

Published with Open Access at **Journal BiNET**

Vol. 11, Issue 02: 609-618

**International
Journal of Business, Management and Social Research**Journal Home: www.journalbinet.com/ijbmsr-journal.html

Current status of dairy products in Bangladesh: A review on supply and utilization

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Article Received: 24.01.2022; Revised: 22.03.2022 and Published online: 30 April, 2022.

ABSTRACT

Being a vital part of agricultural systems, the dairy sector of Bangladesh facilitates both employment opportunity for the needy and enhancing the supply of essential protein to people's meals it contributes to country's food security as well as economic growth. The livestock sectors of Bangladesh contribute almost 1.54% of the total Gross Domestic Product in the economy which also employed the population engaged in different jobs related to this sector. The Dairy products plays crucial role in suppling nutrients like proteins, fat, carbohydrates, vitamins and minerals in a considerable amount than any other single foods as it is highly recommended to ingest regularly by all ages of population. In 2019, milk production in Bangladesh is estimated 10.47 million tons. Forecasting the demand of milk production, Bangladesh requires at least more 10 years to be independent. The prediction says milk production in 2030 will be 18.1 million tons and the demand will rise 17.22 million tons. Production of milk, meat and eggs should increase substantially. Production growth of dairy products was large due to a mutual effect of government's importance as well as activities of the nongovernmental organizations. However, the study aims to introduce about supply and utilization of dairy products in Bangladesh.

Key Words: Dairy milk, Meat, Egg, Supply chain, Production performance, consumption pattern, consumers demand.

Cite Article: Hossain, S., Jahan, M. and Khatun, F. (2022). Current status of dairy products in Bangladesh: A review on supply and utilization. International Journal of Business, Management and Social Research, 11(02), 609-618. **Crossref:** <https://doi.org/10.18801/ijbmsr.110222.65>



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I. Introduction

More than half of the people in Bangladesh work in agriculture and livestock farming. People in Bangladesh live on dairy products, which are an important part of farming systems. Dairy products help people get enough protein in their food, which helps the country's economy grow and reduces poverty in both rural and urban areas of the country (Hamid and Hossain, 2014). In Bangladesh, about 20 % of the people fully and 75% of the rural people depend on livestock for their livelihood (Uddin et al., 2016). Demand for meat and dairy products has been rising quickly in Bangladesh and other developing countries, thanks to a rise in income and a rise in the number of people living there. Nearly

40% of the population lives below the poverty line, but there has also been a lot of growth in middle- and high-income families over the last few years, especially in the cities, where people are eating more high-value foods like milk, meat, eggs, fish, fruits and vegetables. Daily milk consumption rose from 22gm in 1983 to 32gm in 2005, while meat and eggs consumption went up from 10gm to 18gm. (Jabbar et al., 2010). People of all ages eat a lot of dairy products that are very healthy. Dairy products in our diet give us more nutrients like protein, fat, carbs, vitamins and minerals than any single food. (Hossain et al., 2016).

There are many dairy products that are made from milk, such as butter, cream cheese, curd, and dairy-based sweets. Dairy products are made from milk. People in Bangladesh have traditionally eaten a lot of dairy products in their food. Cream, curd, Chana, butter, and butter oil are all dairy products that aren't the same as other dairy products (ghee). Cream is the part of milk that is rich in fat. It has at least 18 percent milkfat and usually has 18 to 80 percent milkfat. It is called malai or sar by people who live there. It is used to make butter, butter oil (ghee) and ice cream. Milk production in Bangladesh in 2019 was 10.47 million tonnes (IDRN, 2020). Bangladesh needs at least 10 years to be able to make milk on its own. 18.1 million tonnes of milk will be made and there will be 17.22 million tonnes of demand in 20 years. In Bangladesh, the recommended amount of milk for each person each day is 250 ml. There is only 126 ml of milk for each person each day (Kabir, 2016). The total amount of milk that people need each year is 16.49 million tonnes, while the amount that is made each year is 7.27 million tonnes. When looking at the dairy price chain, it's important to look at how people drink milk in the bad section. Income, price, and availability of milk and dairy products affect how dairy consumers buy and use milk and dairy products (Kabir, 2016).

In Bangladesh economy, livestock sectors has a noteworthy contribution with 1.54% of the Gross Domestic Product (GDP at consistent prices) as it also employed 20% and 45% of the country population engaged in different jobs and part-time jobs, respectively (Das et al., 2021). Bangladesh produces 9.4 million tons of milk (against the requirement of 15.04 million tons) in a year and according to International Farm Comparison Network (IFCN, 2019), total milk production in Bangladesh stands at 8.08 million tons. This implies that Bangladesh produces only 63 percent of the total requirement (while, as per IFCN it is 54 percent). Due to the Corona epidemic hitting in March, milk prices are down 17% and feed prices are up 3.7 percent, which is used as the basis for farmstead simulation. Milk yields were reduced by 7.9% and 8.9%, respectively, for small households and family farms. In 2020, research was conducted on the cost of milk production, which was increased by 19.10 percent for households and 10.9 percent for farms, respectively, resulting in a negative impact on farm income and accounting for a national economic loss of 4.43 million USD/day from dairy farms in Bangladesh (36.84 corers BDT). Due to a combination of COVID-19, flood and seasonality effects on lowering milk production, this loss has fluctuated since April and was highest in June (3.83 million USD/day) (Uddin et al., 2020).

Today, the demand for dairy products, especially milk, meat and eggs, is increasing daily. Therefore, production of these products should be increased to meet the demand to contribute to a better economic situation in our country. With the above in mind, this review has set three goals, i.e. i) learn about the dairy product's contribution to economy of Bangladesh, ii) Review the production performance of dairy products, focused on milk, meat and egg; and iii) Overview the supply chain and consumption of these dairy products.

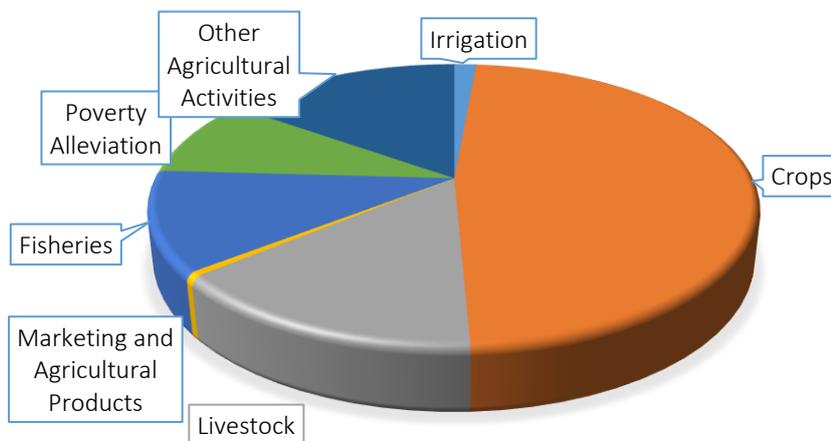
II. Materials and Methods

This paper is entirely a review paper. Therefore, all the information was collected from secondary sources for preparing this paper. Recent information was collected from internet browsing. After collecting required information, it has been compiled and arranged chronologically for better understanding and clarification. This review paper focuses not only on the economic contribution of dairy products but also on the production growth of the last 10 years and their consumption pattern and marketing strategies followed. By exploring the increasing consumption demand, import potentialities are also identified in different sections.

III. Results and Discussion

Contribution of dairy products to economy of Bangladesh

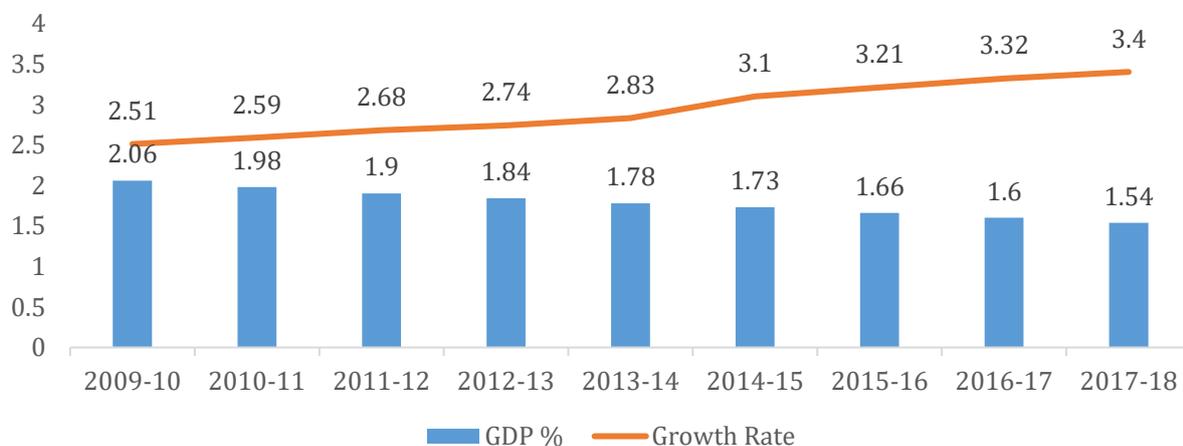
Bangladesh is a country of agrarian economy since the agricultural sector contributes the dominating share (16%) to the gross domestic product (GDP) considering the livestock an integral part of the country and the living for the survival of farmers. So nowadays, dairy product and dairy market is a dominating sector in Bangladesh economy. Because, according to Newaz (2018) 90.9 lac tons of milk production would be essential in the year 2025 in Bangladesh with a modest population growth rate and per capita milk consumption of 120 ml suggesting a yearly requirement of 1.90 lac tons per capita daily intake flows to 250 ml. The dairy product market is expanding day by day because like many other countries dairy product is one of the most important and common items in our daily life and so the demand for dairy products is very high. This high demand leads to the final purchase decision of dairy products and the realization of the customer purchase decision process is the prerequisite of gaining market share for the success of any organization. However, understanding customers can be a daunting task, as there is a decision-making process that needs to be investigated behind the visible buying behavior. The purchase decision process is a combination of several steps that a buyer goes through to determine which product or service to purchase.



Source: Bangladesh Bank, Agricultural Credit Department, 2017

Figure 01: Actual agricultural credit disbursement in fiscal year 2017

Through different formal and informal channels, the value chain actors are financed which can be seen in the Figure 01. In 2018 a report of Bangladesh Bank reveals 30.57 billion BDT were paid to the livestock subsector in 2017 which covers 14.6% of the total. 2-billion-taka refinancing fund was sanctioned by the Central Bank from 2015 to grow milk production and artificial insemination. Dairy farmers receive 5% interest rates from credit sources and the government provides a 5% subsidy. The following year, that percentage dropped to 4%. In addition to bank loans, MFI, co-operative funds and private finance are the most common interventions for value chain players, especially small producers (Uddin and Dhar, 2018).



Source: DLS, Livestock Economy at a Glance, 2019

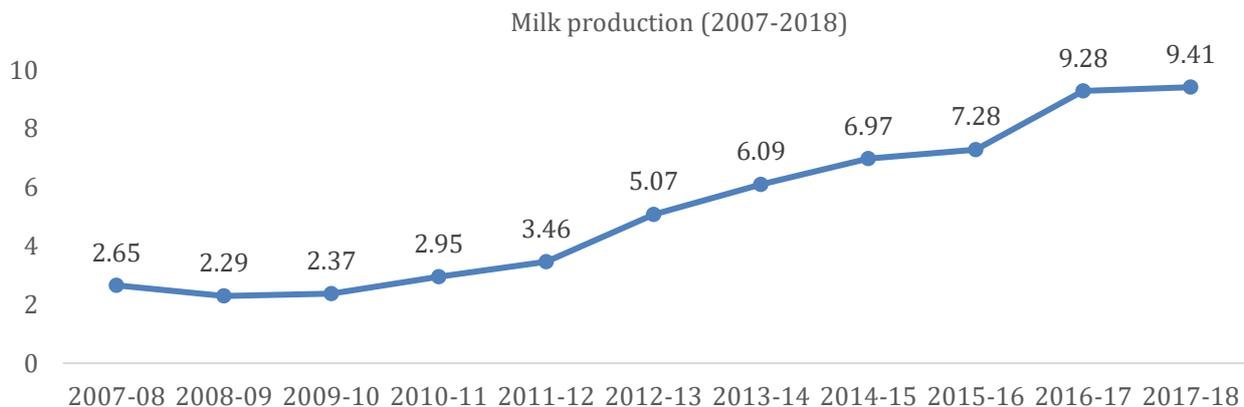
Figure 02. Growth rate of livestock and its contribution in GDP

Even though the rate of population density is decreasing, people in Bangladesh are still suffering under nutrition, malnutrition and severe food safety issues. Therefore, the Government of Bangladesh distinguishes that the livestock sector provides its people with essential and nutritious food and jobs for the large number of low-income and vulnerable people living in the poor and rural areas. According to DLS (2019), the livestock subsector provides 20% of the population with straight works and 45% with part-time works which helps unemployed vulnerable specially youth, women and landless farmers, to lift themselves out of poverty. From the above-mentioned Figure 02, the livestock sub-sector accounted for 1.54% of the total GDP in Fiscal Year (FY) 2017-18, slightly decreasing year after year from the beginning. Even though the contribution seems to be small, the GDP growth rate of livestock has increased from 2.51% to 3.4% from FY 2009 to 2018 representing its potential in rural development and poverty alleviation (MoFL, Bangladesh Economic Review, 2018).

Production of milk

Almost every countryside household poses at least one cow for their daily consumption and income purposes. However, a considerable number of cattle growers, are not selling milk due to their low productivity, partial land and high population, high feed cost and a lack of training. All those constraints lagging behind the progress of dairy sub-sectors. Although the government of Bangladesh has therefore keep emphasized on the milk production, which can invest to various existing production systems corresponding within the country (MoFL, Bangladesh Economic Review, 2018).

The trend of milk production from the last 10 year is presented in the Figure 03. The total cattle population of Bangladesh has reached 24 million with a total milk production of 9.3 million metric tons over the last 10 years forecasting the production of milk rises with a growing trend. As land-based Agriculture is very common in Bangladesh for small land holding where farmers can hardly expand their fields by purchasing or rent in, farmers are now can think of rearing cattle to paved the way of escape poverty.



Source: DLS, Livestock Economy at a Glance (2019)

Figure 03. Milk production in past decade

To understand the size of the final market, it is imperative to first enumerate the quantity of milk production in the domestic market. As shown in the Table 01, Bangladesh's total milk production touches 9,406,000 tons in 2017-18, half of which comes from cattle. Goats produce 54.2%, cows 42.4%, buffalo 1.8% and sheep 1.5%, producing most of the milk. In terms of production, the local milk consumption in Bangladesh has comes from goats, covers only 1% and about 4% comes from buffalo. Consequently, in the dairy value chain, milk is most often aggregated for consumption and processing (DLS, Livestock Economy at a Glance 2019).

Table 01. Local fresh milk production in 2017-18

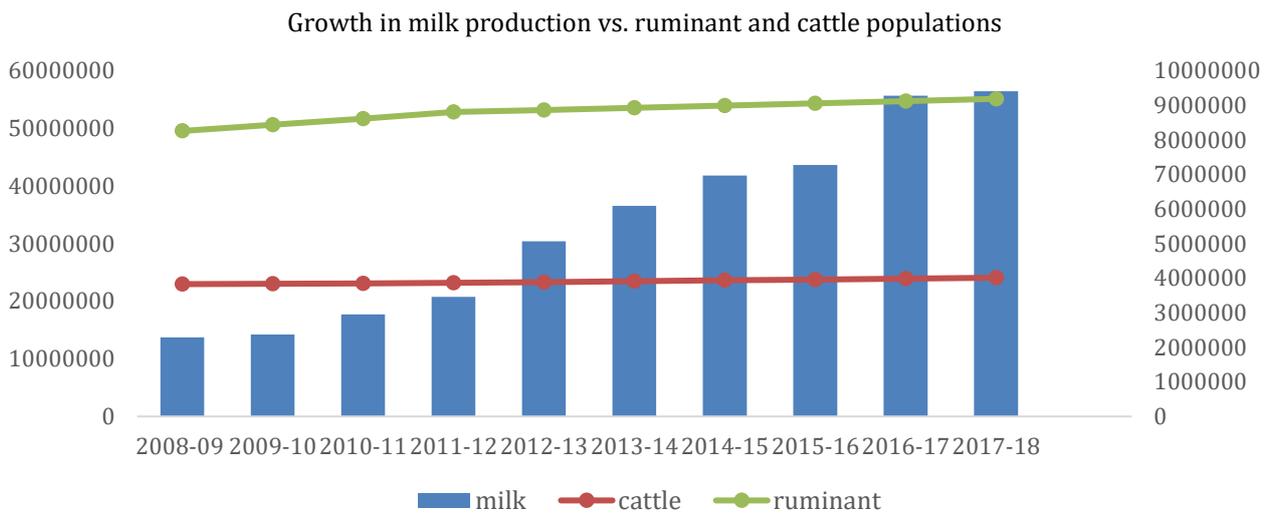
Production	Percentage (%)	Quantity (MT)
Total milk produced in the country	100.0%	9,406,000
Total milk produced by cows	42.4%	3,988,144
Total milk produced by buffalo cows	1.8%	169,308
Total bovine milk production	54.2%	4,157,452

Source: DLS, Livestock Economy at a Glance 2019.

Comparison between milk and cattle population

Total yield of milk per person is often seen as an important issue in the discussion of self-sufficient milk production, but comparisons as market indicators do not make much sense. Bangladesh's per capita milk demand is lesser than the WHO suggested; humans rarely consume small ruminant milk. Imported milk powder increases the availability of milk in the country (DLS, Livestock Economy at a Glance 2019).

Figure 04 explains the rate at which milk is growing compare to the population of ruminant and cattle. The graph above shows a surge to the total ruminant on the left axis and a rise in the production of milk on the right axis. From 2010 to 2018, the combined annual growth rate of milk production was 19.5%. Proceeding to this, milk production improved by 3.5%, outpacing the consumption. The per head obtainability of fresh local milk (from all ruminants) stretched 125.59 ml in 2015-16, 157.97 ml in 2016-17 and 158.19 in 2017-18 (DLS, Livestock Economy at a Glance 2019).

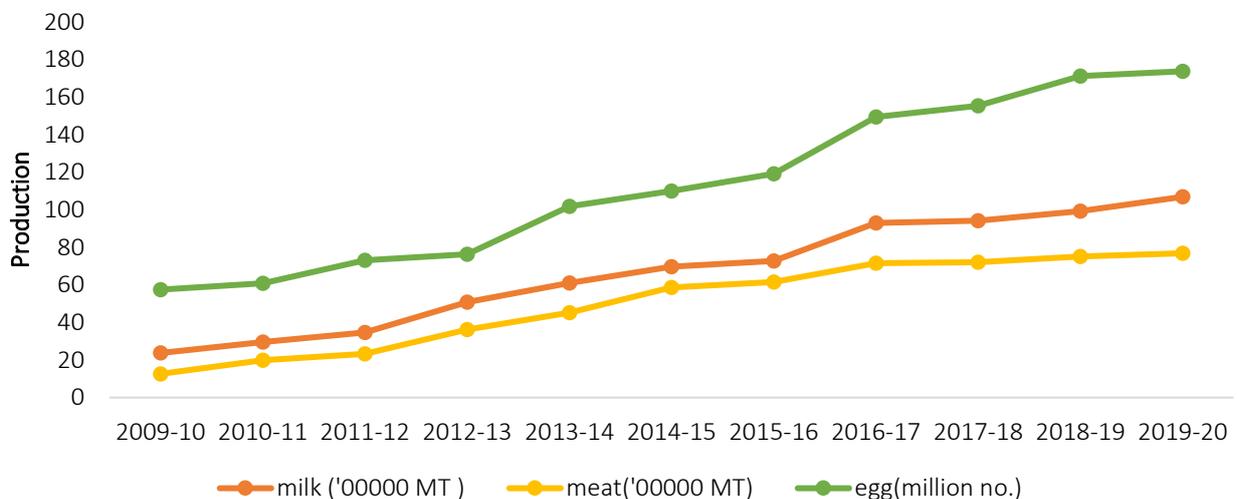


Source: DLS, Livestock Economy at a Glance 2019

Figure 04. Increase in ruminant and cattle populations vs. growth in milk production

Production of egg, meat and milk

For the last 10 years, the average annual growth rate of cattle has been 1.0% and the small ruminant population (sheep and goat) has been 5.2%. Fluctuating growth rates during the census period. High annual growth rates (7.4%) were observed in poultry (chicken and ducks). Studies show that the increase in poultry populations is primarily due to the combined effects of government emphasis and actions by non-governmental organizations to encourage marketable poultry farming through women. (Deb, 2016).



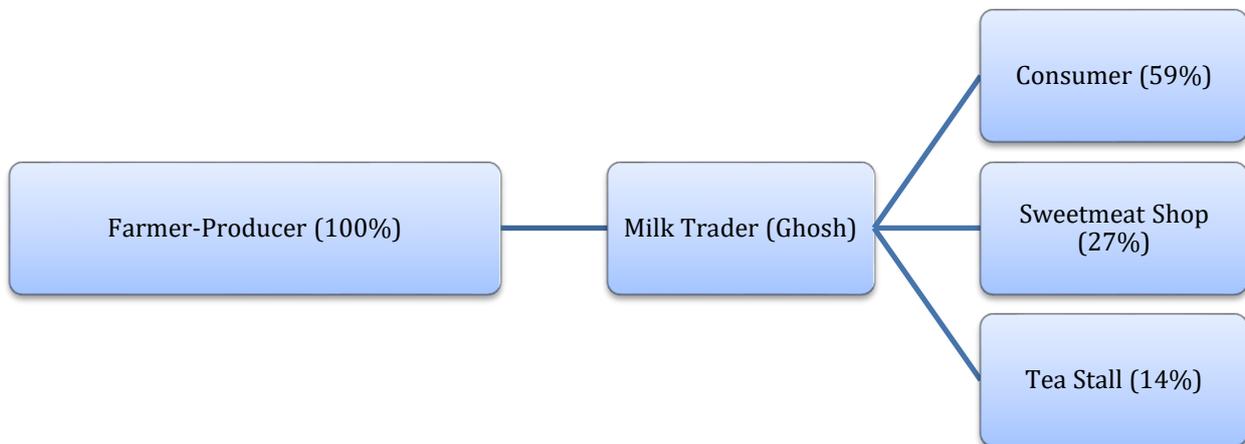
Source: DLS, Livestock Economy at a Glance 2021

Figure 05. Annual production of milk, meat and eggs in Bangladesh: 2009-10 to 2019/20

Milk, meat and egg production in Bangladesh has increased significantly from 2009-10 to 2014-15 shown in [Figure 05](#). Prior to liberation, livestock were an essential portion of the agricultural system, but agricultural business for the production of milk, meat and eggs was restricted. Between 2009-10 and 2019-20, production of milk is amplified 4.5 times (from 23.7 lakh MT to 106.8 Lakh MT) and meat production has increased to 6.09 times (from 12.6 Lakh MT to 76.74 Lakh MT). Alternatively, production of egg has improved to 3.03 times (from 57.424 million eggs to 173.6 million eggs). Milk, meat and egg production growth in recent years (FY2008/09 to FY2014/15), was 22.9, 32.1 and 15.0 percent individually. Through the Sixth FYP, growth in milk, meat and egg production was 25.7, 32.7 and 16.4 percent separately. The actual headcounts and progress of livestock resources can be seen for the period of 10 years 2010-2020 ([DLS, Livestock Economy at a Glance 2021](#)).

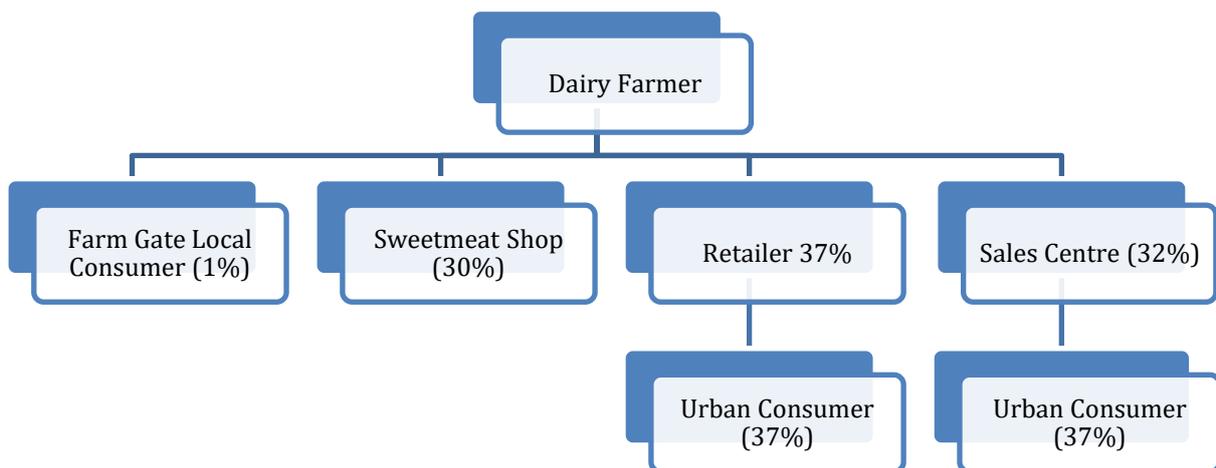
Market chain of dairy products

No unified marketing channel of milk is available in traditional system because of the nature of the milk production. It depends on the region. The [Figure 06](#) and [07](#) shows several marketing channels in different regions of Bangladesh.



Source: [Raha, 2009](#)

Figure 06. Traditional marketing channels of milk



Source: [Raha, 2009](#)

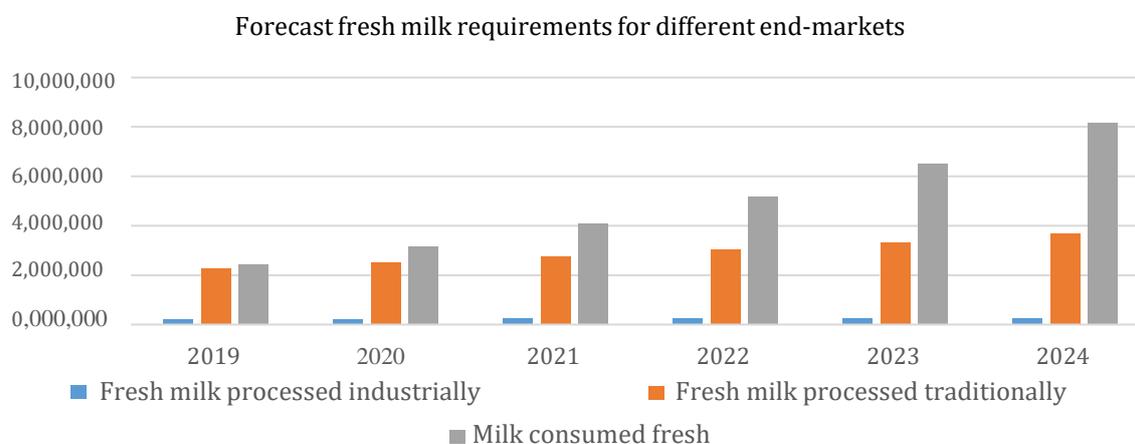
Figure 07. Modern marketing channels of milk

Utilization of dairy products

Utilization of milk

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 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.

Figure 08 shows the trend of fresh milk requirements for different industrial and traditional markets. The fluctuating global market prices of powder milk increase the demand from commercial dairy products for fresh local milk. Given that skim milk powder and whole milk powder are generally cheaper than local milk, industrial dairy products can be expected milk powder to be used only. Though, some foodstuffs are made with fresh milk or have excellent taste and quality. In addition, almost all industry diaries have a social mission to contribute to the development of the country's milk subdivision by growing the gathering of local milk (Hemme et al., 2014).



Source: DLS, Livestock Economy at a Glance 2021

Figure 08. Forecast fresh milk requirements for different end-markets: industrial processing, traditional.

In Table 02 the uses of fresh milk and powdered milk is depicted. Cost is the main factor for the high dependence on milk powder from commercial dairy processing. As mentioned earlier, the imported whole milk powder now reaches the factory in Dhaka at about 40 BDT/liter LME. In contrast, local milk is 46.5 BDT/liter, accumulated in the dairy zone and shifted to the factory by frozen truck. As already stated, the import price of skim milk powder is even lower, ranging from 25-45 BDT/liter LME, but industrial dairy products use whole milk powder than skim milk powder (Hemme et al., 2014).

Table 02. Local fresh milk and imported powdered milk used in industrial sector processing in 2017

Uses	Percentage (%)	Quantity (MT)
Local fresh milk used	20.3%	207,873
Imported powdered milk used (LME)	79.7%	815,727

Source: DLS, Livestock Economy at a Glance 2019

The milk consumption rate per capita in Bangladesh is forecasted in Table 03. If milk production continues to grow at the expected rate per head, milk accessibility will reach 188.57 ml/day/person by 2024 and milk obtainability for all channels will be 2022. By then, the recommended intake of WHO will be exceeded. Milk production from cows is increasing more rapidly than milk production from small ruminants, so the forecast is that 50% of the milk supply comes from cows, slightly higher than the current ratio.

Table 03. Per capita milk consumption according to forecast (ml/day)

Milk consumption	2019	2020	2021	2022	2023	2024
Per capita milk consumption (bovine)	81.26	96.16	113.79	134.66	159.35	188.57
Per capita milk consumption (all ruminants)	162.52	192.32	227.59	269.32	318.71	377.15

Source: DLS, Livestock Economy at a Glance 2021

The SAARC country milk consumption rate per household is summarized in Table 04. Milk and dairy products consumption has been in various ways in the country. Purchased straightly from growers, sellers and industrial milk processors and producers. Mature humans need at least 250 ml of milk per

day, but the amount available is about 108.66 ml/h/d. The country's total milk production is 6.09 MMT/year (2013-14), but the demand is about 14.02 MMT/year. The shortage rate is about 56.6%. Looking forward to the (SAARC) milk consumption patterns, it can be seen that our place in milk consumption at the lowest of all SAARC countries (Khan, 2014).

Table 04. Comparative milk consumption rate in SAARC countries

Countries	Milk Consumption
Bangladesh	109ml/h/day
India	227ml/h/day
Nepal	140ml/h/day
Pakistan	520ml/h/day
Sri Lanka	142ml/h/day
Maldives	188ml/h/day

Source: Khan (2014); DLS (2019)

Utilization of meat

The meat supply breakdown in Bangladesh is shown in Table 05. The bulkiness of the animal used to evaluate the meat supply leaves some room for estimation. People prefer the local beef, which comprises the famous slaughtered beef. The weight assumptions for an animal using 225 kg for a distinctive cow or bull slaughtered, as the live weight of local breed cattle is 200-250 kg. Adult male pubna cows weigh between 350 and 400 kg each and females weigh less. Holstein-Friesian mixed varieties with 50% unusual blood weight of about 0.5 tons and 100% Holstein-Friesian purebreds weigh more than 1 ton.

Table 05: Breakdown of meat supply to the consumer market in Bangladesh (2017-2018)

Livestock	National livestock population (2017-18)	% Slaughtered annually	Number slaughtered	Smuggled into the country	Total number slaughtered	Carcass weight (Kg)	Meat supply (MT)	% Of meat supply
Cattle	24,086,000	40.00	9,634,400	300,000	9,934,400	146.25	1,452,906	65.45
Buffalo	1,485,000	40.00	594,000	0	594,000	211.25	125,483	5.65
Sheep	3,468,000	35.00	1,213,800	0	1,213,800	19.50	23,669	1.07
Goats	26,100,000	55.00	14,355,000	0	14,355,000	19.50	279,923	12.61
Poultry	337,998,000	100.00	337,998,000	0	337,998,000	1.00	337,998	15.23
Total			363,795,200		364,095,200		2,219,978	

Source: DLS, Livestock Economy at a Glance 2019

Demand and production of egg meat and milk

Following the information inserted in the table 06, we can conclude that there is a significant difference between the demand and production. In case of milk, demand is 152.02 Lakh Metric Ton (250 ml/day/head) but production is 99.23 Lakh Metric Ton and availability of milk is 165.07 (ml/day/head). In case of meat, demand is 72.97 Lakh Metric Ton (120 gm/day/head) but production is 75.14 Lakh Metric Ton and availability of milk is 124.99 (gm/day/head).

Table 06. Demand, production, availability and deficiency of milk, meat and eggs (2018-19)

Products	Demand	Production	Availability
Milk	152.02 Lakh Metric Ton (250 ml/day/head)	99.23 Lakh Metric Ton	165.07 (ml/day/head)
Meat	72.97 Lakh Metric Ton (120 gm/day/head)	75.14 Lakh Metric Ton	124.99 (gm/day/head)
Egg	1732.64 Crore number (104 numbers/year/head)	1711 Crore numbers	103.89 (numbers/year/head)

Source: DLS, Livestock Economy at a Glance 2019

IV. Conclusion

The analysis of the study comes up with some important conclusions. Livestock's contribution to GDP is 1.47%, livestock's share of agricultural GDP is 13.46% and in the case of employment, livestock directly accounts for 20% and, in some cases, 50%, whereas total production of dairy products like milk, meat and egg is 99.23 lakh metric ton, 75.14 lakh metric ton and 1711 crores respectively. The supply chain of dairy products, especially milk, includes intermediates like farmers, milk traders, sweetmeat shops, tea stalls and consumers. 250 ml/day/head is the demand for milk, but availability is 165.07 ml/day/head. So, milk production should be increased to meet the consumer's demand. In the case of meat, availability meets consumers' demand where demand is 120 gm/day/head and availability is 124.99 gm/day/head. Egg production is nearly sufficient to meet the consumers demand as demand is 104 numbers/year/head and availability is 103.89 numbers/ year/head. Although the production of meat and egg is sufficient, in the case of milk production, we could not fulfil consumers' demand yet. Promoting milk production can be an important instrument for increasing farmers' income and meeting consumers' demand.

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HOW TO CITE THIS ARTICLE?

MLA

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APA

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