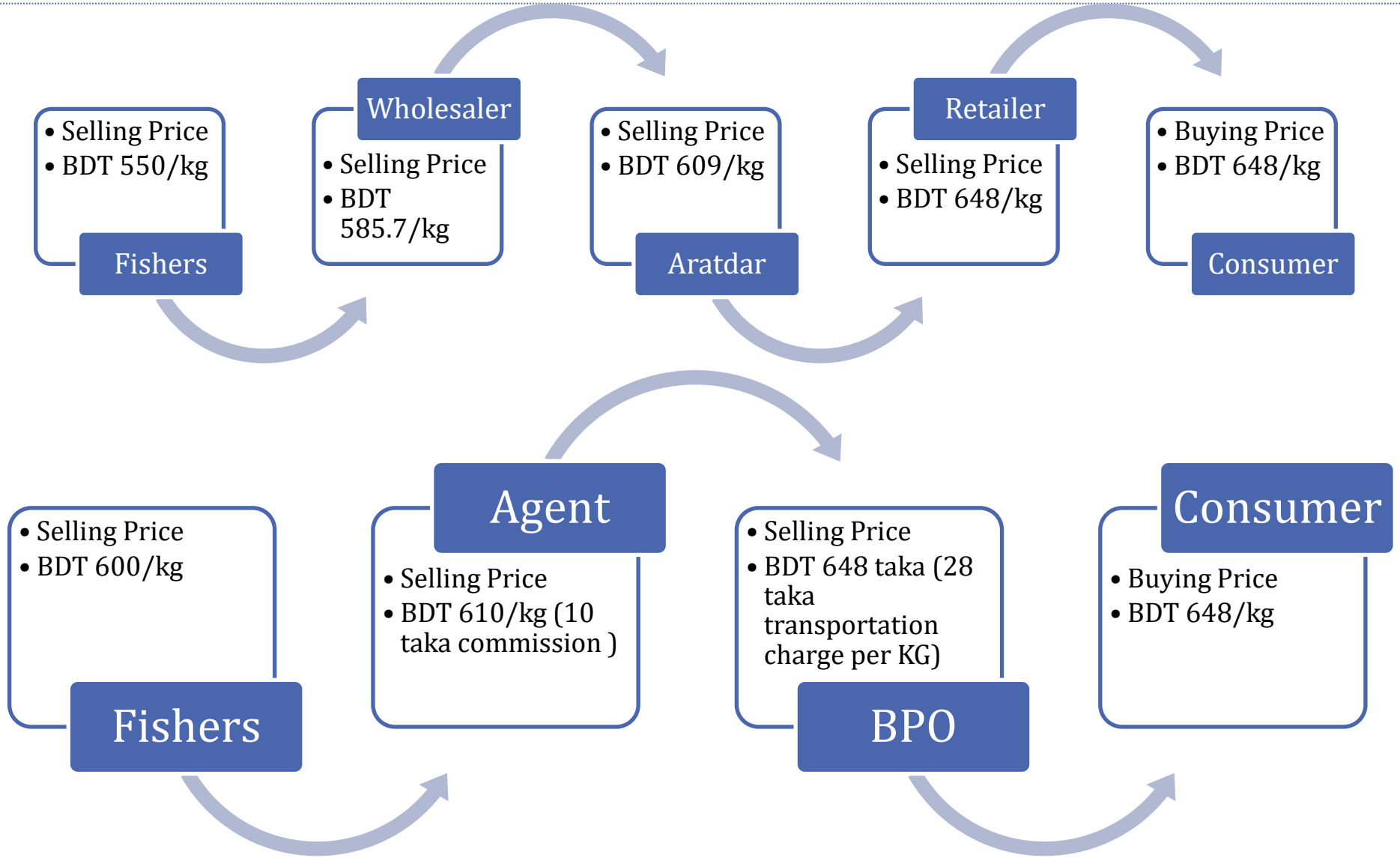
(A) FRUIT CASE (JACKFRUIT)



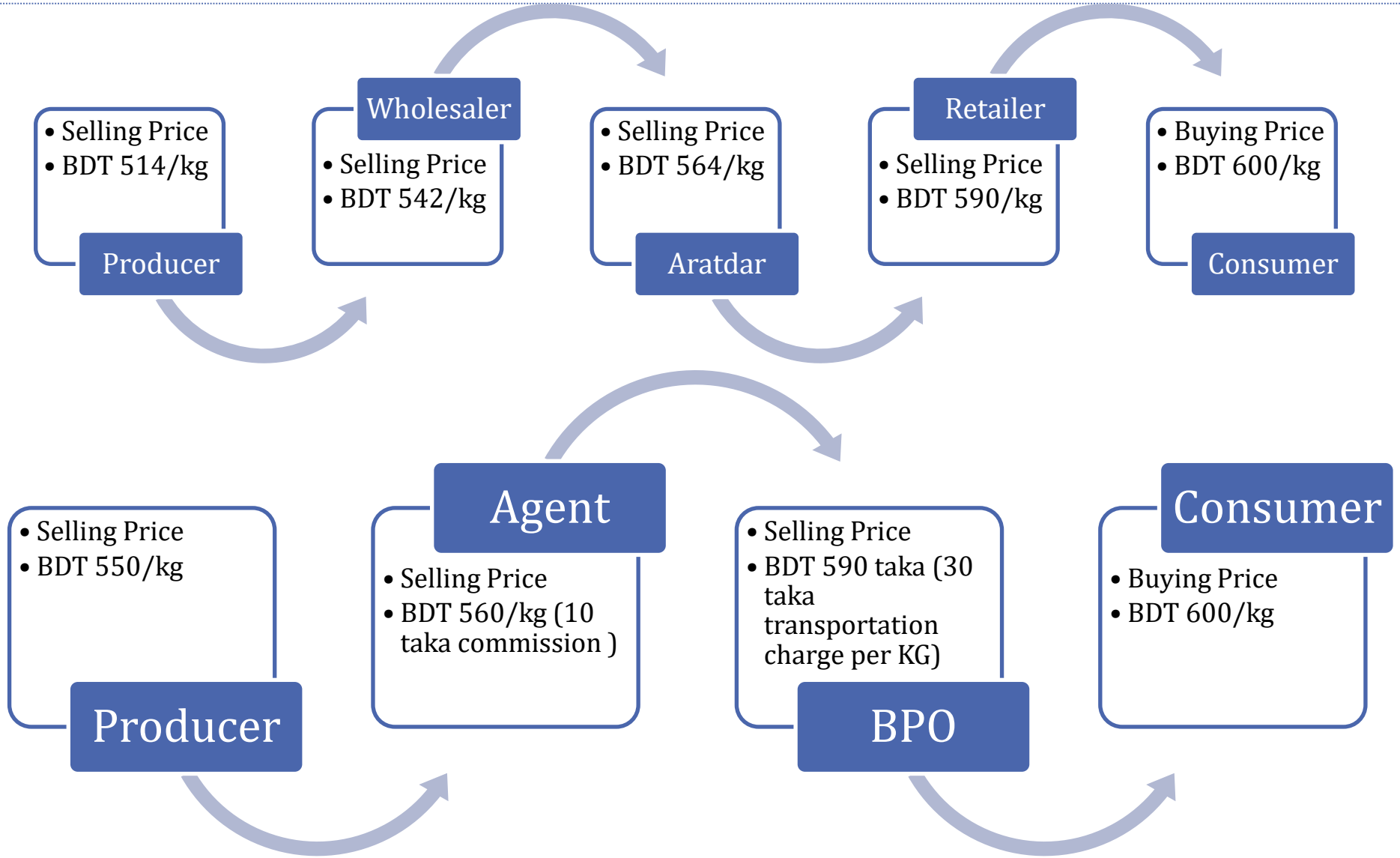
(B) VEGETABLE CASE (BRINJAL)



(C) FISH CASE (HILSHA)



(D) MEAT CASE (BEEF)



4.2.1.2 Value Propositions

FOR FARMERS/PRODUCERS:

- **Enhanced Coverage**: Currently farmers are selling their products to local traders and customers. They have very less accessibility to the central or town markets. Due to less customer availability farmers cannot negotiate properly. They even do not understand the actual demand for their products. In that case, they have to sell their products to local traders only. With BPO's Initiative farmers will get accessibility throughout the country and thus he/she do not have sell to the local traders.
- **Market Intelligence:** Farmers do not have the proper market intelligence/ Information. Due to market information asymmetry farmers are not cultivating, producing or harvesting agricultural goods rightly. For example, All the farmers are harvesting their products at the same time, thus supply increases exponentially and market prices drops drastically. Also, as farmers do not have the information of the central or terminal markets, they have no proper idea about the actual price. So, if the farmers get this intelligence correctly and timely, they will have more power in their hands thus they can make more profits. BPO's this business model will have such environment and mechanism that
- **Justified Price:** Due to lake of Information and accessibility, farmer had to take the price he gets. In these case farmers negotiation power decreases and they become price taker. On that note, most of the time farmers earns less then what have been the production cost.
- **Access to Finance:** To cultivate or harvest the products farmers often take loan as working capital to hire labours and machineries, to buy seeds, fertilizers or pesticides etc. Entrepreneurs will ensure financial assistance for farmer at lowers or tolerable interest rates through Micro-financial Institutes. MFI's will collect their loan repayment instalments from farmers earning through sales, As BPO will handle the financial Inflow they will pay the MFIs from Farmers account. Thus, farmer will not get the burden to repay at once.
- **On Time Payment:** Farmers often sale their products at less price to get payment in cash at once. Earn less revenue compare normal rate. Sometimes it takes long time to get payment if products are sold on credit.
- **Payment guarantee/ Compensation in case of un-delivered/ un-sold/ damaged goods:** Farmers often sale their products at less price to get payment in cash to secure payment despite of undelivered/unsold/damaged goods. Farmer do not take Liability of products after being sold.
- **BPO Product**- Insurance will ensure payment for farmer in case of undelivered /unsold/ damaged goods. Having BPO Product- Insurance policy Farmer will be compensated for undelivered /unsold /damaged goods.

FOR RETAILERS

- **Share profits made through elimination of middleman with retailers:** The small retailers source products from nearest terminal markets or wholesale markets. In the terminal market products come after changing many hands, thus price increases at different stages of the supply chain. High price of the products. As entrepreneurs will directly source from farmers and deliver to retailers' products will change less hands, thus price will be less than regular market.
- **Quality-Product:** Retailers go to terminal or wholesale market to know traders to get better quality. Retailer have to go by himself to get the best quality product from the market. Entrepreneurs will do the quality checking before onboarding the products. Any vulnerable products will be changed or will not be sent to retailers. Entrepreneur will be responsible for product quality.
- **Timely delivery:** To get products on time retailers go to the market by himself and bring the product with him so that no delay on delivery. Retailer have to go by himself and carry products with him. Intelligent Fleet management System Upon confirming the order entrepreneurs will quickly process the order and give it to BPO's dedicated wing to deliver the products on time.
- **Compensation in case of damaged products:** To get products on time and on right condition retailers go to the market by himself and bring the product with him so that products do not get damaged. Unless the retailers have to bear the loss from their pocket. BPO will deliver the products un-harmed to the nearest BPO delivery office on time. If not, the products will be insured and retailers will get proper compensation against their products.

  Entrepreneur will be responsible for timely onboarding and proper packaging so that products don't get damaged and delivered on time. BPO will be responsible for timely delivery of the products. In case of late delivery or damaged goods retailers will get compensation.

4.2.1.3 Key Activities

1. Maintaining an E-commerce platform
2. Enlisting/ Appointment retailers (Customers) and entrepreneurs and Farmers from all over Bangladesh
3. Attract customer (Retailers) from all over Bangladesh to sell farmers products directly irrespective of the existing supply chain.
4. Training and inspire rural entrepreneurs in the agriculture business.
5. Entrepreneurs will do the market watch to get current market price and supply information for farmers and Retailers.
6. BPO will have a pricing mechanism by which they will set the price

7. Entrepreneurs will collect working capital loan request from enlisted farmers for cultivation and harvesting.
8. BPO will have some dedicated emergency funds, in case of late payment from retailer or other issues BPO will pay from their Fund to farmer
9. If Farmer's Products are unsold/ undelivered/ damaged after receiving any commitment from BPO, Farmer will get 100% compensation against his product. In this case BPO will have insurance against farmers agricultural products.
10. By eliminating/ bypassing the middle man BPO will have generate some extra value/money, a portion of that BPO will share with retailers.
11. Identification of good agricultural product sources
12. Quality Checking by Entrepreneur and farmers before sending the products
13. BPO's MPC will be upgraded for logistics handling agricultural goods
14. Meet with producers/farmers regularly to give feedback from retailer/ customers.
15. Using smart packaging (innovative containment Solutions i.e, easy to open/ easy to empty) for protection from any physical, chemical or biological contamination of the agricultural goods.
16. BPO will deploy dedicated vehicles for agro product movement, dedicated vehicles will ensure timely movement and delivery.
17. Unified/ Standardized packaging size to maximum utilization of vehicle/ container space.
18. BPO will insure their fleet and logistic handling, so that incase of any accident or occurrence they can compensated the retailers against damaged goods.

4.2.1.4 Resources

(A) E-COMMERCE PLATFORM:

An Ecommerce Platform for facilitating the business is very important. Without the e-commerce platform gaining transport order from regular market would be very difficult as the markets are already under the syndication of different stakeholders.

Figure 40: Demo-Outlook for the Agro-Ecommerce Platform

(B) RECRUITERS/AGENCY:

A third-party recruiting agency will be beneficial for the Bangladesh post office. it will handle many time-consuming tasks involved in the recruitment process, such as reviewing resumes, conducting interviews, and performing background checks. In addition, this will allow BPO to focus on other essential aspects. While there will be fees associated with working with a recruiting agency, it can be more cost-effective in the long run than hiring an in-house recruiter or HR team. This is because recruiting agencies have the expertise and resources to find high-quality candidates quickly and efficiently.

(C) E-POST CENTERS:

Bangladesh Post office has 8500 post-e-centers across the country; these centers are well equipped with laptops, printers, internet facilities, scanners, photo printers, and others types of furniture. These centers are excellent resources for post and postal agents. These centers can facilitate as data entry points for agents. Agents can upload information and trade goods from these centers.

(D) POSTAL AGENTS WITH AGRICULTURAL EXPERTISE:

For agro-business, postal agents need to know goods handling, packaging, and carrying from one place to another. More details of the postal agent for agro business are given in the later sections.

(E) GOVERNMENT:

Department of Agriculture Extension (DAE) and Department of Agricultural Marketing (DAM), Department of Fisheries, and Department of Livestock work closely with farmers. They have a database of farmers with production volume and varieties. This is also an essential resource for the Bangladesh post office.

(F) AUTOMATIC DECISION SUPPORT SYSTEM (ADSS):

An Automatic Decision Support System (ADSS) is a software-based system that uses algorithms and data analysis techniques that will provide decision-making support to the BPO. ADSS typically involves a range of automated processes that collect, analyze, and interpret data and then generate recommendations or solutions based on this analysis, like product stock, availability, seasonality, or pricing of products based on the Situation.

(G) TRANSPORTATIONS:

Transportation for perishable goods, such as fresh produce (fruits and Vegetables), meat, and fish products, requires specialized handling and transportation methods to ensure that the goods arrive at their destination in good condition.

As one of the leading value propositions of the Bangladesh post office is to carry the right product at the right time to the desired location, thus transportation is the most crucial resource for the Bangladesh post office in this business model.

To carry the perishable goods BPO need to purchase transportation.

Freezer Van/ Reefer Van: These trucks are equipped with refrigeration units to keep the temperature inside the truck constant. They are commonly used to transport fresh produce, meat, fish, and dairy products.

Two types of freezer van will be required for carrying the perishable goods, small size 1 Ton Feeder vehicles to run inside the city and 5 Ton highway van to carry the goods from One MPC to another MPC.

Table 11: List of Vehicles Required for the Business Model

Type of vehicle	Capacity	Number of Vehicle	Remarks
Freezer Van for Highway movement	5 ton	37	14 MPC+
Freezer Van for local movement (Feeder)	1 ton	37	23 Prodhan
Total		74	Dak-Ghar

Uniform Package/ Crate/sack

4.2.1.5 Partners

1. E-commerce Site Managing firm/ department
2. Entrepreneur Recruitment Agency
3. Small Entrepreneur/ E-dak Ghar Entrepreneur
4. Farmers
5. Agriculture Training Institute (ATI)- MOA
6. NGOs
7. Department of Agricultural Extension/ Department of Agricultural Marketing- officers at field level may help the entrepreneurs with adequate information.
8. Pricing tool Management company/ department

9. Micro-finance Institutes (MFIs)/ Operators
10. BPO Treasury Department
11. Financial Service Providers/ MFS (Payment Gateway)
12. Insurance Operators (BPO/ third-party)
13. BPO MPC/ AMPC Operators
14. Packaging Manufacturer/ suppliers (package/ Crate/ Sack)
15. BPO Transportation / 3rd party Transport service providers

4.2.1.6 Distribution Channel

Distribution Channel is one of the significant components of the business model. This is the part where efficiency is required. This business model may not work as expected without a proper and efficient distribution channel.

Distribution is the process of making a product or service available for the consumer or business user who needs it, and the distributor is a business involved in the distribution stage of the value chain.

Usually, this is done directly by the producer or service provider or using indirect channels with distributors or intermediaries. The Bangladesh Post office will play and control this critical role in this business model.

Developing a coherent distribution plan is a central component of strategic planning. In addition, the overall distribution channel should add value to the consumer.

For this business model, we identified two types of Distribution Channels.

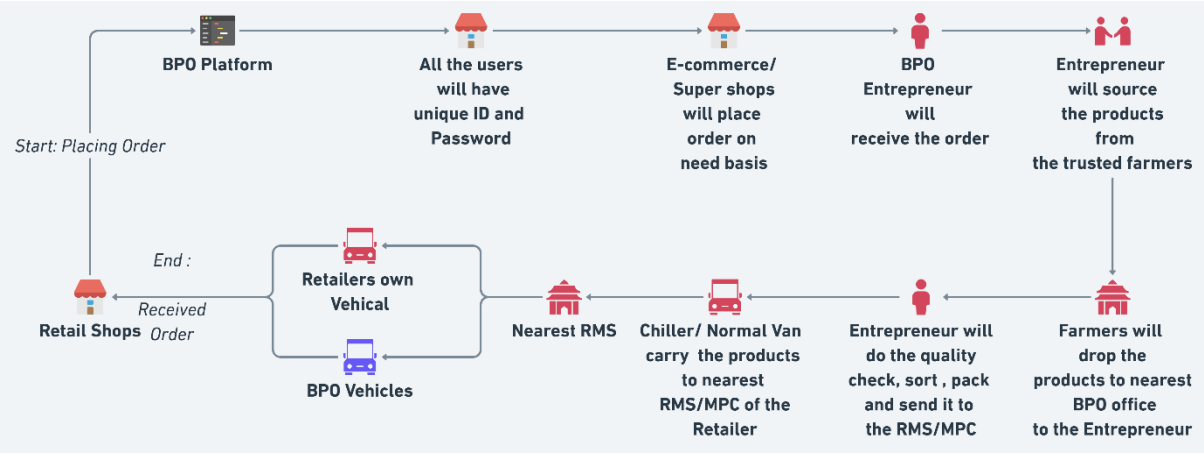
- **Channel-1:**

This channel will depend highly on the BPO's E-commerce Platform. Retailers (traditional / Super-shops) will place an order on BPO's Agro-e-commerce site using their login IDs.

After placing/ Receiving the order, the BPO's Entrepreneur/ Agent, in collaboration with a farmer, prepares the order, and the Farmer will drop the parcel at the nearest BPO office. The entrepreneur will check the quality, prepare the packaging, and load it into the designated vehicle.

The vehicle will take the products to the customer's nearest RMS/ MPC/ BPO office. From there, customers can take their products or request BPO for doorstep delivery (with additional charges). This is how the first channel should work.

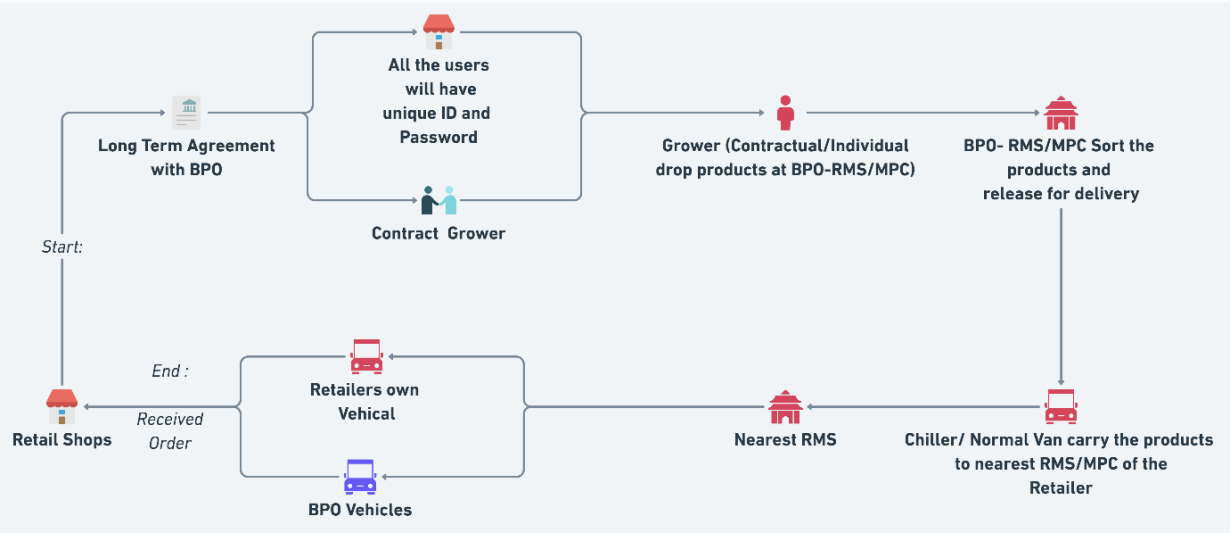
Figure 41: Proposed Distribution Channel-1



- **Channel 2:**

The Second Channel is almost the same as Channel 1, But the difference is, The part of E-commerce sire is not very relevant here. In this case, BPO will go into long-term agreements with retailers (traditional / Super-shops), where retailers have fixed or contract growers or even spot purchases from rural areas. Then, according to the agreement, BPO will carry the products to the nearest RMS/ MPC/ BPO office. From there, customers can take their products or request BPO for doorstep delivery (with additional charges). This is how the second channel should work.

Figure 42: Proposed Distribution Channel-2



4.2.1.7 Revenue Model

A revenue model is a framework for generating financial income. It identifies which revenue source to pursue, what value to offer, how to price the value, and who pays for the value. It is a key component of a company's business model.

Revenue	Who pays for the value
Transportation Fees	Retailers / Customers
Commission from Entrepreneurs Earning	Entrepreneur
Interest (1%-2%) from Farmers/ MFIs (MFIs will take 5%-7% interest from Farmer)	MFIs
Profit from Insurance (in case of Successful sale /delivery)	Insurance Company
Money Transection Fees	Financial Service Providers
Advertisement fees on e-commerce platform	Who will give add/ open for all
Data Selling to Private Companies	Agro-based Companies
Packaging fees	Retailers / Customers

4.2.1.8 Revenue Collection System:

How the revenue will be collected and Distributed among the stakeholders (Example: Transport Fees)

4.2.1.9 Cost Model

- E-commerce platform management cost/ Solutions Management/ Pricing Tool Cost
- E-post center management cost
- Entrepreneur Recruiting Cost / Relationship Management
- Commission of Entrepreneurs
- Training/ Capacity Development Cost (subsidized courses fees/ 30%-50% cost will be shared by Entrepreneurs)
- Treasury fund/ Cost of Financing
- Logistic Insurance Cost
- Transportation cost/ Logistics Handling cost
- MPC Cost
- Packaging Cost

Proposed Postal Agent Model for Agro-based Product

The project needs commission-based agents responsible for farmers and product management. They will source good quality products from trusted farmers. In Some cases, farmers themselves could be the agent if they have proper IT knowledge to deal with customers over the E-commerce platform.

Functions of the Agents:

For the Agro-Business Bangladesh Post office required, Special and separate agents.

Their roles are given below:

1. Farmer Management
2. Product Sourcing
3. Uploading Product's Information on the platform
4. Negotiating with farmer/ customers if required
5. Quality control
6. Packaging
7. Delivering the packages to the RMS/ BPO office/ MPC
8. Pickup and Door-step delivery (If requested)

Commission of Agents:

Agents will work for commission for their services which are successfully rendered. Commission will be set as per the market rates compare to other similar services.

Below are the specific services for which agents will be eligible for commission:

1. After customer accepting the desired delivery.
2. If Customer request for any special packaging, they will receive separate commission.

3. If the Farmer/Customer need door-step pick up or delivery service. Agent will get additional commission.

Requirements of the Agent:

The Bangladesh post will have to recruit or appoint this agent separately and only exclusively for this service.

Below are some criteria given, If BPO could manage agents with this pre-requisite the model will work better.

1. IT knowledge of product enlistment on the e-commerce site
2. 1-2 years' experience in Agri-marketing
3. Good connectivity in local areas
4. Able to work with farmers

Project Implementation Timeline (Agricultural Product's Business model)

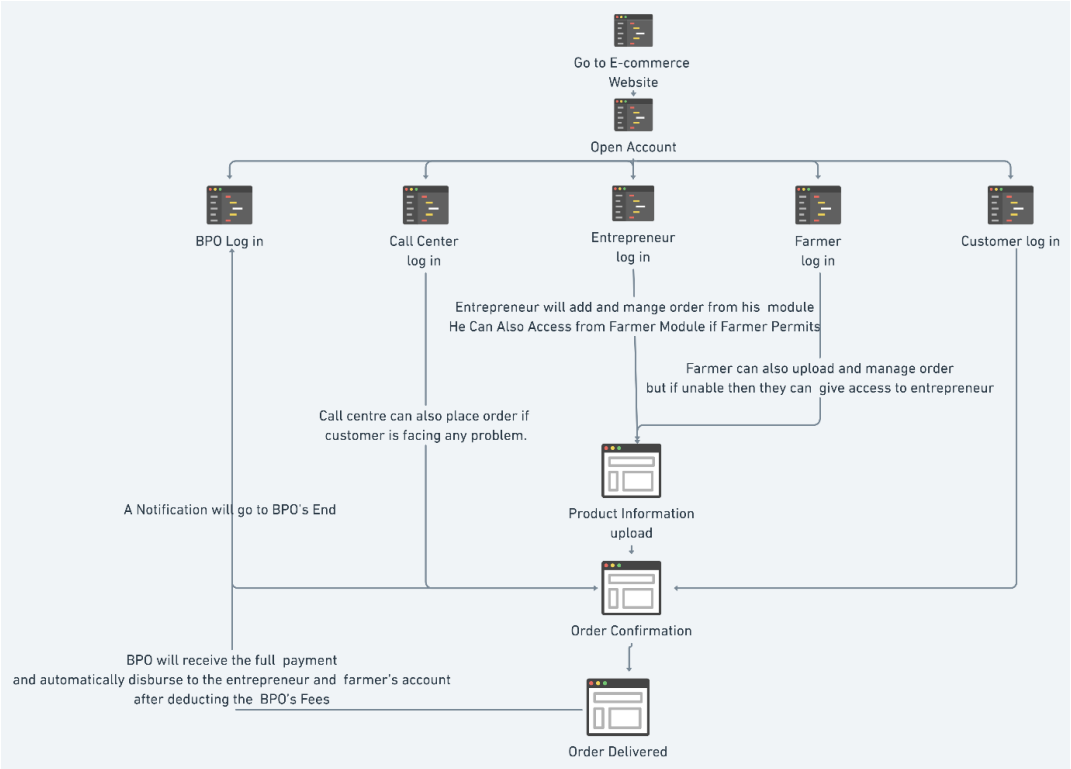
The blow chart is the tentative timeline for the proposed business model project. It is proposed to follow the following timelines for the implementation of the Agricultural Product's Business model, which is subject to change during the course of the project.

Figure 43: Project Implementation Timeline in Gantt Chart (Agricultural Product's Business model)

Sl. No	Activity	Year-1		Year-2		Year-3		Year-4		Year-5	
		H-1	H-2	H-1	H-2	H-1	H-2	H-1	H-2	H-1	H-2
1	Tender for Vendor										
2	E-commerce Site Development										
3	Select the Business Location (Gradually increase service area)										
4	Appointment of Agents										
5	Infrastructure Development										
6	Logistics Procurement										
7	Delivery of Agricultural Goods										
7	Conduct Market Research to update Plan										
8	E-commerce site management										
9	Training of the existing staffs										
10	Yearly Performance Report Preparation										

4.3 ARCHITECTURE

Figure 44: Information Architecture of Agro-based product business model



The Agro product-based business model will be highly based on the e-commerce platform. The Agricultural e-commerce Platform will have five access points. BPO, Call center, Entrepreneur, Farmer and Customers all will able to open and access their own account.

Entrepreneur will manage the farmers, Both Entrepreneur and Farmer would be able to insert product information. Customer and Call Center (on Behalf of customer) would be able to place order. BPO will monitor the eco-system, product delivery and payment procedure.

Once the product is delivered and payment is received, payment will be disbursed to entrepreneur and farmers automatically.

4.4 COSTS ESTIMATES:

Estimated Budget for Agricultural product's Business Model:

The consultant estimated cost of new/ proposed Agricultural product's Business Model, to implement the model, BPO will be required around BDT 312.12 Crore for five years. Below is the breakdown of the project cost:

Table 12: Estimated Cost for Project Implementation (Five Years) (in Lakh taka)

Sl. No.	Particulars	Unit	Unit Per Cost	Total unit	Total amount
1	Driver for freezer van	Man Month	0.20	4,440	888.00
2	Training and Capacity Building	Year	55.95	3	167.85
3	Large Freezer Van for Highway (5 Ton)	Per unit	150.00	37	5,550.00
4	Feeder Freezer Van for local Transportation (1 Ton)	Per unit	70.00	37	2,590.00
5	Promotional and Marketing Cost	Year	100.00	5	500.00
6	Fuel Cost	Per liter	0.0011	5,550,000	6,049.50
7	E-post Center Management Cost	Year	10.00	5	50.00
8	Packaging Cost (Crate, wooden Box, Paper Box)	Year	2,515.87	5	12,579.37
9	PIU (Project Implementation Unit)	Year			2,837.47
	Total Project Cost				**31,212.19**

Table 13: Year-wise Estimated Cost for project Implementation (Five Years) (in Lakh taka)

Sl. No.	Particulars	Year-1	Year-2	Year-3	Year-4	Year-5	Total
1	Driver for freezer van	177.60	177.60	177.60	177.60	177.60	888.00
2	Training and Capacity Building	55.95		55.95		55.95	167.85
3	Large Freezer Van for Highway (5 Ton)	2,100.00	3,450.00				5,550.00
4	Feeder Freezer Van for local	980.00	1,610.00				2,590.00

Sl. No.	Particulars	Year-1	Year-2	Year-3	Year-4	Year-5	Total
	Transportation (1 Ton)						
5	Promotional and Marketing Cost	100.00	100.00	100.00	100.00	100.00	500.00
6	Fuel Cost	1,209.90	1,209.90	1,209.90	1,209.90	1,209.90	6,049.50
7	E-post Center Management Cost	10.00	10.00	10.00	10.00	10.00	50.00
8	Packaging Cost (Crate, wooden Box, Paper Box)	535.33	1,113.12	1,733.36	2,995.09	6,202.47	12,579.37
9	PIU	567.49	567.49	567.49	567.49	567.49	2,837.47
Total Project Cost		**5,736.27**	**8,238.11**	**3,854.31**	**5,060.08**	**8,323.42**	**31,212.19**

Table 14: Breakdown of Training and Capacity Building (Sl.no. 2) Cost (in Lakh taka)

Sl. No	Particulars	Stakeholder	Participants	Per Batch	Number of Batch	Cost per Batch	Total Amount
1	TOT	PIU	117	30	5	6.30	31.50
2	Goods Handling Practice	Driver, Loader, Agent, Others	444	30	15	4.05	60.75
3	Business Model Training	Agent, PIU, Others	113	30	4	6.30	25.20
4	E-commerce Platform Handling Training- Agent and PIU	Agent, PIU, Others	113	30	4	6.30	25.20
5	Promotion and Marketing training	Agent, PIU, Others	113	30	4	6.30	25.20
	Total Training Cost						**167.85**

Table 15: Breakdown of Promotional and Marketing Activities (Sl.no.5) with cost (in Lakh Taka)

Sl. No.	Particular	Specification	Unit	Total Amount
1	Advertisements	Local media; television, radios and online using paid web ads or social media ads like those of Facebook, and Instagram.	LS	500.00
2	Brand Ambassador	Appointing Influential/ Popular person for Publicity	LS	
3	Business branding	Branding through a eye catching logo	LS	
4	Exhibitions	Participating in Trade Fairs	LS	
5	Free Sampling	Free Delivery and products at minimum price	LS	
	Total Cost			**500.00**

5. SECTION 5: ENVIRONMENTAL SUSTAINABILITY, CLIMATE RESILIENCE AND DISASTER RISK ANALYSIS

This business model does not have any environmental risk, but have some market risk which are described in section-9.

6. SECTION 6: COST-BENEFIT ANALYSIS (AGRO-BUSINESS MODEL)

6.1 FINANCIAL ANALYSIS

Components of Cost and Benefit:

There are eight types of costs that are identified:

1. E-commerce platform development and maintenance cost: For the agro-based business model, to control the overall environment of the business Bangladesh Post office requires an E-commerce platform.
2. UDC/E-post center management cost: Bangladesh Post office has E-post centers in most of the unions in Bangladesh; Besides, there are UDC centers by a2i, and entrepreneurs/ agents could use either center for a day-to-day trading.
3. Entrepreneur Recruiting Cost / Relationship Management: A cost will incur to Recruit Entrepreneurs/ agents from all over the country
4. Commission of Entrepreneurs: The Bangladesh post office has to pay the Entrepreneurs/ agent commission from the revenue.
5. Training/ Capacity Development Cost (Entrepreneurs will share subsidized courses fees/ 30%-50% cost)
6. Logistic Insurance Cost
7. Transportation cost/ Logistics Handling cost
8. Packaging Cost

Revenue/ Benefits from the Business:

1. Transportation Charges: The Largest Share of revenue from this Business model will come from the Transportation/Delivery Fees.
2. Advertisement fees on the e-commerce platform: The Platform will be open for advertisement; any institute can give advertisements on the platform in exchange for fees.
3. Commission from Entrepreneurs Earnings: BPO can earn a portion form the entrepreneur's earnings as they allow the entrepreneurs to the business.
4. Money Transaction Fee/ Service charge from financial services: For online payments, BPO will charge the payment gateway service provides.
5. Packaging fees: BPO will Charge the customers for the packaging, as products will be harmed without proper packaging.

Cash flow Calculation:

6.1.1.1 Calculation of the Revenue from the Business Model:

Values in Lakh Taka

Table 16: Calculation of Revenue

Revenue	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Addressable Market (in MT)	24,612,779	25,588,864	26,564,948	27,541,033	28,517,117	29,493,202	30,469,286	31,445,371	32,421,455	33,397,540
Market Capture Rate	0.1%	0.2%	0.3%	0.5%	1.0%	2.0%	3.0%	3.0%	4.0%	5.0%
Volume Handling	24,613	51,178	79,695	137,705	285,171	589,864	914,079	943,361	1,296,858	1,669,877
%of Fruits and Vegetable	90%	90%	90%	80%	80%	70%	70%	60%	60%	50%
% of Fish and Meat	10%	10%	10%	20%	20%	30%	30%	40%	40%	50%
Volume of Fruits and Vegetable	22,151.50	46,059.96	71,725.36	110,164.13	228,136.94	412,904.82	639,855.01	566,016.67	778,114.92	834,938.49
Volume of Fish and Meat	2,461.28	5,117.77	7,969.48	27,541.03	57,034.23	176,959.21	274,223.58	377,344.45	518,743.28	834,938.49
Price for Fruits and Vegetable/ per ton	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Price for Fish and Meat/ per ton	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04
Revenue from Fruits and Vegetable	332.27	690.90	1,075.88	1,817.71	3,764.26	6,812.93	11,613.37	10,273.20	14,122.79	16,669.55
Revenue from Fish and Meat	73.84	153.53	239.08	908.85	1,882.13	5,839.65	9,954.32	13,697.60	18,830.38	33,339.09
Total Revenue from Transportation	406.11	844.43	1,314.96	2,726.56	5,646.39	12,652.58	21,567.68	23,970.81	32,953.17	50,008.64
Advertisement Fees	-			100.00	120.00	144.00	172.80	207.36	248.83	298.60
Packaging Fees	642.39	1,335.74	2,080.04	3,594.10	7,442.97	15,395.45	23,857.45	24,621.73	33,848.00	43,583.79
Total Revenue	1,048.50	2,180.17	3,395.00	6,420.67	13,209.36	28,192.03	45,597.94	48,799.89	67,050.00	93,891.03

6.1.1.2 Calculation of the Cost from the Business Model:

Values in Lakh taka

Table 17: Calculation of Project Cost

Particulars	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Driver for freezer van	177.60	177.60	177.60	177.60	177.60	177.60	177.60	177.60	177.60	177.60
Training and Capacity Building and Recruitment	55.95	-	55.95	-	55.95	-	55.95	-	55.95	-
Vehicles- Freezer Van										
Highway: 5 Ton Freezer Van	2,100.00	3,450.00	-	-	-	-	-	-	-	-
Feeder: 1 Ton Freezer Van	980.00	1,610.00	-	-	-	-	-	-	-	-
Total Vehicle Cost	3,080.00	5,060.00	-	-	-	-	-	-	-	-
Fuel Cost	1,209.90	1,209.90	1,209.90	1,209.90	1,209.90	1,209.90	1,209.90	1,209.90	1,209.90	1,209.90
E-post Center Management Cost	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Packaging Cost (Crate, wooden Box, Paper Box)	535.33	1,113.12	1,733.36	2,995.09	6,202.47	12,829.54	19,881.21	20,518.10	28,206.67	36,319.82
Promotional Activity and Marketing	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
PIU	567.49	567.49	567.49	567.49	567.49	567.49	567.49	567.49	567.49	567.49
Total Project Cost	5,736.27	8,238.11	3,854.31	5,060.08	8,323.42	14,894.54	22,002.15	22,583.10	30,327.61	38,384.82

6.1.1.3 Net cashflow:

Values in Lakh taka

	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Net Cashflow	(4,688)	(6,058)	(459)	1,361	4,886	13,297	23,596	26,217	36,722	55,506

6.1.1.4 Key Assumptions:

- Discounting Rate: 12%
- Project Implementation Year: 10 Years

6.1.1.5 Calculation of Financial Analysis:

(A) CALCULATION OF THE NET PRESENT VALUE (NPV):

Formula: $NPV = \frac{P}{(1+i)^t}$

Where NPV= Net Present Value

P= Present value of the Net Cash flow

i= Discount rate

t= time

Result of the NPV = BDT 534.08 crore (Positive)

(B) CALCULATION OF THE INTERNAL RATE OF RETURN (IRR):

Formula: $NPV = \sum \frac{P}{(1+irr)^t}$

Where NPV= Net Present Value

P= Present value of the Net Cash flow

irr= Internal rate of return

t= time

Result of Internal Rate of Return (IRR): 52% (Positive)

(C) CALCULATION OF THE BENEFIT-COST RATIO (BCR):

Result of the Benefit- Cost Ratio:

- BCR : $\frac{PV\ of\ Benefit\ Expected\ from\ the\ Project}{PV\ of\ the\ Cost\ of\ the\ Project} = \frac{125{,}694}{72{,}286} = 1.74 > 1$

All the three criteria ensure that project could be accepted.

The financial model of the Agricultural product's business model for the Bangladesh Post Office with an NPV of BDT 534.08 crore, an IRR of 52%, and a benefit-cost ratio of 1.74 indicates that the project is financially viable and profitable. The financial model includes estimating the initial investment cost, calculating the expected cash inflows and outflows, and determining the net present value, internal rate of return, and benefit-cost ratio.

To calculate the NPV, IRR, and benefit-cost ratio, the following steps can be taken:

- Determine the initial investment cost, including the cost of equipment, infrastructure, and other capital expenditures.
- Estimate the expected cash inflows from the project over its lifetime, including revenue from increased efficiency, reduced operating costs, and other benefits.
- Estimate the expected cash outflows over the project's lifetime, including operating expenses, maintenance costs, and other expenses.
- Calculate the net present value (NPV) of the project by discounting the expected cash inflows and outflows at the project's required rate of return or cost of capital.
- Calculate the internal rate of return (IRR) of the project, which represents the discount rate that makes the net present value of the project equal to zero.
- Calculate the benefit-cost ratio, which is the ratio of the present value of expected benefits to the present value of expected costs.

Based on these calculations, a financial model has been developed that outlines the project's financial viability and profitability. The NPV of BDT 534.08 crore indicates that the project is expected to generate a positive net present value, while the IRR of 52% indicates that the project is expected to generate a high rate of return. The benefit-cost ratio of 1.74 indicates that the project's benefits are expected to outweigh its costs by a factor of 1.74.

6.2 ECONOMIC ANALYSIS

This business model will have a few indirect benefits which the economy and the people of Bangladesh will enjoy. However, these benefits are not directly measurable but have their own value.

The Business model will open new employment opportunities for the citizens of Bangladesh, and consumers are expected to get agricultural goods at a lower price than the current market structure, which also has an economic value.

Besides, this business model will reduce postharvest loss of agricultural goods, adding tremendous value to the economy.

Below the Yearly additional economic values are calculated using the current market values.

6.2.1.1 Calculation of Economic Benefits from the business model:

Table 18: Economic and Financial Benefits From The Business Model

Values in Lakh taka

Particulars	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Post Harvest Loss Reduction (0.1%)	1,230.6	1,279.4	1,328.2	13,770.5	14,258.6	14,746.6	15,234.6	15,722.7	16,210.7	16,698.8
Income Generation	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
Consumer Benefit	1,230.6	2,558.9	3,984.7	6,885.3	14,258.6	29,493.2	45,703.9	47,168.1	64,842.9	83,493.8
Total Benefits	2,476.1	3,853.1	5,327.8	20,670.6	28,531.9	44,254.6	60,953.4	62,905.5	81,068.4	100,207.4
Total Financial Benefit	1,048.5	2,180.2	3,395.0	6,420.7	13,209.4	28,192.0	45,597.9	48,799.9	67,050.0	93,891.0
Total Benefits (Economic and Financial)	3,524.6	6,033.3	8,722.8	27,091.2	41,741.3	72,446.6	106,551.3	111,705.4	148,118.4	194,098.4

6.2.1.2 Net Economic Cashflow

Particulars	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Economic Cashflow	(2,212)	(2,205)	4,868	22,031	33,418	57,552	84,549	89,122	117,791	155,714

6.2.1.3 Key Assumptions:

- Discounting Rate: 12%
- Project Implementation Year: 10 Year

6.2.1.4 Calculation of Economic Analysis:

(A) CALCULATION OF THE NET PRESENT VALUE (NPV):

Formula: $ENPV = \frac{P}{(1+i)^t}$

Where ENPV= Economic Net Present Value

P= Present value of the Net Economic Cash flow

i= Discount rate

t= time

Result of the NPV = BDT 2,287.07 crore (Positive)

(B) CALCULATION OF THE INTERNAL RATE OF RETURN (IRR):

Formula: $NPV = \sum \frac{P}{(1+irr)^t}$

Where NPV= Net Present Value

P= Present value of the Net Cash flow

irr= Internal rate of return

t= time

Result of Internal Rate of Return (IRR): 174% (Positive)

(C) CALCULATION OF THE BENEFIT-COST RATIO (BCR):

Result of the Benefit- Cost Ratio:

- BCR : $\frac{PV\ of\ Benefit\ Expected\ from\ the\ Project}{PV\ of\ the\ Cost\ of\ the\ Project} = \frac{300{,}993}{72{,}286} = 4.16 > 1$

All the three criteria ensure that project could be accepted.

The financial model of the Agricultural product's business model for the Bangladesh Post Office with an NPV of BDT 2,287.07 crore, an IRR of 174%, and a benefit-cost ratio of 4.16

indicates that the project is both financial and economically viable and profitable. Besides the financial model, the economic model includes estimating the initial investment cost, calculating the expected economic cash inflows and outflows, and determining the net economic present value, economic internal rate of return, and economic benefit-cost ratio.

Based on these calculations, an Economic model has been developed that outlines the project's economic viability and profitability.

This business model is both economically and financially viable.

7. SECTION 7: HUMAN RESOURCES AND ADMINISTRATIVE SUPPORT ANALYSIS

7.1 HUMAN RESOURCE FOR AGRO-BASED PRODUCT

To implement the Agro-business model, we need several dedicated key human resources. Both during the project implementation and after the project, who will be transfer to the revenue stream. Below the required HR structure is explained.

During Project Implementation

A separate Head of Agro-Business will be appointed for the Agro-Business model under the project. The role of the Project Manager would be to execute the agro-business for Bangladesh Post Office. With sufficient Agro-Business knowledge, this person should be newly appointed or deputed from any other department.

Also, a Agro-Business Operation manager with Agro-business specialization and Educational Background in Agri-business should be appointed for filed level operations. With sufficient Agro-Business knowledge, this person also should be newly appointed for the project implementation period.

Table: Human Resource Required for the Project Implementation (For project period only)

Sl.	Team member	Office	Total number					Total
			Year-1	Year-2	Year-3	Year-4	Year-5	
1	Head of Agro-Business	Head-Office	1	1	1	1	1	1
2	Agro-Business Operation Manager	Head-Office	1	1	1	1	1	1
3	Drivers	MPC wise	28	28	74	74	74	74 (Max)

To establish the business BPO have to purchase specialized vehicles to carry the Agro-Products. For the new vehicles special drivers will be appointed. After Project completion to run the service BPO have to retain then as Revenue HR.

Post Project Implementation

After successful completion of the project, Head of Agro-Business and Agro-Business Operation Manager will be laid off, charges will be handed over to BPO senior officials. Only the drivers will be retained as the service will be continued.

Table: Human Resource Retained after the Project Implementation

Sl.	Team member	Office	Total number
1	Drivers	MPC wise	74

Capacity building of the existing HR

From each district a Project Coordinators have to be deputed from the district head offices to coordinate the whole business from the root level. This person will get extensive training on Agro- Business and Agro- Logistic Handling.

Then again, BPO will need Sorters, Loaders/ Unloaders for delivering the goods. Sorter and Loader/ Un-loader must train in and know Agro-product handling. Otherwise, products will be damaged, and orders will be affected. Bangladesh Post office will train their existing manpower to serve this purpose.

8. SECTION 8: INSTITUTIONAL AND LEGAL ANALYSIS

Any law of Bangladesh Post Office (BPO) does not imply that, The Bangladesh post office could not carry perishable goods. But as the BPO Does not have the capacity and Required Infrastructure they were not carrying any Perishable goods. But with Directors Generals permission BPO could carry perishable goods anytime. By solving a few Institutional issues BPO could start carrying Perishable goods

- Suitable packaging solution for Agro-products
- Direct route (hub to hub) to carry perishable goods
- Person with knowledge of Good Handling Practices
- Marketing and Promotional Activity
- Reefer Vehicle/ Frozen Van

As BPO has the service coverage all over Bangladesh by solving these institutional issues BPO could start carrying agro based products immediately after introducing the Digital Platform/ E-commerce Platform.

9. SECTION 9: RISK (UNCERTAINTY) AND SENSITIVITY ANALYSIS

9.1 INEFFICIENT INVENTORY MANAGEMENT:

Inefficient Inventory management could cause delay in product delivery; thus, one of the

model's values propositions (fast delivery) will fail. The whole business model could fail if inventories are not efficiently managed. To mitigate this risk, Automated/ Digitalized inventory management has to be installed.

9.2 PRICING OF THE SERVICES:

Pricing of the services has to be re-calculated. Currently, BPO Service fees are subsidized. Other businesses will take this advantage. They will send the product at a low rate, and the burden on the government will increase; thus, project financing could be in danger. Thus, market competitive pricing with a better value proposition has to be offered. To mitigate this risk, an AI-based pricing tool must be installed, which will revise the service fees frequently.

9.3 EMPLOYEE BEHAVIOR TOWARDS THE WORK:

BPO employees must change their behavior; they need to be more customer-friendly rather than too professional. They have to give proper attention to the customers, other-wise customer dissatisfaction will become the reason for the downfall. To mitigate, Lots of Training and motivational Training needs to be conducted at each level of Employee.

9.4 TOOLS AND EQUIPMENT:

Without proper and up to date tools, even a motivated employee will lose motivation; thus, proper and advanced tools and equipment are required.

9.5 DATA SECURITY AND HACKING:

If the customer data are unsecured and someone hacks the platform or accounts, that will critically damage the image of BPO, and They will never be able to acquire these or any new customers anymore. Thus a well-protected security system needs to be appointed.

9.6 RISK OF THEFTS:

Delivery persons/ drivers or other in-house or out persons can steal the products. to avoid any stealing case, a proper monitoring and tracking system is required.

9.7 VEHICLE ACCIDENT:

In case of accidents, all the products of the customers might be destroyed. In that case, compensation to customers is must, and this compensation has to be settled down quickly. To mitigate this risk, all vehicles are required to be insured from good insurance companies.

9.8 GOVERNMENT INSTITUTE

Being a government entity Bangladesh Post Office has some risk. Government offices are slow in decision making due to its bureaucratic nature. Also, government offices are not technological very advanced. To compete with this technologically advanced market, BPO

must act dynamically and systematically.

10. SECTION 10: ALTERNATIVE/OPTIONS ANALYSIS

As Bangladesh post office has no experience of handling bulk amount of perishable goods, and also, they currently do not have the Platform/ e-commerce site. BPO could do some piloting programs in selected areas as a proof of concept.

The Result form the pilot projects would generate enough data and real-life evidences which will help them to prepare the DPP.

11. SECTION 11: RECOMMENDATION AND CONCLUSION

11.1 RECOMMENDATION FOR AGRO-BASED PRODUCTS

Introducing an E-commerce Site

From the analysis, the consultant found that introducing an e-commerce site is essential for the Bangladesh Post office. Without the site, it won't be easy to control the ecosystem. Though BPO will not do the e-commerce business, they will manage and coordinate the whole system. It will be a match-making site where demand-side and supply-side actors meet and do the trading. Bangladesh post office control the delivery and Payment system.

Agro-Business Agent

Bangladesh Post office has to introduce the Agent model for the Agro-Business. Existing extra-departmental branches or entrepreneurs won't be suitable for this business. To successfully implement the business, Agents will play a vital role, starting from farmer management, customer requirement fulfillment, quality control, packaging, and disbursement.

Introducing Reefer Vans

Though all fruits and vegetables are not very sensitive to temperature, in Bangladesh, due to traffic congestions and environmental conditions, the quality of fruits and vegetables degrades. Introducing the reefer van will be a game-changer for the agriculture sector and the Bangladesh Post office.

Focusing on Remote Areas

The supply chain and logistics facility in the agriculture sector of Bangladesh is not very structured and advanced. As a result, agro-products from remote rural areas like char and hill tracks are not reaching the central markets. On the other hand, excellent varieties and quality of goods are being cultivated in rural areas, and new-generation farmers are coming up with new technologies there; with the help of Bangladesh Post, they could change the current situation of the industry and their respective areas.

Introducing Insurance against accidental and un-delivered/ unsold/ damaged goods

BPO must introduce insurance and payment guarantee facilities to attract more supply-side and demand-side actors. In case of any adverse situation where customers are affected, BPO must compensate them. To shift this burden from BPOs revenue, they must insure their fleets and process from third-party insurance companies.

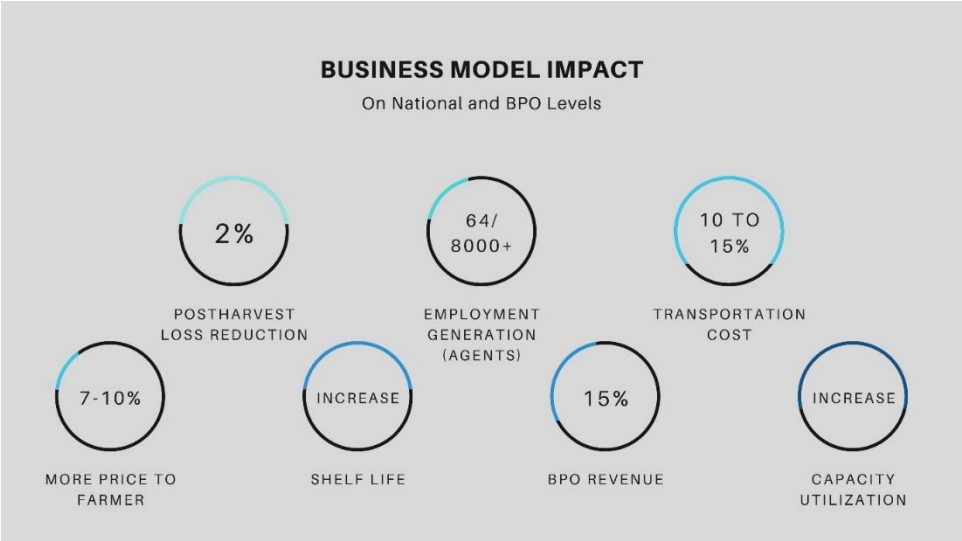
Introducing Access to Finance Facility

To attract supply-side actors like agents and farmers, financial packages like working capital loans must be introduced. The BPO has to on-board good and prestigious MFIs of Bangladesh for this access to finance facility.

11.2 CONCLUSION:

In the current context of the Bangladesh Economy, the proposed business model has both national and organizational impact. This business model will help the agriculture sector of Bangladesh to grow with sustainable market mechanisms.

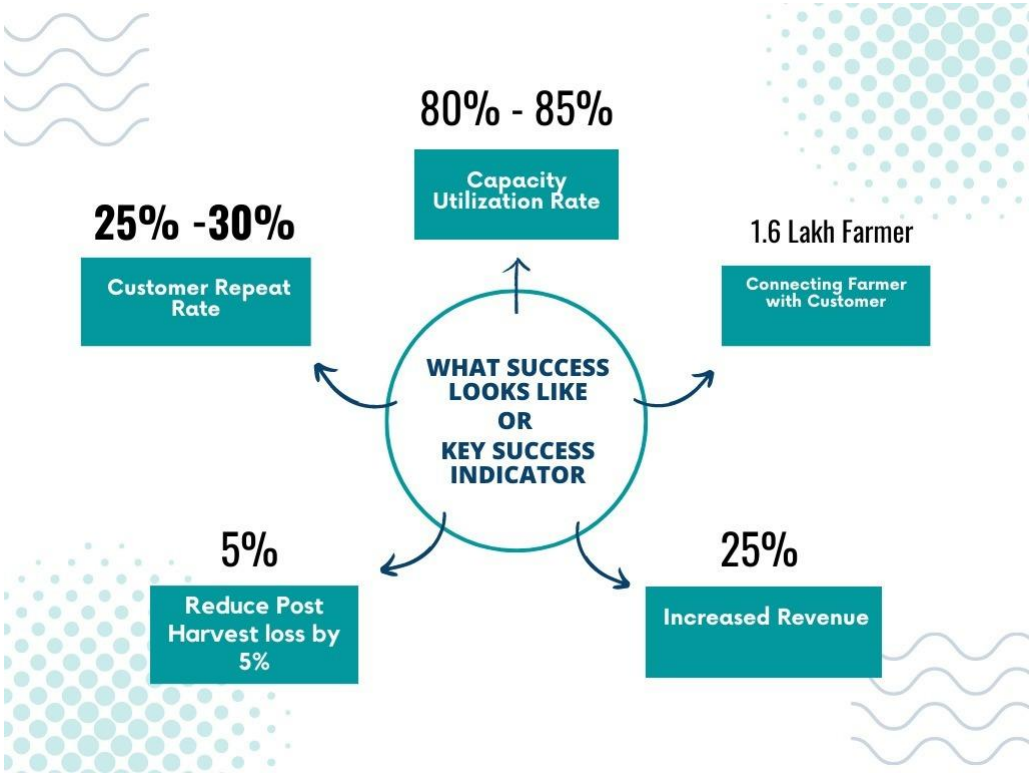
Impact/Output of Business Model



- ✓ By introducing this business model, BPO will contribute to the agriculture sector which includes Fish, Meat, Fruits and Vegetable.

- ✓ This Business model will help to reduce postharvest loss in the agriculture sector
- ✓ This will also reduce the transportation cost and cost of products by eliminating middle man.
- ✓ This Business model will increase employment and also help to generate more income.
- ✓ This will help Farmers and Consumers to get a justified price of the agricultural goods.
- ✓ This business model will help BPO to properly utilize its new and existing infrastructures and it will open a new branch of services as well as revenue for Bangladesh post office.

Key Success Indicator/ What Success looks like



12. SECTION 12: ANNEXES

12.1 PRIME MINISTER'S INSTRUCTION ABOUT MPC

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
ডাক, টেলিযোগাযোগ ও তথ্যপ্রযুক্তি মন্ত্রণালয়
ডাক ও টেলিযোগাযোগ বিভাগ
মাননীয় মন্ত্রীর দপ্তর
বাংলাদেশ সচিবালয়, ঢাকা।

বিষয় ঃ মেইল প্রসেসিং ও লজিস্টিক সার্ভিস সেন্টার স্থাপন এবং ডাক পরিবহণ প্রসঙ্গে।

উপর্যুক্ত বিষয়ে জানানো যাচ্ছে যে, জাতীয় অর্থনৈতিক পরিষদের নির্বাহী কমিটির (একনেক) গত ২৯-৫-২০১৮ তারিখে অনুষ্ঠিত সভায় "মেইল প্রসেসিং ও লজিষ্টিক সার্ভিস সেন্টার নির্মাণ" সংক্রান্তে আলোচনা হয়। উক্ত সভায় মাননীয় প্রধানমন্ত্রী নির্দেশনা প্রদান করেন যে, ১৪টি মেইল প্রসেসিং সেন্টারে যে সকল আধুনিক যন্ত্রপাতিসমূহ স্থাপন করা হবে সেগুলো পরিচালনার জন্য সংশ্লিষ্ট ব্যক্তিদের প্রশিক্ষণের ব্যবস্থা গ্রহণ করতে হবে। তিনি পর্যায়ক্রমে ৬৪টি জেলায় মেইন পোস্ট অফিসসমূহে মেইল প্রসেসিং সেন্টার স্থাপনসহ উপজেলা ও ইউনিয়ন পর্যায়ে বিদ্যমান পোস্ট অফিসসমূহ আরও উন্নয়নের উপর গুরুত্বারোপ করেন। রেলপথ, সড়কপথ, নদীপথ এবং বিমানপথে ডাক পরিবহণের জন্য একটি সামগ্রিক পরিকল্পনা গ্রহণের লক্ষ্যে তিনি নির্দেশনা প্রদান করেন।

এমতাবস্থায়, মাননীয় প্রধানমন্ত্রীর নির্দেশনা মোতাবেক, ৬৪ টি জেলার মধ্যে প্রাথমিকভাবে ১৪ টি জেলা সদরে মেইল প্রসেসিং ও লজিষ্টিক সার্ভিস সেন্টার স্থাপনের পর অবশিষ্ট ৫০ টি জেলা সদরে মেইল প্রসেসিং ও লজিষ্টিক সার্ভিস সেন্টার স্থাপন" এবং "রেলপথ, সড়কপথ, নদীপথ ও বিমানপথে ডাক পরিবহণের" জন্য একটি সামগ্রিক পরিকল্পনা গ্রহণের প্রয়োজনীয় ব্যবস্থা গ্রহণের জন্য নির্দেশক্রমে অনুরোধ করা হলো।

২৪/০৬/২০১৮
(সেবাস্টিন রেমা)
মন্ত্রীর একান্ত সচিব (উপসচিব)
ফোন : ৯৫১৪৪০৩ (অ:)

নং-১৪.০০.০০০০.০২৭.০২৫.০০২.১৭-১৭৪ তারিখ ঃ ২৪/০৬/২০১৮ খ্রিঃ

প্রাপক ঃ

সচিব
ডাক ও টেলিযোগাযোগ বিভাগ
বাংলাদেশ সচিবালয়, ঢাকা।

ডাক ও টেলিযোগাযোগ বিভাগ
অতিরিক্ত সচিব (প্রশাসন) এর দপ্তর

ডাইরী নং ২৫৬৪	তারিখ ২৫/০৬/১৮
প্রেরক শাখা	অগ্রগতির সকল
যুগ্ম-সচিব(প্রশাসন)	যুগ্ম-সচিব (ডাক)-(নিরীক্ষা)
	ব্যক্তিগত কর্মকর্তা

অতিরিক্ত সচিব (প্রশাসন)

	তারিখ
	সচিব, ডাক ও টেলিযোগাযোগ বিভাগ
	যুগ্ম-সচিব (প্রশাসন)
	উপ-সচিব
	সিনিয়র সহকারী সচিব
	মানসংযোগ কর্মকর্তা
	নিচিবের একান্ত সচিব

৪৫৪ ২৫/৬/১৮
ডাইরী নং..... তারিখঃ.....
ডাক ও টেলিযোগাযোগ বিভাগ

অতি জরুরী
বিশেষ বাহক মারফত

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
ডাক, টেলিযোগাযোগ ও তথ্যপ্রযুক্তি মন্ত্রণালয়
ডাক ও টেলিযোগাযোগ বিভাগ
পরিকল্পনা উইং
বাংলাদেশ সচিবালয়, ঢাকা।

স্মারক নং-১৪.০০.০০০০.০১৪.১৮.০১৬.১৪-১৬৪

তারিখঃ ২২ জ্যৈষ্ঠ ১৪২৫ / ০৫ জুন ২০১৮

বিষয়ঃ ডাক অধিদপ্তর সম্পর্কে মাননীয় প্রধানমন্ত্রী কর্তৃক প্রদত্ত সদয় অনুশাসন সংক্রান্ত।

উপর্যুক্ত বিষয়ে জানানো যাচ্ছে যে, গত ২৯/০৫/২০১৮ তারিখে অনুষ্ঠিত একনেক সভায় ডাক অধিদপ্তর কর্তৃক উপস্থাপিত "মেইল প্রসেসিং ও লজিস্টিক সার্ভিস সেন্টার নির্মাণ" শীর্ষক প্রকল্পের আলোচনায় ডাক অধিদপ্তর সম্পর্কে মাননীয় প্রধানমন্ত্রী কর্তৃক প্রদত্ত সদয় অনুশাসন নিম্নরূপঃ

ক) "মেইল প্রসেসিং ও লজিস্টিক সার্ভিস সেন্টার নির্মাণ" শীর্ষক প্রকল্পের আওতায় বর্তমানে প্রস্তাবিত ১৪টি স্থানে মেইল প্রসেসিং সেন্টার নির্মাণের স্থলে পর্যায়ক্রমে দেশের ৬৪টি জেলার অবশিষ্ট জেলাগুলোতেও নির্মাণের ব্যবস্থা গ্রহণ করতে হবে।

খ) ডাক পরিবহণের জন্য সংগৃহিত যানবাহনে Chill Chamber এর সংস্থান রাখতে হবে।

গ) ডাক অধিদপ্তরের আওতায় প্রতিটি ডাকঘরে পণ্য পরিবহণ ব্যবস্থায় E-Commerce প্রবর্তন করতে হবে।

ঘ) রেলের মাধ্যমে পণ্য পরিবহণে ডাক গাড়ীতে (Mail Van) Chill Chamber এর সংস্থান রাখতে হবে।

২। এমতাবস্থায়, মাননীয় প্রধানমন্ত্রী কর্তৃক প্রদত্ত উক্ত অনুশাসন অনুযায়ী পরবর্তী প্রয়োজনীয় ব্যবস্থা গ্রহণের জন্য নির্দেশক্রমে অনুরোধ করা হল।

০৫.০৬.১৮
(মোঃ আব্দুল মান্নান)
সিনিয়র সহকারী প্রধান
ফোন-৯৫৭৩৫৬৬

মহাপরিচালক
ডাক অধিদপ্তর, ঢাকা।

অনুলিপিঃ

১। সচিবের একান্ত সচিব, ডাক ও টেলিযোগাযোগ বিভাগ।
২। যুগ্ম-প্রধানের ব্যক্তিগত কর্মকর্তা, ডাক ও টেলিযোগাযোগ বিভাগ।