VALUE CHAIN ANALYSIS OF GHEE IN THE PABNA DISTRICT OF BANGLADESH

CHOW. MD. SWAPNIL MAHFUZ

DEPARTMENT OF

AGRIBUSINESS AND MARKETING

SHER-E-BANGLA AGRICULTURAL UNIVERSITY,

SHER-E-BANGLA NAGAR, DHAKA-1207.

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BY

CHOW. MD. SWAPNIL MAHFUZ

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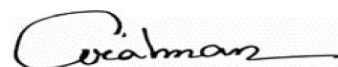In partial fulfilment of the requirements

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Approved by

<div style="display:flex; justify-content:space-between;">

(Sauda Afrin Anny)
Assistant Professor
Dept. of Agribusiness and Marketing
Sher-e-Bangla Agricultural University
Supervisor

(Dr. Airin Rahman)
Associate Professor
Dept. of Agribusiness and Marketing
Sher-e-Bangla Agricultural University
Co-Supervisor

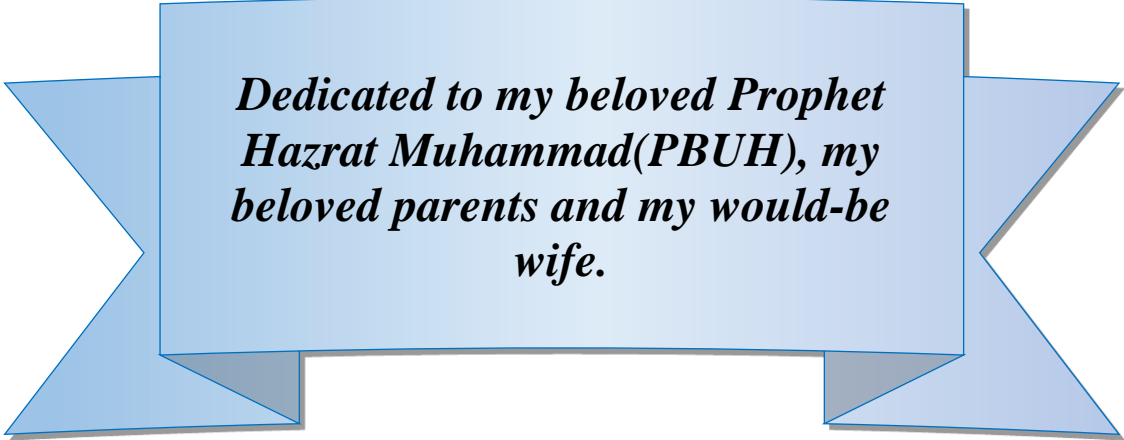</div>

(Dr. Sharmin Afrin)
Chairman
Examination Committee
Department of Agribusiness and Marketing
Sher-e-Bangla Agricultural University

Phone no: +8801724755471   E-mail: swapnilmahfuz77@gmail.com

Dedicated to my beloved Prophet Hazrat Muhammad(PBUH), my beloved parents and my would-be wife.

Memo No.: SAU/AGBM/   *Date:*

CERTIFICATE

*This is to certify that the thesis entitled, **"VALUE CHAIN ANALYSIS OF GHEE IN THE PABNA DISTRICT OF BANGLADESH"** submitted to the Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE IN AGRIBUSINESS AND MARKETING,** embodies the result of a piece of bona fide research work carried out **CHOW. MD. SWAPNIL MAHFUZ**, Registration No. **15-06855,** Mobile no. **01724755471**, e-mail: **swapnilmahfuz77@gmail.com** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.*

I further certify that such help or source of information, as has been availed of during the course of this investigation has duly been acknowledged.

Dated: December, 2022
Dhaka, Bangladesh

(Sauda Afrin Anny)
Assistant Professor
Supervisor
Dept. of Agribusiness and Marketing
Sher-e-Bangla Agricultural University
Sher-e-Bangla Nagar, Dhaka-1207.

LIST OF ACRONYMS AND ABBREVIATIONS

%	=	Percentage
AFC	=	Average Fixed Cost
AVC	=	Average Variable Cost
Avg.	=	Average
BAU	=	Bangladesh Agricultural University
BBS	=	Bangladesh Bureau of Statistics
BCR	=	Benefit-Cost Ratio
BER	=	Bangladesh Economic Review
BLRI	=	Bangladesh Livestock Research Institute
CGIAR	=	Consultative Group on International Agricultural Research
COVID-19	=	Corona Virus Disease of 2019
DAE	=	Department of Agricultural Extension
DAM	=	Department of Agricultural Marketing
DLS	=	Department of Livestock Services
e.g.	=	exempli gratia (L), for example
et al.	=	And others
etc.	=	Etcetera
FAO	=	Food and Agricultural Organization
FY	=	Financial year
GDP	=	Gross Domestic Product
GO	=	Government Organisation
Govt.	=	Government
Ha	=	Hectare
HSC	=	Higher Secondary Certificate
i.e.	=	id est. (Latin); that is (Eng)
IFAD	=	The International Fund for Agricultural Development
ILRI	=	International Livestock Research Institute
gm	=	Gram (s)

Kg	=	Kilogram (s)
Kcal	=	Kilo Calorie
mg	=	Milligram (s)
MT	=	Metric Ton
NGOs	=	Non-Government Organizations
No.	=	Number
OLS	=	Ordinary Least Squares
SAU	=	Sher-e-Bangla Agricultural University
SD	=	Standard Deviation
SDG	=	Sustainable Development Goals
sq.	=	Square
Sq. Ft.	=	Square feet
SSC	=	Secondary School Certificate
SVRS	=	Sample vital registration systems
TVC	=	Total Variable Cost
Tk.	=	Taka
UN	=	United Nations
USD	=	United States Dollar
USDA	=	United States Department of Agriculture
UDAF	=	Integrated Development of Artisanal Fisheries in West Africa
VAT	=	Value Added Tax
VCA	=	Value Chain Analysis
VIF	=	Variance Inflation Factor
WB	=	World Bank
YAS	=	Yearbook of Agricultural Statistics

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ABSTRACT

This thesis conducts a comprehensive value chain analysis of the Ghee industry. It explores the various stages involved in the production, processing, and distribution of Ghee, identifying key activities and actors along the chain. The study assesses the value added at each stage and examines the efficiency, competitiveness, and sustainability of the Ghee value chain. The findings contribute to a deeper understanding of the industry's dynamics and highlight potential areas for improvement and innovation. This research provides valuable insights for policymakers, industry stakeholders, and businesses aiming to enhance the value chain of Ghee. Faridpur, Bhangura and Chatmohar Upazila of Pabna district were selected for the study based on the intensive production of milk value-added milk products. A simple random sampling technique was used for collecting data from 60 Ghee Producers, 20 wholesalers, 20 Online Traders and 20 Retailers grand total of 120 respondents by using a structured interview schedule. Tabular analysis and the OLS model were used for the analysis purpose. The Ghee producer's TVC (per kg) was about Tk.1546.78, average revenue (Per kg) was about Tk.1690.42, Average Profit (Tk/Kg) was about Tk. 143.63 and maintaining the Avg. BCR of 1.086501. The Wholesaler's Total Cost (Tk/Kg) was 874.43, Profit (Tk/Kg) was 48.90 and the BCR was 1.06. Online Traders' Total Cost (Tk/Kg) was 1014.20, the Profit (Tk/Kg) was 159.05 and the BCR was 1.15822. The Retailer's Total Cost (Tk/Kg) was 883.90, Profit (Tk/Kg) was 100.85 and the BCR was 1.114159. The number of total employees and BCR had a positive relationship with the Yearly Profit. Occupation (Other Jobs), To Whom Do They Sell Their Products (Other Manufacturers), Occupation (Ghee Producer), Ownership Type (Others), Education Level etc. had a negative significant relationship with the Yearly Profit. Ghee producers and other respondents faced various problems. Most of them are capital shortages, transportation problems, lack of proper roads, inconsistency of demand, inconsistent supply of raw materials, lack of skilled Labor, and local tolls (Chanda) etc. Some various solutions were expressed by the respondents including loan facilities, Govt. intervention, marketing, training facilities, law and order, public awareness etc.

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CHAPTER 1

INTRODUCTION

1.1 Background

Bangladesh is an agricultural country where the livestock sector is prominent. Agriculture is the single largest producing sector of the economy and it contributes about 11.50% to GDP and employs around 40% of the total labour force (BBS, 2022). Crop production, forestry and livestock dominate the agricultural sector (Economic Review, 2022). Agriculture greatly impacts employment generation, poverty alleviation and food security (WB, 2016). In Bangladesh, dairy farming is a crucial component of the agricultural production system. Investment is required for milk production and commercialization in the economic activity of dairy farming. A biological system called daring produces milk from enormous amounts of feed and roughage. It is an effective and intense system for producing nutrients and proteins for human consumption from a given quantity of resources. Additionally, it requires more labour and generates a sizable amount of jobs in the fields of production, processing, and marketing. Dairy could show to be a tool for raising revenue and employment in rural areas due to Bangladesh's agro-climatic characteristics. Dairy farming has been a major source of income for many Bangladeshi agricultural families that are small and landless. Several large dairy farms with a high capital investment have also been built in the past year (Shanjida, 2014).

Bangladesh's animal farming plays an important role in our agricultural and national economy. Animal farming's contribution to GDP is 1.90% with a growth rate of 3.10% in FY 2021-22 (Economic Review, 2022). The share of livestock in Agricultural GDP at constant prices is 16.52% in FY 2021-22 (DLS, 2022). If milk production lasts to grow at the projected rate per head milk obtainability will reach 188.57 ml/day/person by 2024, surpassing the milk obtainability of all ruminants. Forecasts assume that 50% of the milk supply comes from cows, somewhat bigger than the present proportion, as milk production from cows is delivered faster than milk production from small ruminants (Hossain *et al.*,2022). The livestock sector generates 20% of full-time employment in Bangladesh and around 50% of employment is related to it (DLS, 2022).

Bangladesh is still insufficient in milk production and must import dry milk to meet its domestic demand. It is long overdue to revitalize this sector with appropriate technology to meet local milk, meat and milk product demand (IFAD, 2016).

Dairy farming is one of the investment opportunities for farmers to raise their living standards (ILRI, 2007). It is a developmental instrument because it broadens and sustains three main mechanisms for escaping poverty: protecting assets, enhancing productivity among small farmers and pastoral productivity and boosting the poor people's market involvement (Randolph et al., 2007). More than 750 million people, or almost 150 million farm households, are thought to be involved in milk production globally, with developing nations accounting for most of these homes (FAO, 2010). Many individuals, many of whom are poor, receive income and jobs from the dairy industry. A million litres of milk produced annually on smallholder dairy farms generate about 200 farm jobs, or 12 to 14 per cent of the world's population, or 750 million to 900 million people, living on dairy farms or in households that are dairy farmers (FAO, 2010).

Table 1.1 Production of Cattle, Milk and Meat

Fiscal Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Cattle	233.41	234.88	236.36	237.85	239.35	240.86	242.38	243.91	245.45	247.00
Milk (Lakh MT)	50.70	60.92	69.70	72.75	92.83	94.01	99.23	106.80	119.85	130.74
Meat (Lakh MT)	36.20	45.21	58.60	61.52	71.54	72.06	75.14	76.74	84.40	92.65

Source: DLS (2022).

The consumption patterns of dairy products have altered as a result of the growth of contemporary civilization and culture, especially the rise of high income. In contrast to regular raw milk, they are growing more excited about processed milk and milk products. Consequently, there has been significant growth in the usage of ghee, butter, yoghurt, and other milk products (Shanjida, 2014).

Value and chain are the two main notions in the study of value chains. In the Value Chain Analysis (VCA), the term "value" is synonymous with "value added" since it describes the additional value of a product that is created after it has been processed. Value addition for agricultural goods may also occur through product diversification based on food safety and functionality. The cost of the finished product demonstrates its added value. According to Hawkes and Ruel (2011), the term "chain" refers to a supply chain, denoting the procedure and the players engaged in a product's life cycle (from creation to disposal). The study of the "full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use" is thus described as VCA by Kaplinsky and Morris (2001, pg.4). Sanogo (2010) adds examination of the institutional support to production at various phases to VCA in addition to the flow of a product from one stage to another and identification of the players, businesses, and their services.

In the Value Chain Analysis (VCA), the term "value" is synonymous with "value-added," since it describes the additional value of the finished product that is produced after a product has been processed. Value addition for agricultural products can also occur through product diversification based on food safety and functionality. Sahiwal, Red-Sindhi, Holstein, Jersey, Holstein-Friesian crosses, Jersey crosses, and Sahiwal crosses are the most common breeds seen on commercial farms. Cross-breeding occurs frequently in major cities like Dhaka. Fresh milk processing and commercialization, a new field of the urban agriculture industry, has received particular attention (Zahoor,2012).

1.2 Statement of dairying and value chain

Everywhere in the world, dairy production is a successful industry. Dairying has thus been seen as crucial in Bangladesh's recent agricultural diversification efforts, especially for the rural system.

In Bangladesh, it offers nourishment, organic manure, supplemental jobs, monetary income, and draft animal power. The development of the dairy industry is crucial to

providing people with employment possibilities because dairy farming is labour-intensive and supports employment in production, processing, and marketing.

Dairy farming is a category of agricultural or animal husbandry businesses for the long-term production of milk, which may either be processed locally or transferred to a dairy factory for processing and eventual retail sale.

The majority of dairy farms in the nation are private and fall into one of five groups: Dairying for home consumption; 2. Rearing of cows for dual purposes (draft and milk); 3. Small-scale dairy farming 4. Medium-sized commercial dairy farming 5. Private large commercial dairy farms (Halder and Barua, 2003).

The value chain can be conceptualized as a series of processes, services, and goods resulting in a good or service delivered to the customer. The value chain can assist in providing answers to queries about:

i) how the products a farmer produces reach the final consumer;

ii) the structure (economic relationships) among actors in the chain;

iii) how this structure is likely to change over time;

iv) the key threats to the entire value chain;

v) by the key determinants of the share of the profits created the chain

1.3 Nutritional Value of Milk and Milk Product

When compared to the restricted amino acids found in plant diets, milk offers protein with a high biological value (Table 1.3). The fact that every nation in the world engages in milk production and has a dairy development strategy or policy shows how crucial milk is to a healthy diet.

Table 1.2 Nutritional value of milk (in every 244gm or 1 cup)

Item	Quantity
Calories (gm)	150
Protein (gm)	8
Fat (gm)	8
Saturated fat (gm)	5.1
Carbohydrates (gm)	11

Item	Quantity
Calcium (mg)	291
Iron (mg)	0.1
Sodium (mg)	12
Vitamin (μg)	310
Ascorbic Acid (mg)	2

Source: Nutrition Almanac (2002).

Table 1.3 Nutritional value of Ghee (in every 100gm)

Item	Quantity
Energy (kcal)	867
Protein (g)	0
Total lipid (fat) (g)	100
Carbohydrates, by difference (g)	0
Sugars (g)	0
Sodium (Na) (mg)	0
Fatty acids, total saturated (g)	60
Cholesterol (mg)	267

Source: USDA (2019).

Table 1.4 Nutritional value of Butter (in every 100gm)

Item	Quantity
Water (g)	16.2
Energy (kcal)	717
Protein (g)	0.85
Total lipid (fat) (g)	81.1
Sugars (g)	0.06
Carbohydrate (g)	0.06
Calcium (Ca) (mg)	24
Iron, (Fe) (mg)	0.02
Potassium (K) (mg)	24

Source: USDA (2019).

1.4 Importance of dairy farming in Bangladesh

It is commonly known that milk is the best nourishment for humans, especially to support children's growth, fetal growth in pregnant women, and lactation-related milk production. It has also been called the ideal food created by nature. Mother's milk is a comprehensive and well-balanced diet for a newborn child or animal. Its primary components, which provide the young with energy and building blocks, are joined by a variety of nutrients, including minerals, vitamins, and organic compounds. For the maintenance of soil fertility, cow dung is a crucial nutrient. It is also employed in the creation of biogas. In rural areas, some dried cow dung is used as fuel for cooking.

Animal husbandry is crucial to human civilization. The livestock industry has evolved economic uses as the characteristics of the soil, the air, and the sunshine associated with civilization have changed. Our culture placed a high value on a farmer's many cattle, and we also value milk extremely highly. With population growth, this industry experiences an increase in demand. This nation has an extremely high population density and a rapid rate of population expansion. This industry has a significant potential to help this enormous population meet its nutritional needs. This industry can guarantee the sustainable multipurpose use of our land and help unemployed rural residents. Therefore, this sector has the potential to guarantee Bangladesh's economy certain mobility through the elimination of poverty, the provision of nourishment, and the creation of jobs.

Bangladesh is ideally situated to produce milk on a global scale thanks to the accessibility of inexpensive labour. Despite the considerably higher local milk price, the Bangladeshi mini-dairy farm did not seem to be very lucrative. Bangladeshi farmers can increase their profits by using better breeds, nutrition, care, and management (Alam, 1995). Farmers nowadays are gradually making improvements in those areas and management techniques. Small- and large-scale dairy farms have been growing daily in various regions, particularly the Dhaka district.

Dairy farmers need to develop ways to lower costs and boost returns to be more competitive due to globalization and the influence of fluctuations in the price of milk globally. Knowing specifics about the management techniques, value-adding activities, relative productivity, profitability, and resource use efficiency of small-scale dairy

contract and non-contract farming is crucial for developing a plan to help dairy farmers transition from their less profitable farming to higher profitable businesses. Increased milk output will help farmers earn more money while also contributing to the national economy and saving foreign currency.

1.5 Prospects of the dairy sector in Bangladesh

The dairy business in Bangladesh is expanding and has a lot of promise. In a nation of more than 160 million people, there is a sizable demand for milk and milk products. The Bangladeshi government is acting to support the industry, particularly by upgrading infrastructure and giving subsidies to dairy producers.

The country produced 10.34 million metric tonnes of milk in 2019–2020, up from 9.35 million metric tonnes in 2016–2017, according to the Bangladesh Bureau of Statistics. Numerous people are finding work thanks to the dairy industry, especially in rural areas.

However, the industry continues to face difficulties like low productivity, restricted credit availability, and a lack of cutting-edge technology. It will be essential for the sector's expansion and competitiveness in the global market to address these concerns. Overall, Bangladesh's dairy industry has bright prospects and can significantly boost the nation's economy with the correct policies and investments.

1.6 Present Scenario of Value-Added Dairy Products

The demand for dairy products has significantly increased in Bangladesh as a result of the country's expanding urbanization and population. The dairy business in Bangladesh has been investigating value-added products to meet the changing tastes and preferences of consumers. These products provide improved nutritional advantages, convenience, and diversity over traditional dairy products. In this article, we will examine the current state of Bangladesh's dairy value-added goods, including the variety of products offered, market trends, industry issues, and opportunities for the future.

Bangladesh's dairy sector has increased the variety of value-added products it offers. Traditional dairy products like butter, cheese, and yoghurt have long been mainstays. However, the market has recently added items like flavoured yoghurt, probiotic beverages, sweets made with milk, and dairy products that have been fortified. These

added-value goods are marketed to consumers who are health-conscious and appreciate convenience, nutrition, and distinctive flavours.

Table 1.5 Present Scenario of Value-Added Dairy Products in Bangladesh

Items	Yearly Revenue (Billion. Tk.) (1 USD=100 Tk.)
Yoghurt	128
Cheese, Butter, Ghee etc.	86
Powdered Milk (Import)	2.5
Milk	499
Other Dairy Products & Eggs	405

Source: Statista.com (2023)

Due to shifting customer tastes, the demand for dairy value-added products has been continuously rising in Bangladesh. The need for quick and wholesome food alternatives has increased as disposable incomes, urbanisation, and the number of people working have grown. Value-added dairy products provide ready-to-eat, portion-controlled, and nutritionally enhanced substitutes to meet these demands.

Furthermore, people are becoming more and more aware of the advantages that value-added dairy products provide for their health. Due to the advantages they provide for digestive health, probiotic beverages and yoghurt with living cultures are becoming more and more popular. Dairy products that have been fortified, such as milk with added vitamins and yoghurt with added calcium, are also popular because they meet certain nutritional needs.

The Bangladeshi market for dairy products with added value is promising, but it also has certain difficulties. The absence of suitable infrastructure and technology to enable value addition operations is one of the main challenges. Investments in processing facilities, cold chain logistics, and quality control procedures are necessary in this sector of the economy to guarantee the secure production and distribution of value-added goods.

Finding high-quality raw materials is another difficulty. For the industry, maintaining a consistent supply of milk and other dairy components that adhere to the necessary requirements can be a challenge. This problem can be solved by strengthening the dairy supply chain, enhancing milk collecting and storage procedures, and promoting environmentally friendly agricultural methods.

Despite these challenges, the current situation also offers potential for Bangladesh's dairy value-added product business. Manufacturers may be able to get a bigger market share when customer knowledge and willingness to pay for premium goods rise. Collaborations between business stakeholders and academic institutions may promote product innovation, providing a constant flow of fresh dairy products with added value. Bangladesh's dairy value-added goods look to have a bright future. The government's attempts to help farmers, enhance infrastructure, and promote the dairy industry are positive developments. These initiatives seek to boost milk output, improve quality, and streamline value-adding procedures.

Additionally, as the middle class in the nation keeps expanding, more people are anticipated to want value-added dairy products. Manufacturers may take advantage of this chance to provide novel, healthier solutions that meet changing customer tastes and demands.

Bangladesh's current situation for dairy products with added value shows a promising trend. The sector is positioned for expansion thanks to an expanded product line, rising customer demand, and helpful governmental initiatives. For sustainable development, it will be essential to address the issues with infrastructure, raw material procurement, and quality control. The dairy value-added product business in Bangladesh may find a place and prosper in the cutthroat market by leveraging market trends, adopting technical improvements, and concentrating on product innovation.

1.7 Rationale of the Study

In both developing and wealthy nations, the demand for milk and dairy products is increasing more quickly than that for crops due to the world's population boom. There is a critical need to investigate the causes of the dairy industry's underdeveloped state and identify solutions for overcoming its challenges concerning dairy production,

marketing, and profitability to sustain and accelerate the dairy industry and thereby foster agricultural growth in Bangladesh.

These dairy farms are expanding their businesses by opening new channels in the milk industry and relying on current and potential urban clients. They supply urban consumers with fresh dairy products, particularly fresh packaged milk, through their own sales centers and, in the majority of cases, through local stores. Researching the contemporary marketing system, which is still flourishing with the help of contemporary channels, has become vital. To determine the current marketing channels, the overall marketing system, and the distribution pattern of milk in the urban and suburban areas of the Dhaka district, the current study has been done.

This study will assist in identifying issues at various levels of the value chain, from production to marketing, and will also make ideas for potential solutions, all of which will enhance Bangladesh's dairy value chain. As a result, it is anticipated that the current study will be useful to individual dairy farmers, milk traders, processors, retailers, policymakers, extension workers, and researchers to conduct further analysis and build a plan for the dairy industry.

The dairy industry has continued to receive little attention. Without any efforts to improve it, it will be challenging to reach the objective of self-sufficiency in food, which is the most important and fundamental necessity of existence (Kar, 2003). The only way to objectively determine how markets affect the production, processing, and consumption of milk is through a scientific study.

The research area offers enormous potential for milk production and commercialization. The study, which was novel for that region, will increase milk output now being done. To improve the condition of milk producers and market intermediaries, it was more vital than ever to pinpoint their inefficiencies. This study's spatiality was intended to deliver some crucial information on the performance of the milk supply chain and value chain in the study area.

1.8 Objectives of the Study

1. To determine the socio-demographic characteristics of Ghee producers and other value chain actors;

2. To identify existing Ghee value chain, marketing channels and value addition in every stage of channels;

3. To identify problems and challenges of the Ghee marketing system.

1.9 Structure of the dissertation:

There are a total of six chapters in the dissertation. The introduction chapter outlines the research principles and gives empirical support by analysing pertinent studies and secondary data, followed by the chapter on the review of the literature. The framework of the Ghee value chain analysis, data sources, sample methodologies, variable descriptions, data management, analytical techniques, etc. are then covered in depth in the methodology chapter. Chapter 4 discusses the Ghee value chain and provides an overview of the Ghee business to help with objective two. To further illustrate goals one and three, findings concerning the socio-demographic traits of ghee producers and their effect on yearly profit, as well as the profitability and value addition in different stages of the ghee value chain, are described in Chapter 5. Lastly, the study concludes by summarizing the research results and discussing limitations, future research scopes and policy implications.

CHAPTER 2
REVIEW OF LITERATURE

A little research has been done on these topics, the literature on the development of the dairy milk and Ghee value chain and marketing effectiveness is notably deficient, especially in Bangladesh. In this chapter, the findings of earlier investigations that are connected to the current study project are briefly reviewed. However, there is some pertinent research available from Bangladesh as well as from other nations regarding the supply chain, value chain, and efficiency of dairy milk production and marketing. This chapter examines the body of literature on the production, marketing, supply, and value chains of Ghee as well as dairy.

Jabbar (2009) carried completed a study on the North West Region's policy barriers to the development of Bangladesh's dairy value chain. It was established that conventional or even processor-driven supply chains include a flow of commodities and services because participants, including producers, trade goods and services. In contrast to transactions involving outputs, those requiring inputs often include a different set of players and chains. Although these transactions and interactions are governed by unofficial rules and conventions, and many players perform various roles, there is no overarching system of governance that unites all actors and bestows upon each participant particular rights and duties. In a supply chain, each actor seeks to maximise their profits at the expense of the other(s), however in a value chain design, there are agreed-upon rules for sharing the benefits of advances in chain functions and performance.

Pathan (2011) carried out a study on the economics of small-scale dairy production. The Cob-Douglas production function model was used to determine which factors in the production process were most crucial. The study found that raising dairy cows was profitable. The projected daily cost of raising a dairy cow was Tk. 71. A dairy cow's daily total return was calculated to be Tk. 139. Here, 82.04% of the overall return was attributable to milk production value. For a dairy cow, the daily net return was Tk. 68. 2 litres of milk were produced on average each day. Insufficient feed and fodder, a lack of better breeds, a lack of veterinary care and services, a lack of institutional finance, and the high cost of concentrate feed are only a few of the significant issues that the study uncovered.

Saadullah (2000) conducted economic research on the rearing of dairy cows and discovered that dairy farming is a successful business. According to the report, raising dairy cows has the highest single expense of all: feed. Feed makes up 60.01 and 67.57 percent of the total cost for the local breed and cross-bred animals, respectively. Net returns per day per cow for the native breed and cross-bred cattle were Tk. 16.43 and 82.01, respectively. Local breed and cross-bred had benefit-cost ratios of 1.38 and 1.90, respectively. The Cobb-Douglas production function was used to calculate the variables' contributions to farmers' increased returns. Despite a 1.2% annual supply growth for domestically produced animal products (milk, meat, and eggs) (DLS, 2000), the daily availability of milk and meat per person is only 32.6 ml and 10.2 gm, respectively, compared to the demands of 250 ml and 120 gm. Because 85, 89, and 75% of the population, respectively, cannot get enough milk, meat, or eggs, there is a severe scarcity of these livestock products. Production of dairy cattle is severely hampered by a lack of high-quality feeds, fodder, and breeds.

Quddus (2006) conducted a study to determine the profitability of dairy farming, milk consumption trends, and dairy farmers' marketing strategies. It was found that the commercial region's net return on dairy milk was much greater than that of other regions because the region raised cross-bred cows and fed them premium feed. The semi-urban area got the highest net return from dairy firms (75%) at 69 percent of the total cost. According to the positive values of the marginal value product, the addition of dry feed, capital investment, and manpower would boost positive returns through milk production. By area and income level, dairy owners' average daily milk consumption varied widely per individual.

Mandal *et al.* (2013) conducted a study on the value added by wholesale milk market participants. The outcome revealed that the estimated daily cost per dairy cow was Tk. 94.16, while the net profit was Tk. 78.59. For Beparies, wholesalers, and sweetmeat shops, the marketing expense per 100 litres of milk was Tk 132.63, Tk 147.50, and Tk 4726.60, respectively. Beparies, wholesalers, and sweetmeat shops each added Tk. 367.37, Tk. 152.50, and Tk. 1023.40 in value for every 100 kg of milk consumed.

Kumar *et al.* (2022) stated that due to its high perishability, milk plays a significant part in the value chain. Value chains are used to coordinate the resources and parts of a value chain and are a tool for strategic business analysis and planning. Effective value

chain management has a direct influence on the profitability of the involved parties and consumer satisfaction. To increase production and the welfare of underprivileged farmers in developing nations, contemporary technology must be included in the milk value chain. The impact of value chains on the transmission and/or adoption of technology in food chains in developing nations is little understood. Here, we'll concentrate on the role that external factors play in the milk value chain, how the milk value chain is organized using a cooperative model, the main challenges and opportunities it faces, etc. After producing milk of a high calibre, we must upgrade by adding some value. Therefore, knowledge extension is required at the village level. The major goal is to enable readers to explore opportunities for innovation and improvement at each stage of the milk value chain after reading it. This will support the societal provision of safe and wholesome milk.

Habibullah (1997) performed a study on the opportunities and challenges for private sector development of dairy farms. He discovered that the cost of feed is the biggest cost component for dairy animals. For all types of farms, the share of concentrate feed was approximately twice as high as the share of roughage. The increased percentage of concentrate feeds unfavourably correlated with both the farms' dairy animal populations and milk output. In terms of total returns from dairy farming in the private sector, return from milk accounted for the greatest portion. This study demonstrated that the largest challenge in raising dairy animals is the high cost of veterinary care and concentrated feed.

Datta (2019) conducted a study of the economics of dairy cow farming in the Rangpur dairy. According to the study, the daily rearing costs for native and crossbred cows were 43.59 and 90.97, respectively. For locally bred and crossbred cows, the average daily milk production was 1.46 litres and 4.59 litres, respectively, while the daily total return was assessed at 60.02 and 172.98 for the same. For local breed and crossbred farms, the value of milk reproduction constituted 70.52 and 77.02 percent of total returns, respectively, while the net return per day per cow was 16.43 and 82.01. For local bred and crossbred cow rearing, the BCR per day per cow was Tk. 1.38 and Tk. 1.90, respectively. Here, the impact of important factors was evaluated using the Cob-Douglas production function model.

Raymon (2003) provided an example to show how marketing efficiency is defined as the effective use of resources to maximise customer pleasure. In terms of physical input-to-output ratios, the efficiency of agricultural marketing relates to how effectively marketing resources are utilised. Given locational and environmental restrictions, an efficient company or market maximises output from the inputs utilised and minimises resource inputs for any given output.

Backman and Davidson (1962) defined a market as one of the several systems, institutions, processes, social relationships, and infrastructures that enable parties to trade goods and services. In a market, transfers of title frequently coincide with the real movement of the items in question. A market is a point, location, or sector in which a price-making force occurs. Despite the possibility of parties exchanging products and services through barter, the majority of marketplaces rely on sellers providing their goods or services (including labour) in exchange for money from purchasers.

According to **Bain and Howells (1988)**, a market may be thought of as straightforward arrangements that make it easier to swap one product for another. A market is more than just a physical location; its pricing and exchange mechanisms are its most obvious characteristics. A market does not require physical contact to function, especially with the advancement of information and communication technology.

Chhina (2009) asserts that a market is deemed highly efficient if the price variation of a good at various points throughout the year does not exceed the cost of storage, the price variation of a good at various locations does not exceed the cost of transportation to those locations, and the price variation concerning the change in the product's form (processing) does not exceed the cost of processing. Therefore, the pricing of the product with the change in time, place, and form can be used to measure the effectiveness of a market.

Chinna (2009) also discovered that a variety of factors, including the quantity of the product, perishability, bulkiness, risk involved, market facilities, grading, storage, transportation, regular or irregular supply, advertisement, processing, packaging, retail or wholesale, level of market information, and level of market competition, have an impact on the cost of marketing a specific commodity. To lower marketing costs, it's

important to take into account several factors, including better management, better product handling, increased sales volume, lower market fees, perfect competition conditions, risk reduction, and grading practised market information.

According to **Shepherd (1972)**, marketing effectiveness is the ratio of the total value of items sold to the cost of marketing. Efficiency increases with greater ratios and vice versa. Different things are expected of growers, traders, and middlemen in the marketing system. The producers hope to quickly get the fastest money for their sale while also selling their goods at the greatest prices feasible. Customers want to spend as little money as possible on the highest-quality goods. The merchants want to charge the most for their services and make the most money possible from their marketing firm.

Marketing expenses, as defined by **Holloway and Ehui (2002)**, are those expenses incurred during the conveyance of products from producers to consumers to carry out different marketing operations. The costs of marketing also include handling (packing and unpacking), the cost of seeking a partner with whom to trade, the cost of investigating prospective trading partners to establish their dependability, the cost of haggling with prospective trading partners (officials) to reach an agreement, the cost of transferring the product, the cost of overseeing the agreement to make sure that its terms are adhered to, and the cost of enforcing the exchange agreement.

According to **Mendoza (1995)**, market margins are mostly determined by a combination of the quantity and calibre of marketing services provided, their cost, and the efficiency with which they are executed and charged. For instance, a wide margin may result in little to no profit or even a loss for the seller involved depending on the marketing expenditures as well as the selling and purchasing prices.

A desirable change, according to **UNIDO (2011)**, is one that increases or extends productive operations while simultaneously bringing about social benefits including poverty reduction, higher income and employment, economic growth, enhanced environmental performance, gender equity, and other development goals. Enhancing business processes at the level of producers, processors, and other participants in the chain, as well as the (contractual) linkages between them, the flow of knowledge and information, and innovation, maybe the focus of interventions for value chain

development. Value chain expansion may also promote entrance barrier reduction, overall chain coordination, participation of selected beneficiaries in local, national, or worldwide value chains, and a higher share of value addition for certain actors.

The **World Bank (2005)** stated that investment is necessary for better upkeep of the port and transportation facilities. To enhance the proper and timely shipment of perishables, managerial changes and infrastructural expansion must both be made.

AGRICO (2004) asserted that value chain analysis also exposes the dynamic flow of economic, organizational, and coercive actions involving participants in several sectors. It demonstrates that understanding how entry barriers 30 are formed and how reward and risk are allocated depends on power relations. It examines global perspectives on the competition. By highlighting strengths and shortcomings, value chain analysis aids participating players in creating a common understanding of how the chain should function and in locating collaborative relationships that will enable them to maintain developing the chain. The second result is particularly pertinent in the case of new manufacturers, such as impoverished producers and poor countries, who aspire to enter international markets in a way that will guarantee sustainable revenue development.

According to **AGRICO (2004)**, lower operating costs, more negotiating power, and better access to technology, information, and capital are the main advantages for commercial stakeholders of being a part of an efficient value chain. These factors encourage innovations in production and marketing processes to increase value and provide higher quality to customers. Commercially speaking, weak value chains are the outcome of poor value chain links between business stakeholders and service suppliers. Value chains are constructed by associations of producers, intermediaries, processors, and service providers to boost productivity and add value to their operations. A value chain's players can increase their competitiveness through collaboration and maintain it through innovation. By creating synergies and governance guidelines with the goal of generating greater value, the constraints of each participant in the chain are overcome.

AGRICO (2004) also stated that the main obstacle to the growth of the agribusiness sector in Bangladesh is the absence of strong value chain connections between input suppliers, agro producers, middlemen, processors, and service providers. Several

elements, including policy, institutions, human resources, gender, and infrastructure, account for the lack of strong connections.

According to **IDAF (2009)**, a poor agricultural finance system, an unorganised market structure, harsh weather, small land holding sizes, and a lack of technological progress are to blame for the low productivity in the smallholder sector. Continuous farming, soil erosion, deforestation, and a lack of technological advancement in land and water management all contribute to land degradation. This is due to the lack of more productive agricultural methods in use. Smallholder agriculture is associated with a lack of value addition in agricultural products, little agro-processing, and the majority of smallholder farmers selling raw agricultural commodities without adding value while receiving no additional pay for quality.

According to **AGRICO (2004)**, there are several effects when there are insufficient connections between the stakeholders in a value chain. The prevalence of supply chain bottlenecks may be the most visible one. Fruit farmers, therefore, deal with surpluses of their goods, processors are unable to obtain enough raw materials for their factories, merchants are unable to fulfil consumer demand, and exporters are unable to satisfy the needs of international clients. Reduced domestic and international trade means that rural households and businesses won't be able to benefit from increased employment and income in the rural sector. A poor rural economy thus limits the potential for additional investment in rural regions and results in slow overall growth. Without strong connections between stakeholders, successful entrepreneurial instances stay isolated and do not result in a broader expansion of the agriculture industry. Entrepreneurs must be connected, form associations, and create mechanisms for information exchange, including the creation of economic clusters, which are places where many related businesses group themselves to achieve economies of scope and scale.

Reviewing all these papers, there is a clear thing that in Pabna there was no such research about the Ghee value chain. However such research is much needed because, in Pabna, most of the people are now involved in dairy production. Some research will be helpful at both local and national levels for dairy and dairy products producers and intermediaries to overcome all obstacles present in Ghee marketing and value chain development.

CHAPTER 3
METHODOLOGY

Any research study's methodology is both a crucial and indispensable component. Without a suitable approach very often leads to poor results. The technique of the study is used in a variety of ways to choose the optimal approach for achieving the specified research objectives (Mazumder, 2008). This chapter provides a thorough explanation of the study area, how it was chosen, how respondents were chosen, how the data was collected, and the analytical methods used.

3.1 Research Approach:

A method of quantitative research is used to carry out the current study. It is exploratory research since it assisted in examining and identifying the Ghee value chain, as well as the main factors that determine the chain's share of the profits, the main dangers to the chain as a whole, and the route taken by a farmer's goods to the customer. These occurrences are assessed using numerical data collected by the researchers utilizing a standardized questionnaire for the study's objective on the respondents' varied attributes. Despite having significant limitations when it comes to understanding the narrative aspects of human livelihoods without informing the respondents, quantitative research does present a rare opportunity to conduct research in an organised manner by using useful research instruments and appropriate analytical tools (Daniel, 2016). Consequently, the researcher concluded that the quantitative research technique was best suitable for this particular study.

3.2 Sources of data:

This investigation was carried out with the aid of primary data. The intended respondents were personally interviewed for the main data using a structured questionnaire.

3.3 Size of sample:

A total of 120 interviews were conducted to collect data from the respondents. Among them, 60 respondents produced Ghee, 20 were wholesalers, 20 were retailers and 20 were online traders.

3.4 Area of study and data collection process:

The Pabna district served as the major source of respondents' survey data for this study. Pabna is well recognised as one of Bangladesh's milk-producing districts due to the high concentration and quick expansion of farms that produce milk products (Talukder et al., 2019). Faridpur, Bhangura, and Chatmohar are some of the milk and milk products producing upazila in the Pabna district (The Business Standard, 2021). The majority of data from respondents were collected from Faridpur Upazila as it is the largest "Bathan" area of the country, a concentrated milk product-producing hub. The researcher also selected these areas because of the ease of the data collection process. 60 respondents who produce Ghee were selected randomly. The majority of the respondents were from Faridpur Upazila as it had a very concentrated milk product-producing hub.
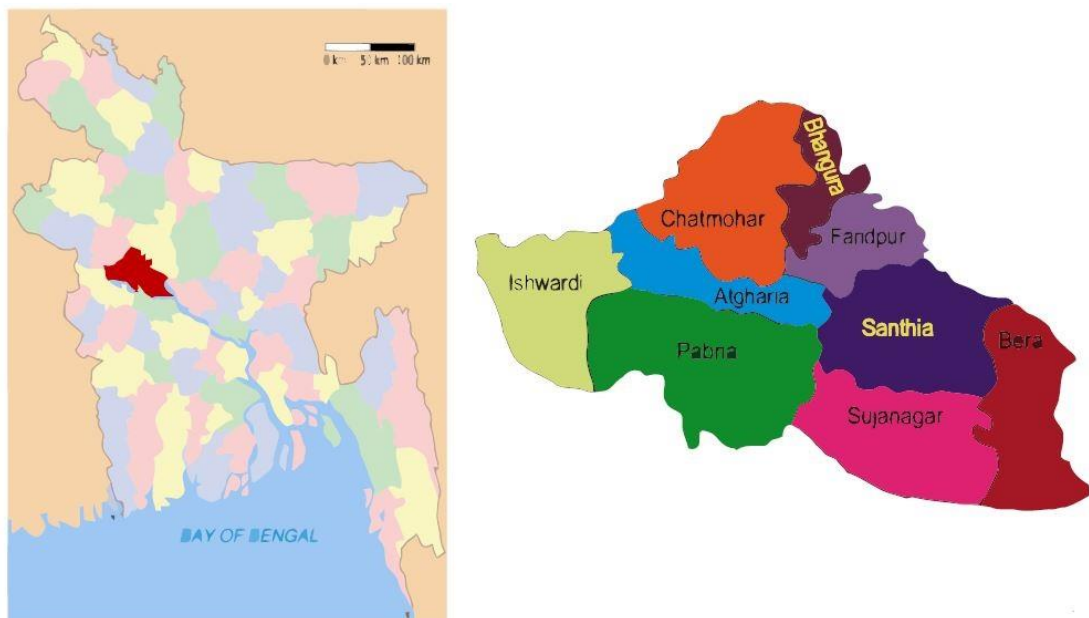
Fig. 3.1 Pabna District map (Showing Faridpur, Bhangura, Chatmohar Upazila)

20 respondents were the wholesalers who sold Ghee at bulk volume. They were selected randomly. Another 20 respondents were retailers who sold Ghee mostly at the consumer level. Retailers are also selected by a random process. Further 20 respondents were Online traders who traded produce online all over the country. Some data were collected over the phone or Facebook Messenger or physically.

3.5 The survey instrument and data collection period:

Key components of the Ghee value chain evaluation methods and methodologies that many authors have used in their research, as well as details on business and person characteristics, were combined to build a thorough and well-designed questionnaire (the questionnaire is included in **Appendix-01**). Facebook Messenger data was gathered by posing questions in conversation and recording the answers on a questionnaire. The researcher himself also took notes about the information gathered over the phone. Face-to-face interviews with the researcher himself were used to gather further data.

Data were gathered from mid-January, 2023 to the end of February 2023. A pilot survey was conducted in the month of November 2022. Data collection was delayed because of COVID-19 and the Russia-Ukraine war. As for these circumstances, the market of the products was in an unrest situation. The price and the demand for the product were fluctuating so much.

3.6 Reliability and validity of data:

The researcher performed a few actions to preserve the validity and trustworthiness of the data. The study supervisor's advice and directives were followed in the creation of the questionnaire. Each respondent received a brief explanation of the questionnaire before the interview so they could understand it completely. Some respondents might be afraid of income tax inspection. They might provide a false contact number.

3.7 Ethical perspective of the research:

The researcher acquired primary data from the respondents and used it in the study while following the Sher-e-Bangla Agricultural University's ethical, confidentiality and other applicable requirements. For gathering primary data, after gaining approval, the researcher started his data collection. Before the interview, participant information sheets containing information on the research objectives, criteria for choosing the targeted participants, research topics, voluntary participation, anonymity, data storage and protection methods, and data withdrawal procedure were distributed to all respondents.

3.8 Analytical technique:

To achieve the first goal of this study, the researcher used descriptive statistics, which were based on the findings of primary data and literature already available regarding the activities taking place in Bangladesh's milk and ghee value chains.

3.9 Value addition measurement:

Value addition has been shown by comparing the average yearly profit. In addition, total monthly cost, total monthly revenue, profit (Tk./Kg), monthly profit (Tk./Month), yearly profit (Tk./Year), BCR etc. have been shown in the discussion section.

Here,

Total yearly profit= Total yearly revenue - (Total yearly variable cost + total yearly fixed cost)

$$\text{BCR} = \frac{Total\ yearly\ revenue}{Total\ yearly\ cost} \times 100\%$$

3.10 Ordinary Least Square (OLS) method:

The OLS model was used by the researcher to assess whether different factors affected the yearly profit made by the Ghee producer. The continuous dependent variable's linear relationship with one or more explanatory variables can be explained using the linear regression model (Schneider *et al.*, 2010), so the OLS method is a good approach for this study. In this model, the respondent's yearly profit is used as the dependent variable along with the respondent's age, occupation, upazila, ownership type, number of total employees, number of family members, education level, average selling mass (kg/month), to whom do they sell the product, average profit per kg (Tk./kg) etc. are used as independent variables. The researcher decided to use the old model for this study after getting influenced by the work of Alkire *et al.* (2013), Upadhay & Karasek (2012), Bello *et al.* (2009), Khalid *et al.* (2020), Hochwälder and Brucefors (2005), Haque and Mostofa (2013), Shanjida (2014), Anny (2021) and Rasha (2020).

The model is stated as follows.

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \ldots\ldots\ldots + \beta_{25} X_{25} + \mu$$

μ specifies error term, β_0 specifies the intercept and β_0, β_1, β_2, β_3, β_4, β_5.......... β_{25} are the slope coefficient. The descriptions of the variables are given in the below table.

Table 3.1: Description of dependent and independent variables.

Name of variables	Types of variables	Definition of variables
Dependent variable (Yi)		
Yearly Profit (Y_i)	Continuous	Yearly Profit (Tk./Year)
Explanatory Variables		
Age (X_1)	Continuous	Age number of years
Number of total employees (X_2)	Continuous	Number of employees working on the farm
Number of family members (X_3)	Continuous	Number of family members of the owner's family
Average selling mass (X_4)	Continuous	Average selling mass (kg/month)
Average profit (Tk/Kg) (X_5)	Continuous	Average profit (Tk/Kg)
Ghee Producer (X_6)	Dummy	1 if the respondent's occupation is Ghee Producer, otherwise zero.
Milk Products Producer (X_7)	Dummy	1 if the respondent's occupation is Milk Products Producer, otherwise zero.
Sweets Producer (X_8)	Dummy	1 if the respondent's occupation is Sweets Producer, otherwise zero.
Other Jobs (X_9)	Dummy	1 if the respondent's occupation is Other Jobs, otherwise zero.
Businessman (X_{10})	Dummy	1 if the respondent's occupation is Businessman, otherwise zero.
Student and Other (X_{11})	Dummy	1 if the respondent's occupation is Student and Other, otherwise zero.
Business and job (X_{12})	Dummy	1 if the respondent's occupation is Business and job, otherwise zero.
Sole (X_{13})	Dummy	1 if the respondent's Ownership Type is Sole, otherwise zero.
Partnership (X_{14})	Dummy	1 if the respondent's Ownership Type is Partnership, otherwise zero.

Others (X$_{15}$)	Dummy	1 if the respondent's Ownership Type is Others, otherwise zero.
Primary Level (X$_{16}$)	Dummy	1 if the respondent's Education level is Less than class 5, otherwise zero.
Secondary Level (X$_{17}$)	Dummy	1 if the respondent's Education level is Class 6 to SSC, otherwise zero.
Higher Secondary (X$_{18}$)	Dummy	1 if the respondent's Education level is HSC or Diploma, otherwise zero.
Honours or above (X$_{19}$)	Dummy	1 if the respondent's Education level is Honours or Masters, otherwise zero.
Other Manufacturer (X$_{20}$)	Dummy	1 if the respondent sells to Other Manufacturer, otherwise zero.
Wholesaler (X$_{21}$)	Dummy	1 if the respondent sells to Wholesaler, otherwise zero.
Online Trader (X$_{22}$)	Dummy	1 if the respondent sells to Online Trader, otherwise zero.
Retailers (X$_{23}$)	Dummy	1 if the respondent sells to Retailers, otherwise zero.
Other Manufacturer and Wholesaler (X$_{24}$)	Dummy	1 if the respondent sells to Other Manufacturer and Wholesaler, otherwise zero.
Online Trader+Retailer+Consumer (X$_{25}$)	Dummy	1 if the respondent sells to Online Trader+Retailer+Consumer, otherwise zero.

Source: Researcher's calculation.

3.11 Test of Multicollinearity and Heteroscedasticity:

It is crucial to avoid any linear relationships between independent variables when using multiple linear regression. (Webster, 2013). A correlation matrix was generated to verify the level of collinearity among the explanatory variables employed in the model (Rasha, 2020; Wooldridge, 2013). If the correlation coefficient is less than 0.7, there is no significant correlation between the independent variables (Alam *et al.*, 2018; Rasha, 2020). In addition, the researcher evaluated the multicollinearity among independent

variables using the Variance Inflation Factor (VIF) (Alam *et al.*, 2018; Rasha, 2020; Haque and Mostofa, 2013). There is no substantial collinearity among the variables if the VIF values of the explanatory variables are less than 10 (Alam *et al.*, 2018; Rasha, 2020). In addition to this, a key tenet of multiple linear regression is that data should have a normal distribution and be free of the heteroscedasticity issue (Osborne and Waters, 2002).

3.12 Challenges of data collection:

The most challenging problem that the researcher faced during the study period was difficulty in data collection. During data collection, some respondents did not want to share information about their business. They believed that their "business secrets" could be used by others and could increase the competition. Some other respondents were anxious about the environment of their farm. They thought the researcher could be an undercover food safety officer and could fine them. Furthermore, some respondents assumed the researcher was a covert tax inspector or news reporter. They hesitated to share their actual data and identity like mobile numbers. They thought the researcher might oblige them to give tax or fine.

<center>**Chapter-4**</center>
<center>**Dairy and Ghee Value Chain Map in Bangladesh**</center>

This chapter provides an overview of the dairy industry in Bangladesh and evaluates the dairy and Ghee value chains to identify potential opportunities for ghee stakeholders to engage in ghee value chain activities.

4.1 Overview of the dairy sector in Bangladesh

Bangladesh's agriculture sector includes an important subsector called livestock which accounts for 15% of all employment and 3% of the country's Gross Domestic Product (GDP) (Kabir *et al.,* 2018). In Bangladesh, 9.4 million people work on dairy farms either directly or indirectly (Muntasir, 2019). The country's yearly milk production increased dramatically over the past few decades, going from 2.37 million tonnes in 2009–10 to 9.92 million pounds in 2018–19 (Muntasir, 2019). Despite a significant rise in milk production, Bangladesh still cannot meet its domestic demand. The average amount of meat consumed daily in our nation is 165 ml, although the minimum amount is 250 ml, and only 64% of the nation's total local needs can be met (Uddin et al., 2020). Bangladesh has a long history of dairy farming, but the sector hasn't yet developed a well-organized infrastructure for production, processing, transportation, and marketing. Certainly, both men and women work in the dairy industry. But, in rural regions in particular, encouraging dairy businesses can be a useful strategy for boosting rural income, reducing poverty, and fostering balanced regional development. The government of Bangladesh has launched a variety of practical policies and financial initiatives to promote the dairy industry to meet the rising local demand for milk and milk products and to advance the UN Sustainable Development Goals (zero hunger, no poverty, and decreased inequality). A 20% discount on the electricity bill of milk processing companies, free vaccine supplies direct financial incentives for dairy producers, and a VAT exemption on pasteurized milk are just a few examples of government measures (Uddin et al., 2011). The dairy sector in Bangladesh still has a long way to go. Massive public and private sector investment is needed to fully take advantage of this sector's prospects, create a well-structured framework, and turn it into a dependable source of income and employment for marginally well-off farmers.

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4.2 Overview of dairy value chain map in Bangladesh:

Multiple stakeholders are involved in the Bangladeshi dairy value chain, including farmers, milk collectors, processors, and retailers. The business is dominated by small-scale farmers who have little access to capital and technology. However, the public and private sectors are working on various initiatives to increase the sector's productivity and profitability, such as better access to financing, education, and technology. It plays a significant role in the economy of the nation and employs millions of people, many of whom are small-scale farmers. Islam (2017) showed the existing dairy value chain of Bangladesh.

Diagram 1: Dairy Value chain map in Bangladesh
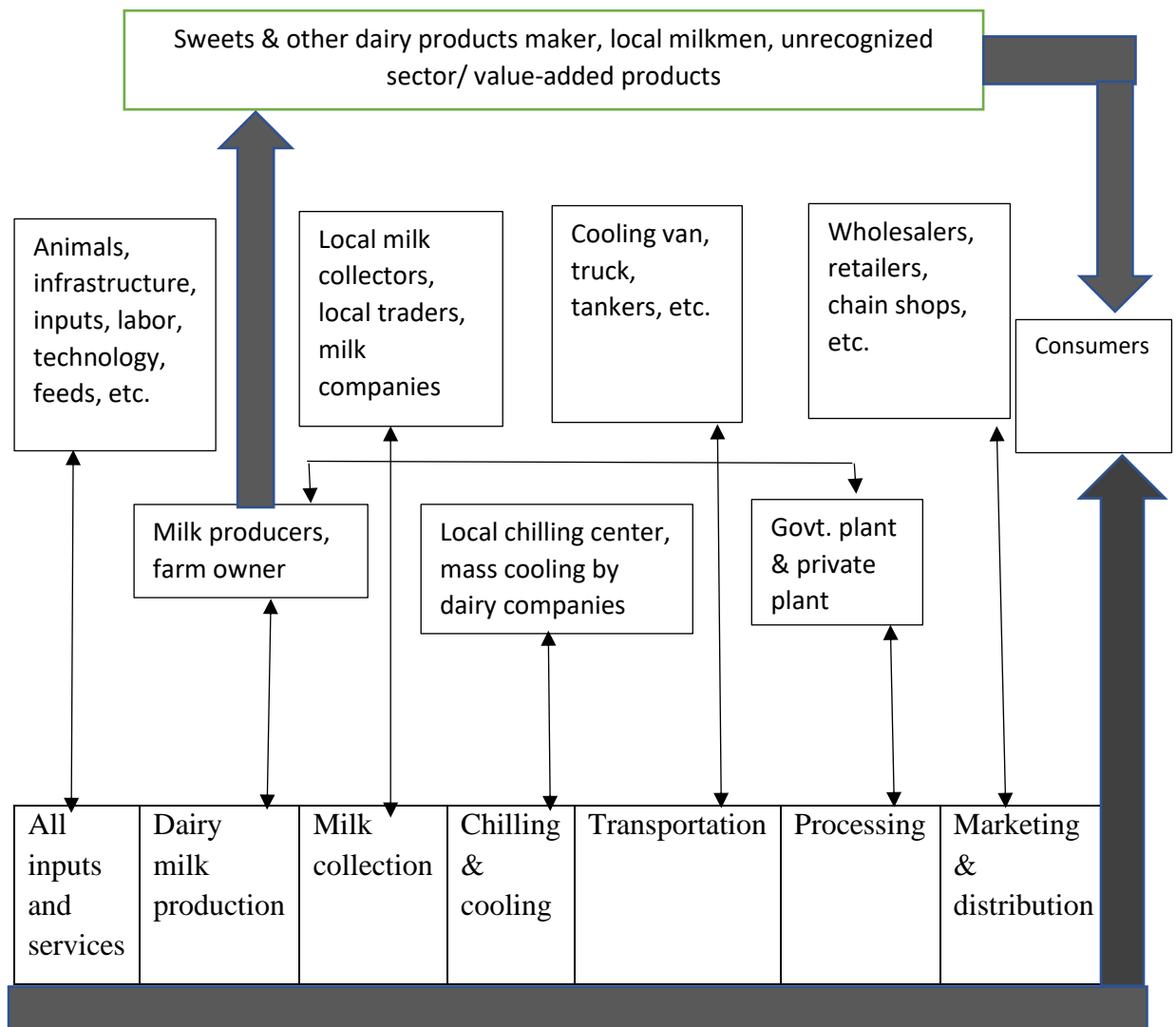
Source: Islam, (2017).

4.3 Overview of Ghee Value Chain Map in the Pabna District of Bangladesh:

In Bangladesh, the production, transportation, processing, packaging, and distribution of milk make up the ghee value chain. Small-scale farmers and regional manufacturers, together with a few large-scale firms, are the main players in the sector. Challenges in the value chain include fluctuating milk quality, a lack of access to funding, and outdated technology. The researcher has collected data from some upazila of the Pabna district. During the data collection and analysis, the researcher established a probable Ghee value chain.

Diagram 4.2: Ghee Value chain map in Bangladesh (Pabna District)
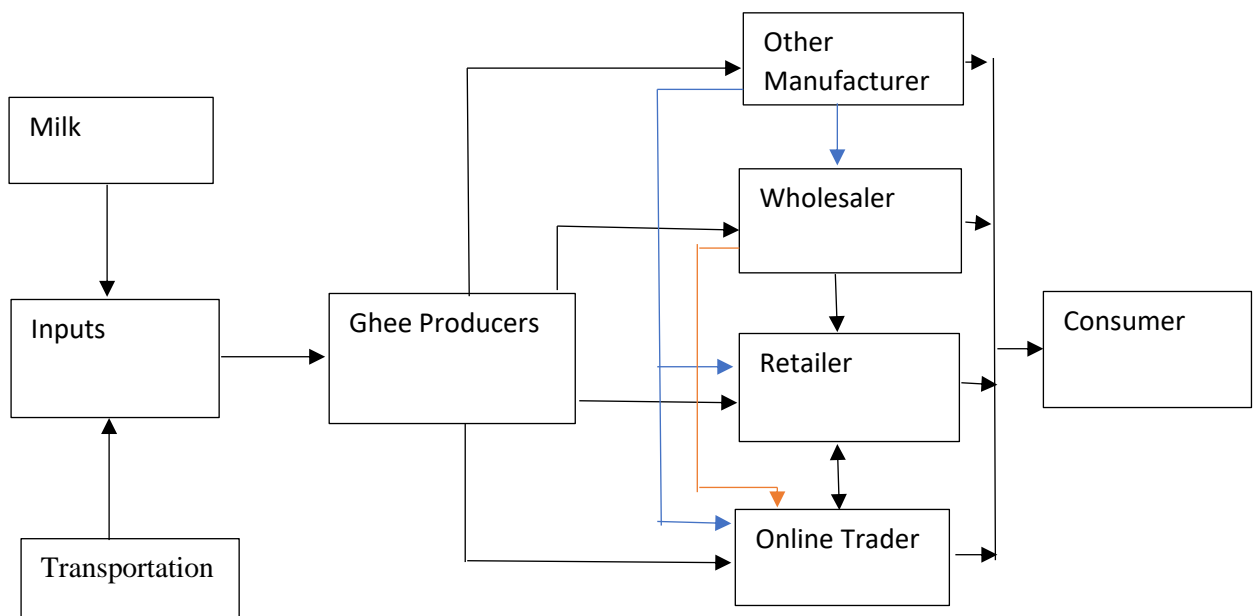
Source: Researcher's investigation.

CHAPTER- 5
Results and Discussion

This chapter primarily focuses on identifying the value chain actors to create a value chain map, as well as on systematically examining the value addition made by the producer of ghee, online traders, wholesalers, and retailers. It also measures production, profitability, and market efficiency at each stage of the channels. Value addition is primarily defined as the difference between the overall costs associated with creating or manufacturing a good and the total income generated by its sales. This chapter examines the market channel that is now in place, the expenses and profits at various levels that Ghee producers, online traders, wholesalers, and retailers incur and realize, and finally the estimation of value addition at various levels and marketing efficiency.

5.1 Socio-demographic characteristics of Ghee producers:

The socio-demographic characteristics of ghee producers vary widely, encompassing individuals from diverse backgrounds, ages, and educational levels. They may come from rural or urban areas and represent different socioeconomic strata, contributing to the richness of the ghee production industry.

5.1.1 Age of the Ghee Producers

Ghee farmers' ages are a key factor in Ghee production and better management of farming operations. To determine which members of households are of working age, the key demographic factor of age, measured in years, was examined. The oldest respondent was 65 years old and the youngest was 26 years old. The average age of the respondents was 42.32 years old.

5.1.2 Family size (persons per family)

The farming houses had families ranging in size from 3 to 15. According to the statistics available, the average number of family members was 6 for the respondents. The higher family size has positively impacted the production of marketable surplus, mostly to meet the family members' cash demands.

5.1.3 Land Ownership of Ghee Farmers

In the study area, 63.33% of respondents have sole ownership of Ghee producing farm. 28.33% of the respondents have partnership ownership. 8.33% of respondents have

"other" types of ownership. Ownership pattern directly affects the cost of Ghee production.

Table 5.1 Farm Ownership and educational level of Ghee Farmers

Characteristics	n=60	Percentage (%)
Farm occupied land ownership Type		
Sole	38	63.33
Partnership	17	28.33
Others	5	8.33
Educational level (no.)		
Primary Level	13	21.67
Secondary Level	27	45.00
Higher Secondary Level	4	6.67
Honours or Higher level	16	26.67

Source: Field survey, 2022.

5.1.4 Educational Level of Dairy Farmers

Family education can either directly or indirectly contribute to ensuring food security at the household level. An educated individual is more informed about diet, finances, and other topics than someone illiterate. In the study area, 21.67% of Ghee producers are Primary level, 45% or more of Ghee farmers have Secondary Level education, 6.67% of respondents have Higher Secondary Level, and 26.67% have Honours or higher level degrees (Table 5.1). The production and marketing of Ghee in the research area had been aided by this greater educational entitlement. It also enhanced people's capacity to learn new information about the market and led to better Ghee production in families.

5.1.5 Occupation of dairy farmers

The respondents rely on a variety of sources of income. Among these, occupation is usually separated into several groups. According to this poll, the primary occupation of about 16.67 per cent of respondents was Ghee producer, 10 per cent were Milk product producers, 11.67 per cent were sweets producer, 8.33 per cent were other job holders, 38.33% were Businessmen, 5% were students with other jobs and 3.33% did Business along with Jobs (Table 5.2).

Table 5.2 Occupational characteristics of Ghee farmers

Characteristics	n= 60	Percentage
Ghee Producer	10	16.67
Milk Products Producer	10	16.67
Sweets Producer	7	11.67
Other Job	5	8.33
Businessman	23	38.33
Student+Other	3	5.00
Business+Job	2	3.33

Source: Field survey, 2022.

5.1.6 Employment status of Ghee producing farm:

The Ghee producing industry is a capital-intensive industry. However the number of employees influences the Ghee producing industry. The larger manufacturer has a higher number of employees. The highest number of employees on a farm is 20. Where the lowest employment is 0. Average number of employees is 7.65.

Table 5.3 Employment status

Characteristics	Content
Highest Employee	20
Lowest Employee	0
Average Employee	7.65

Source: Field survey, 2022.

5.2 Value Addition by Ghee Producer:

The ghee producer is an actor in the long chain of the dairy value chain. Ghee producer adds to the value of dairy products.

5.2.1 Average Fixed Cost

AFC stands for average fixed cost, which is a cost per unit of output related to fixed costs of production. Rent, real estate taxes, insurance, and other overhead expenditures are examples of fixed costs that do not change while the amount of output varies.

Because the overall fixed costs are dispersed over a greater amount of production, the average fixed cost per unit of output drops as output level increases. The average fixed cost per unit of output, on the other hand, rises when output declines.

It's important to note that fixed costs do not depend on the level of production, so they can only be reduced by decreasing the overall size of the operation or finding ways to reduce overhead expenses.

Table 5.4 Average fixed cost of Ghee production (Per year)

Item (n=60)	Cost
Rented Value of the Land	5700.00
Machine Cost	368333.30
Cost of the Infrastructure	1104167.00
Interest on capital (n=1)	120000.00
Overall Fixed Cost (before depreciation)	1476400.00
Depreciation (@10% for 10 years)	14764.00
Yearly Total Fixed Cost	162404.00

Source: Researcher's analysis, 2023.

5.2.2 Average Variable Cost

The average variable cost (AVC) is the variable cost per unit of output. Variable costs are those that vary depending on the level of output. Prices for labour, raw materials, and electricity are a few examples.

To calculate AVC, you need to divide the total variable costs by the quantity of output produced. The formula for calculating AVC is:

AVC = Total Variable Costs / Quantity of Output

As the level of output increases, the average variable cost per unit of output may increase or decrease depending on the nature of the variable costs. For example, if the cost of raw materials increases as production increases, then the average variable cost per unit of output will also increase.

In the short run, a firm may be able to adjust its level of production to reduce its average variable costs. However, in the long run, a firm may need to find ways to reduce the cost of raw materials, labour, or other variable costs to remain competitive.

Table 5.5 Average Marketing Cost of Ghee Production (Per Kg.)

Items	Costs
Bottling	19.12
Packaging	0.58
Transportation	9.45
Market Toll	0.38
Unofficial Payment	3.00
Total Post Production Cost	32.53

Source: Researcher's analysis, 2023.

Table 5.6 Average variable cost of Ghee production (Per Kg.)

Items	Cost
Human and Labor Cost	68.58
Raw Materials	1374.67
Fuel/Energy	71.00
Variable Cost	1514.25
Total Post Production Cost	32.53
Total Variable Cost	1546.78

Source: Researcher's analysis, 2023.

The total post-production cost was 32.53 Tk. In the meantime, the total variable cost was Tk. 1546.78.

5.2.3 Gross Return

The whole investment gain or income earned before subtracting any costs or taxes is referred to as the "gross return." It displays the total financial success of a portfolio or an investment.

Table 5.7 Gross Return

Items	Cost
The lowest selling price of Ghee (Tk./Kg)	780.00
The highest selling price of Ghee (Tk./Kg)	1000.00
The average selling price of Ghee (Tk./Kg)	852.58
The lowest selling price of By-product (Chana)	930.00
The highest selling price of By-product (Chana)	980.00
The average selling price of By-product (Chana) (5.5-6.5 kg @ 130-200/kg)	837.83
Average Revenue (Per kg)	1690.42

Source: Researcher's analysis, 2023.

5.2.4 Overall Average of Ghee Production

Production of ghee is often regarded favourably since it is a common and adaptable element in many cuisines. It is favoured by both customers and chefs because of its robust flavour, high smoke point, and potential health advantages. The overall scenario is described below.

Table 5.8 Overall average of Ghee production

Items	Costs
Average Profit (Tk/Kg)	143.63
Average monthly Profit (Tk/month)	264800.30
Average Yearly Profit	3177604.00
Average yearly profit (after deducting Fixed Costs)	3015200.00
Yearly Variable Cost (Tk./year)	36201476.00
Yearly Fixed Cost	162404.00
Total Yearly Cost	36363880.00
Total Yearly Revenue	39379080.00
Profit	3015200.00
BCR	1.086501

Source: Field survey, 2023.

5.3 Value Addition by Wholesaler:

Wholesalers provide value by efficiently distributing goods, reducing the manufacturer's burden, offering bulk discounts, ensuring product availability, and providing market insights to retailers and manufacturers.

5.3.1 Cost of Wholesaler

A wholesaler's overheads, which collectively have an influence on the total profitability and price of items, include costs for bulk purchases of commodities, storage, shipping, marketing, and administrative costs.

Table 5.9 Cost of Wholesaler (Per Kg.)

Items	Costs
License	0.05
Loading and unloading	0.14
Transportation	2.38
Storage cost	1.62
Market cost	1.19
Grading	0.10
Mobile bill	2.24
Personal Expenses	0.10
Unofficial Expenses/ Tips	0.38
Others	0.29
Average Purchase Price (Tk/Kg)	865.95
Total Cost (Tk/Kg)	874.43

Source: Field survey, 2023.

5.3.2 Overall View of Wholesaler

Wholesalers play a vital role in the Ghee value chain. They act as junction among the value chain actors.

Table 5.10 Overall View of Wholesaler

Items	Costs
Total Monthly cost	1820245.00
Total Monthly Revenue	1922464.00
Profit (Tk/Kg)	48.91
Monthly Profit (Tk/Month)	102219.00
Yearly Profit (Tk./Year)	1226629.00
BCR	1.05596

Source: Field survey, 2023.

5.4 Value Addition by Online Trader:

Online traders provide value addition by offering convenience, access to national markets, real-time information, diverse investment options, lower costs, and efficient transactions, empowering individuals to participate in financial markets more easily and effectively.

5.4.1 Cost of Online Trader

Table 5.11 Cost of Online Trader

Items	Costs
Ordering Cost	10.15
Average Transportation Cost	88.25
Storage cost	4.05
Market cost	4.85
Mobile charge	11.15
Unofficial Expenses	2.75
Others	7.25
Average Purchase Price (Tk./Kg)	885.75
Total Cost (Tk./Kg)	1014.20

Source: Field survey, 2023.

5.4.2 Cost and Revenue of Online Trader

Table 5.12 Cost and Revenue of Online Trader

Items	Cost & Revenue
Total Monthly cost	182331.00
Total Monthly Revenue	210787.50
Profit (Tk./Kg)	159.05
Monthly Profit (Tk./Month)	28456.50
Yearly Profit (Tk./Year)	341478.00
BCR	1.15822

Source: Field survey, 2023.

5.5 Value Addition by Retailer:

Retailers provide value by providing a wide range of products, practical locations, affordable prices, competent employees, effective customer service, and individualized shopping experiences, increasing consumer happiness and loyalty.

5.5.1 Cost of Retailer

Table 5.13 Cost of Retailer

Items	Cost
Transportation	3.5
Storage cost	2.5
Market cost	2.6
Mobile charge	2.7
Unofficial Expenses	0.55
Others	1.05
Average Purchase Price (Tk./Kg)	871.0
Total Cost (Tk./Kg)	883.9

Source: Field survey, 2023.

5.5.2 Cost and Revenue of Retailer:

Table 5.14 Cost and Revenue of Retailer

Items	Cost & Revenue
Total Monthly cost	117856.50
Total Monthly Revenue	132522.50
Profit (Tk./Kg)	100.85
Monthly Profit (Tk./Month)	14666.00
Yearly Profit (Tk./Year)	175992.00
BCR	1.114159

Source: Field survey, 2023.

5.6 Findings of multicollinearity and heteroscedasticity tests

All of the independent variables in this study have Variance Inflation Factor (VIF) values that vary from 1.274 to 6.043 (See Appendix), which is much lower than 10 and shows that there is no serious collinearity among the independent variables. Also, the correlation matrix, where the correlation coefficient values of the independent variables are less than 0.7.

5.7 Relationship between yearly profit and all other independent variables:

To support the third study goal, Table 5.14 shows the estimated values of the coefficient and associated statistics for each independent variable. In this section, the researcher explained how the findings should be interpreted in light of the literature that has already been published and contextualized some potential causes for the findings of the current study.

The number of total employees: It is seen from column (2) of table 5.14 that the number of total employees has a positive and highly significant (coefficient is 0.699, the p-value is <0.0001) association with the yearly profit statistically significant at 1% level of significance. The findings suggest that a one-unit increase in the number of total employees would increase the yearly profit by 0.699 points. That means the ghee producers in the ghee value chain will have more yearly profit if they have a higher number of total employees. Birthal *et. al.,* (2007) stated that the number of employees had a positive relationship with yearly profit in smallholding businesses.

Occupation (Other Jobs): It is seen that Other Jobs has a negative and highly significant (coefficient is -0.200, the p-value is 0.014) association with the yearly profit statistically significant at a 5% level of significance. The findings suggest that a one-unit increase in Other Jobs would decrease the yearly profit by 0.200 points. That means the ghee producers in the Ghee value chain will have less yearly profit if their occupation is other jobs. Here other jobs mean the ghee producer has a stable job. Ghee production is their side business. So, they had higher yearly profits if they were a full-time ghee producer. If the ghee producer has more other sources of income the yearly profit from ghee production will decrease.

To Whom Do They Sell Their Products (Other Manufacturer): It is seen that Other Manufacturer has a negative and highly significant (coefficient is -.290, p-value is 0.006) association with the yearly profit statistically significant at a 1% level of significance. The findings suggest that if Ghee producers sell one unit to other manufacturers then their profit will decrease by 0.29 units. That means the ghee producers in the ghee value chain will have less yearly profit if they sell their products to other Manufacturers. The other manufacturers are those who buy at a lesser price but in a bulk amount. So, the profit decreased. As the ghee manufacturers yearly production is too high the yearly profit will be huge.

To Whom Do They Sell Their Products (Online Trader+Retailer+Consumer): It is seen that "Online Trader+Retailer+Consumer" has a negative and highly significant (coefficient is -0.405, p-value is 0.002) association with the yearly profit statistically significant at 1% level of significance. The findings suggest that a one-unit increase in "Online Trader+Retailer+Consumer" would decrease the yearly profit by 0.405 points. That means the ghee producers in the ghee value chain will have less yearly profit if they sell their products only to the Online Trader+Retailer+Consumer. Because these individuals buy a lesser volume of the product.

Occupation (Ghee Producer): It is seen that Ghee Producer has a positive and significant (coefficient is 0.214, p-value is 0.082) association with the yearly profit statistically significant at a 10% level of significance. The findings suggest that a one-unit increase in Ghee Producer would increase the yearly profit by 0.214 points. That means the ghee producers in the ghee value chain will have more yearly profit if their

occupation is Ghee Producer. It indicates that ghee producer means their main source of income is solely ghee production. They invest more in it and their production is at a higher level. So, the yearly profit is also higher.

Ownership Type (Others): At the 10% level of significance, it can be shown that Others has a statistically significant negative correlation with the annual profit (coefficient is -0.172, the p-value is 0.076). According to the research, a one-unit rise in Others would result in a 0.172-point loss in annual earnings. So, if their ownership type is others, the ghee producers in the ghee value chain will have a lower annual profit. Here the ownership type "Others" means the ownership of the farm maybe family ownership, cooperation etc. The analysis shows that this type of ownership tends to have a lesser yearly profit. If a business has more owners they have lesser responsibility. Which may be responsible for lower yearly profit. Though this type of respondents are very few in number. For this, the results may not show the whole scenario.

Education Level (Secondary Level): It is seen that the Secondary Level has a negative and significant (coefficient is -0.207, p-value is 0.086) association with the yearly profit and the value is statistically significant at a 10% level. The findings suggest that a one-unit increase in the secondary level would decrease the yearly profit by 0.207 points. That means the ghee producers in the ghee value chain will have less yearly profit if their Education Level is Secondary Level.

Education Level (Higher Secondary): At the 10% level of significance, it can be shown that Higher Secondary has a negative and statistically significant connection with the annual profit (coefficient is -0.143, the p-value is 0.078). According to the research, a one-unit rise in higher secondary would result in a 0.143-point decline in annual earnings. So, if their education level is higher secondary, the ghee producers in the ghee value chain will make less profit annually.

To Whom Do They Sell Their Products (Wholesaler): It is seen that Wholesaler has a negative and significant (coefficient is -0.150, p-value is 0.072) association with the yearly profit statistically significant at a 10% level. The findings suggest that a one-unit increase in Wholesaler would decrease the yearly profit by 0.150 points. That means

the ghee producers in the ghee value chain will have less yearly profit if they sell their products to the Wholesaler.

To Whom Do They Sell Their Products (Consumer): It can be shown that Consumer has a statistically significant negative correlation with annual profit (coefficient is -0.169, the p-value is 0.054, significant at 10% level). According to the research, a one-unit rise in the consumer would result in a 0.150-point decline in annual earnings. So, if the ghee producers in the ghee value chain sell their goods to consumers, their annual profit will be lower. Because ghee producers sell a lesser amount of ghee to the consumer than the amount sold to the other manufacturer or bulk selling.

Table 5.15 Calculated values of the coefficient and related statistics of all the explanatory variables of yearly profit.

Explanatory variables (1)	Coefficient (2)	Std. error (3)	t-ratio (4)	p-value (5)
Number of total employees	0.699***	57199.231	6.123	.000
BCR	0.428***	16704782.582	3.091	.004
Other Jobs	-0.200**	728661.930	-2.581	.014
Other Manufacturer	-0.290***	1038571.112	-2.911	.006
Online Trader+Retailer+Consumer	-0.405***	1248587.766	-3.382	.002
Ghee Producer	0.214*	869370.933	1.791	.082
Others	-0.172*	883754.052	-1.828	.076
Secondary Level	-0.207*	614288.137	-1.764	.086
Higher Secondary	-0.143*	821426.133	-1.812	.078
Wholesaler	-0.150*	1169622.014	-1.852	.072
Consumer	-0.169*	1229369.289	-1.995	.054

Source: Researcher's analysis, 2023.

[NB: "***" indicate significance at 1% level, "**" indicate significant at 5%level, "*" indicate significant at 10% level]

5.8 Interpretation of R^2 value:

According to the estimated coefficient of multiple determination (R^2) of 0.757, the explanatory variables used in the model could account for almost 75.7% of the fluctuations in the yearly profit score. According to (Wooldridge, 2013), the R^2 value indicated the model's suitability for the current study.

Table 5.16 R^2 table

Content	Value
R-squared	0.852
Adjusted R-squared	0.757
Sum squared residual	6.0202×10^{13}
P-value	0.0001

Source: Researcher's analysis, 2023.

5.9 Ghee Producer's Problems:

Ghee producers face various problems. Most of them are capital shortages, transportation problems, lack of proper roads, inconsistency of demand, inconsistent supply of raw materials, lack of skilled Labor, and local tolls (Chanda) etc.

Table 5.17 Ghee Producer's Problems

Problems	Percentage
Capital Shortage	93.33
Transportation problems	75.00
Lack of proper roads	68.33
Inconsistent demand	78.33
Inconsistent Supply of Raw	76.67
Lack of Skilled Labor	50.00
Local Tolls (Chanda)	41.67

Source: Field survey, 2023.

5.9.1 Capital Shortage

Capital scarcity means the lack of financial resources and underdeveloped infrastructure. The study found that 93.33% of the respondents identified the lack of capital as their major problem.

5.9.2 Transportation problems

Lack of transportation, high cost of transportation, transportation lack of proper storage facility etc. identified as transportation problems. Ghee producers face a lot of problems regarding transportation. During the monsoon, boats became the only transportation in some places. 75% of the respondents identified this as one of the major problems.

5.9.3 Lack of proper roads

The study area is a low-lying land with a flood-prone area. Proper road facilities are a dream for the respondents. Some roads are too narrow for transportation. There is a lack of concrete or pitch roads. 68.33% of the respondents identified this as one of the major problems.

5.9.4 Inconsistent demand

The term "inconsistent demand" refers to shifts in consumer demand for certain quantities of goods or services over time. Underutilized resources, ineffective production, and missed sales opportunities can result from this. The demand for ghee changes every day.

5.9.5 Inconsistent Supply of Raw Materials

For producers in a variety of sectors, the erratic supply of raw materials may be a serious problem. Geopolitical considerations, abrupt increases or decreases in demand, logistical challenges, and other variables can all affect the supply of vital resources. Delays in manufacturing, higher expenses, and worse profitability may follow. As milk is an agricultural product with uncertain productivity. So, the supply of raw materials may vary from day to day.

5.9.6 Lack of Skilled Labor

Many industries around the world are becoming more and more concerned about the lack of skilled labour. The demand for specialised knowledge and skills has risen as technology develops and employment needs change, leaving many positions empty owing to a lack of competent candidates. This mismatch between the demand for and supply of jobs can lead to several issues, including decreasing productivity, higher labour costs, and a loss of global competitiveness. Ghee production needs a piece of technical knowledge and skills. It can be earned by years of practice and proper

guidelines from the master. The proper knowledge may be passed on to the future generation.

5.9.7 Local Tolls (Chanda)

Local tolls, sometimes known as Chanda, are typical in many regions of the world, including South Asia and the Middle East. These are modest donations provided by community members at a celebration, such as a wedding, burial, or religious holiday. Chanda is frequently considered a method to build a feeling of community and shared responsibility and is generally collected by dependable community members, such as religious leaders or elders. But there have been instances where the chanda collection has been misused, causing conflict and mistrust among communities. But in this situation, most of the Chanda are politically abusive tolls.

5.10 Ghee Producer's Problem's probable solutions:

Ghee producers express some solutions to mitigate the previously mentioned problems. The ghee producers could use the combinations of the solutions.

Table 5.18 Ghee Producer's Problem's Probable Solutions

Solutions	Percentage
Loan facility	90.00
Govt. Intervention	78.33
Marketing	83.33
Training Facility	66.67
Law and Order	40.00

Source: Field survey, 2023.

5.10.1 Loan facility

The government could take some steps to arrange formal or informal loans. This could mitigate the capital shortage. With a proper loan facility, the ghee producers could deal with other problems. As ghee production is a capital-intensive process, so loan facility will boost the production as well as profit. 90% of the ghee producers want loan facilities.

5.10.2 Govt. Intervention

Government intervention is the state's participation in the economy to affect market results or guarantee that specific objectives are achieved. Government intervention's scope and format are determined by a nation's economic philosophy and unique demands. Subsidies, taxes, restrictions, or the provision of public goods are all possible forms of intervention. Government interference may help foster economic growth and social welfare, but it can also be harmful if it is well handled or if it violates people's rights to privacy.

5.10.3 Marketing

The practice of promoting and selling goods or services to prospective clients is known as marketing. It entails conducting research, locating, and comprehending the demands of the target market, as well as developing communication and delivery methods to convey and provide the value of the good or service. A variety of strategies, including advertising, branding, public relations, and sales promotions, are used in effective marketing. An effective marketing strategy may build brand recognition, provide leads, and eventually boost sales and profits. The nutritional importance and quality of Ghee should be promoted.

5.10.4 Training Facility

A training facility is a specific area created for people or teams to grow and improve their knowledge and abilities in a particular subject or activity. These facilities might include everything from conventional classrooms to cutting-edge labs outfitted with the most recent tools and technology. They give students a structured setting in which to practice and master new skills, better preparing them for situations they may face in the real world. The taste of Ghee mostly depends on the skill and mastery of the producers. So, well-trained skilled labour is a must for the quality of the product.

5.10.5 Law and Order

A system of laws and ordinances aimed at preserving tranquilly and stability within a community is referred to as law and order. It entails governmental law enforcement, judicial administration of justice, and the defence of individual liberties and rights. The idea of law and order is crucial for the efficient operation of a democratic society

because it guarantees that people may live and work without worrying about crime or injustice. Without law and order, chaos and anarchy may take hold, making it challenging to sustain social peace and economic prosperity. Law and order will prevent local tolls (Chanda) or any political unrest situation.

5.11 Wholesaler's Problems and Solutions:

Wholesalers face challenges like inventory management, price fluctuations, and intense competition. To address these issues, implementing efficient supply chain systems, utilizing data analytics, and fostering strong supplier relationships can provide effective solutions.

5.11.1 Problems

Wholesalers face various problems. Most of them are capital shortages, lack of storage facilities, transportation problems, lack of proper roads, inconsistency of demand, inconsistent supply of products, maintaining the quality of the products etc.

Table 5.19 Wholesaler's Problems

Problems	Percentage
Lack of storage facilities	70
Maintaining the quality of the products	75
Capital shortages	90
Transportation problems	80
Lack of proper roads	85
Inconsistency of demand	85
Inconsistent supply of products	80

Source: Field survey, 2023.

5.11.1.1 Lack of storage facilities

Ghee does not need an intensive storage facility or chilling. But storing in a glass bottle with a metal lid instead of a plastic bottle, storing in a shadow and normal temperature place have a huge impact on maintaining better quality Ghee.

5.11.1.2 Maintaining the quality of the products

The success of every firm depends on maintaining the quality of its products. To do this, businesses must set up and adhere to stringent quality control methods to guarantee

that every product meets the requirements. This entails keeping an eye on the manufacturing process, doing routine inspections, and inspecting the finished goods for flaws. Companies should also spend money on employee training to make sure that every person is aware of quality standards and can uphold them. Initiatives for continuous improvement can assist pinpoint problem areas and guarantee that goods continue to be of the greatest calibre. Wholesalers always cannot source products from the same manufacturer. Desired quality could be changed.

5.11.2 Solutions

Ghee wholesalers express some solutions to mitigate the previously mentioned problems. The ghee wholesalers could use the combinations of the solutions. Loans, Proper storage facilities, Marketing, Govt. interventions, Maintaining the quality of products etc. could be used to deal with the problems.

Table 5.20 Wholesaler's Problem's Solutions

Solutions	Percentage
Loans	95
Proper storage facilities	85
Marketing	90
Govt. interventions	85
Maintaining the quality of products	75

Source: Field survey, 2023.

5.12 Retailer's Problems and Solutions:

Inventory management, intense rivalry, and shifting consumer preferences are just a few of the issues that retailers deal with. Adopting sophisticated analytics, streamlining supply chains, and improving consumer experiences through individualized marketing tactics are among the solutions.

5.12.1 Problems

Retailers deal with several issues. Most of them are capital shortages, lack of storage facilities, transportation problems, inconsistency of demand, inconsistent supply of products, maintaining the quality of the products etc.

Table 5.21 Retailer's Problems

Problems	Percentage
Lack of storage facilities	75
Maintaining the quality of the products	70
Capital shortages	90
Transportation problems	75
Inconsistency of demand	80
Inconsistent supply of products	60

Source: Field survey, 2023.

5.12.2 Solutions

Retailers provide several strategies to reduce the aforementioned issues. The retailers could use the combinations of the solutions. Loans, Proper storage facilities, Marketing, Govt. interventions, Maintaining the quality of products etc. could be used to deal with the problems.

Table 5.22 Retailer's Problem's Solutions

Solutions	Percentage
Loans	90
Proper storage facilities	75
Marketing	90
Govt. interventions	55
Maintaining the quality of products	75

Source: Field survey, 2023.

5.13 Online Trader's Problems and Solutions:

Technical difficulties, security hazards, and market volatility are common issues for online traders. Risk management techniques, the use of reputable trading platforms, and the adoption of strong cybersecurity measures are among the solutions.

5.13.1 Problems

Online Traders deal with several issues. Most of them are Lack of Capital, Transportation/Delivery Costs, Trust issues, Proper Packaging, Inconsistent Demand etc. and the combination of these.

Table 5.23 Online Trader's Problems

Problems	Percentage
Lack of Capital	30
Transportation/Delivery Costs	90
Trust issues	80
Proper Packaging	70
Inconsistency of demand	75

Source: Field survey, 2023.

5.13.1.1 Transportation/Delivery Cost

Transportation and delivery costs are the costs associated with transferring persons or products from one location to another. Several variables, including distance, mode of transportation, weight, and urgency of delivery, can affect the price. The cost of transportation and delivery may significantly affect a company's profitability since it directly impacts the final cost of the goods or services. To reduce costs and maintain high-quality service, it is crucial to optimize transportation and delivery operations. But the transportation is too costly. Tk. 50 to Tk. 120 charged for the transportation. For larger bulk and longer distance, the cost may increase.

5.13.1.2 Trust issues

Consumers of Bangladesh have some trust issues regarding online shopping. They hesitate to buy online. They are concerned about the quality of the product and the price.

5.13.1.3 Lack of Proper Packaging

To preserve items during transit and storage, proper packaging is essential. Keeping the product safe and secure, entails choosing suitable materials and techniques. Among other things, effective packaging should guard against damage from heat, moisture, and physical force. Consumers should be informed on the proper handling and consumption of the product through proper labelling and instructions. Overall, with adequate packing, a product is guaranteed to reach its destination in top shape, lowering the possibility of losses and raising customer satisfaction. If the Ghee is shipped in a glass bottle there should be heavy packaging to prevent breaking. Even if the bottle is made of plastic the package should be good enough to prevent the spillage.

5.13.2 Solutions

Online traders provide a variety of solutions to lessen the issues mentioned above. Online traders could use the combinations of the solutions. Loans, marketing, Govt. interventions, maintaining the quality of products, public awareness, good packaging etc. could be used to deal with the problems.

Table 5.24 Online Trader's Problem's Solutions

Solutions	Percentage
Loans	45
Public awareness	80
Marketing	90
Govt. interventions	50
Maintaining the quality of products	60
Good packaging	70

Source: Field survey, 2023.

CHAPTER 6
CONCLUSION

The main conclusions of the study are outlined in this chapter, along with some suggested policy solutions. Here, it is also explained how the study's limitations and potential future research areas.

6.1 Main findings

The study was conducted to determine the socio-demographic characteristics of Ghee producers and other value chain actors. The study was carried out by investigating the existing Ghee value chain map of Bangladesh, measuring production, relative profitability and value addition in every stage of channels. Researching existing literature, it is found that milk farmers, milk collectors, transporters, Ghee producers, milk processors, distributors, wholesalers, retailers and consumers are the main value chain actors of the country's Ghee value chain.

Besides, this study shows the value addition of various actors in the ghee value chain. The average profit, BCR, and average profit per kg are also shown in the study.

Lastly, the study investigated the influence of various sociodemographic variables on yearly profit by using the OLS model. Besides by inspecting Ghee producers' participation in daily activities, it is seen that the majority of producers engaged in ghee production who have more the number of employees and BCR are more likely to have better yearly profit. The findings also indicate that Occupation (Other Jobs), To Whom They Sell Their Products (Other Manufacturer), To Whom They Sell Their Products (Online Trader+Retailer+Consumer), Occupation (Ghee Producer), Ownership Type (Others), Education Level (Secondary Level), Education Level (Higher Secondary), To Whom Do They Sell Their Products (Wholesaler), To Whom Do They Sell Their Products (Consumer) etc. have a significant negative impact on the yearly profit.

6.2 Policy Recommendations:

Based on the findings of the study the following recommendations can be followed by policymakers of Bangladesh to improve the potentiality of the Ghee value chain and increase the yearly profit of the Ghee manufacturers.

1. Any policy or infrastructure (such as a loan facility, training, or marketing resources) that would enable respondents' yearly profits as a dependable and trustworthy avenue for them to engage in fruitful activities should be built and promoted. The development of efficient facilities for marketing, training, storage, and transportation is also crucial.

2. For Online traders, transportation cost is too high (50-130 Tk./Kg.). The government could take some initiative to facilitate them. The loan facility, marketing, social awareness, and trust building could give a huge push.

3. The ghee industry is a capital-intensive industry. The government could take steps to encourage other organizations to finance this sector to flourish the industry.

6.3 Limitations of the study:

This study has some limitations. The study is based on a small number of data and samples were limited to only one district and three upazilla. Due to COVID-19 and the Ukraine-Russia war, the price of the goods was not stable. Which may affect the results of the study.

The respondents didn't pay proper taxes and didn't have proper licenses. They didn't even have proper food safety and hygiene facilities. When the researcher went to collect data, they hesitated to give proper data. Even they didn't want to give their proper personal information like name, and mobile number. Sometimes they thought the researcher was a tax inspector. So, they didn't give proper income.

Another limitation of the study is the respondents consider the information about the business as the secret of the business. So, they didn't want to share actual data. They were cautious about the increment in competition.

6.4 Scope of future research:

The study has consequences for both theory and practice. Only ghee producer factors are analyzed. The factors of other intermediaries could be analyzed. More respondents are appreciable. If possible, collecting data from all districts of Bangladesh may have a large scope for policy implications for better ghee production and marketing.

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Appendix-1

INTERVIEW SCHEDULE FOR GHEE PRODUCER

1. Identification:

Name:	Age:
Occupation:	Village:
Upazilla:	Mobile:

2. Identification of farm:

Ownership type:	1. Sole 3. Others 2. Partnership
The number of Total Employees:	
Per Day Production (Kg)	
Number of Family Members:	
Education Level:	

3. Cost of Production:

Cost Items	Cost (Tk/kg)
Variable Cost	
1. Human and labour cost	
2. Raw Materials	
3. Fuel/ Energy	
Fixed Cost	
Rented value of the land	
Machine Cost	
Cost Of the Infrastructure	
Interest in operating capital	

4. After Production cost:

Cost Items Cost)	Cost (Tk/kg)
1. Bottling	
2. Packaging	
3. Transportation cost	

4. Loading and unloading	
5. Market toll	
6. Personal expense	
7. Unofficial payment	

5. Problem with Ghee production:

6. Probable Solutions to your problem:

7. Selling price (Tk/kg)

8. Approximate Selling Mass (Kg/month):

9. To whom do you sell your produce? (Other Manufacturer/Wholesaler/Online Trader/Retailer/Consumer)

Signature: Date:

INTERVIEW SCHEDULE FOR ONLINE TRADER

1. Identification of respondent:

Name:	Age:
Occupation:	Village:
Upazilla:	Mobile:

2. From where do you buy Ghee? (Producer / Wholesaler / Retailer)

3. Does the price vary for different sellers? Yes / No

4. Cost of Ghee Purchase (Producer / Wholesaler / Retailer)

Cost Items	Cost (tk/kg)
1. License	
2. Ordering	
3. Transportation	
4. Storage cost	
5. Market cost	
6. Grading	
7. Mobile charge	
8. Personal expenses	
9. Unofficial expenses	
10. Purchase price	
11. Sales price	
12. Others	

5. Where do you sell your Ghee? (Facebook/Website/Others)

6. Are you involved in storing? Yes / No

7. Approximate Selling Mass (Kg/month):

8. To whom do you sell your produce? (Other Manufacturer /

Wholesaler/Retailer/Consumer)

9. What are the main problems of your business?

10. What are the solutions?

Signature: Date:

INTERVIEW SCHEDULE FOR WHOLESALER

1. Identification of respondent:

Name:	Age:
Occupation:	Village:
Upazilla:	Mobile:

2. From where do you buy Ghee? (Producer / Online Trader / Retailer)

3. Does the price vary for different sellers? Yes / No

4. Cost of Ghee Purchase (Producer / Online Trader / Retailer)

Cost Items	Cost
1. License	
2. Loading and unloading	
3. Transportation	
4. Storage cost	
5. Market cost	
6. Grading	
7. Mobile charge	
8. Personal expenses	
9. Unofficial expenses	
10. Purchase price	
11. Sales price	
12. Others	

5. Where do you sell your Ghee?

6. Are you involved in storing? Yes / No 7. Approximate Selling Mass (Kg/month):

8. To whom do you sell your produce? (Other Manufacturer / Online

Trader/Retailer/Consumer)

9. What are the main problems of your business?

10. What are the solutions?

Signature: Date:

<div align="center">

INTERVIEW SCHEDULE FOR RETAILER

</div>

1. Identification of respondent:

Name:	Age:
Occupation:	Village:
Upazilla:	Mobile:

2. From where do you buy Ghee? (Producer / Online Trader / Wholesaler)

3. Does the price vary for different sellers? Yes / No

4. Cost of Ghee Purchase (Producer / Online Trader / Wholesaler)

Cost Items	Cost
1. License	
2. Loading and unloading	
3. Transportation	
4. Storage cost	
5. Market cost	
6. Grading	
7. Mobile charge	
8. Personal expenses	
9. Unofficial expenses	
10. Purchase price	
11. Sales price	
12. Others	

5. Where do you sell your Ghee?

6. Are you involved in storing? Yes / No

7. Approximate Selling Mass (Kg/month):

8. To whom do you sell your produce? (Other Manufacturer / Online Trader/

Wholesaler/Consumer)

9. What are the main problems of your business?

10. What are the solutions?

Signature: Date: