



# Determinants of Structural Change in the Dairy Sector

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## Research Article

### Abstract

*Even though the dairy products are not a staple food item, but they are necessary for humans as an excellent source of protein. The consumption of dairy commodities began a long time ago, and over time there has been an improvement in the processing to match the changes in the tastes. Small scale dairy production was the root of today's dairy sector. However, now it is going on a large scale. This changed gradually through a process accompanied by different factors. This study aimed at identifying and understanding existing determinants and their role behind the change in the dairy sector. For this, peer-reviewed articles published by researchers around the world were obtained with all possible search combinations from reputed online databases. Statistical data were collected from reliable statistical data providers, and all activities were done focusing on the determinants of changing the dairy sector. The regulatory policy framework of dairy-producing countries, change in farm size, shift in consumption pattern, etc. were found as the most crucial factors behind the change. Possible suggestions required to keep pace with this massive change were discussed.*

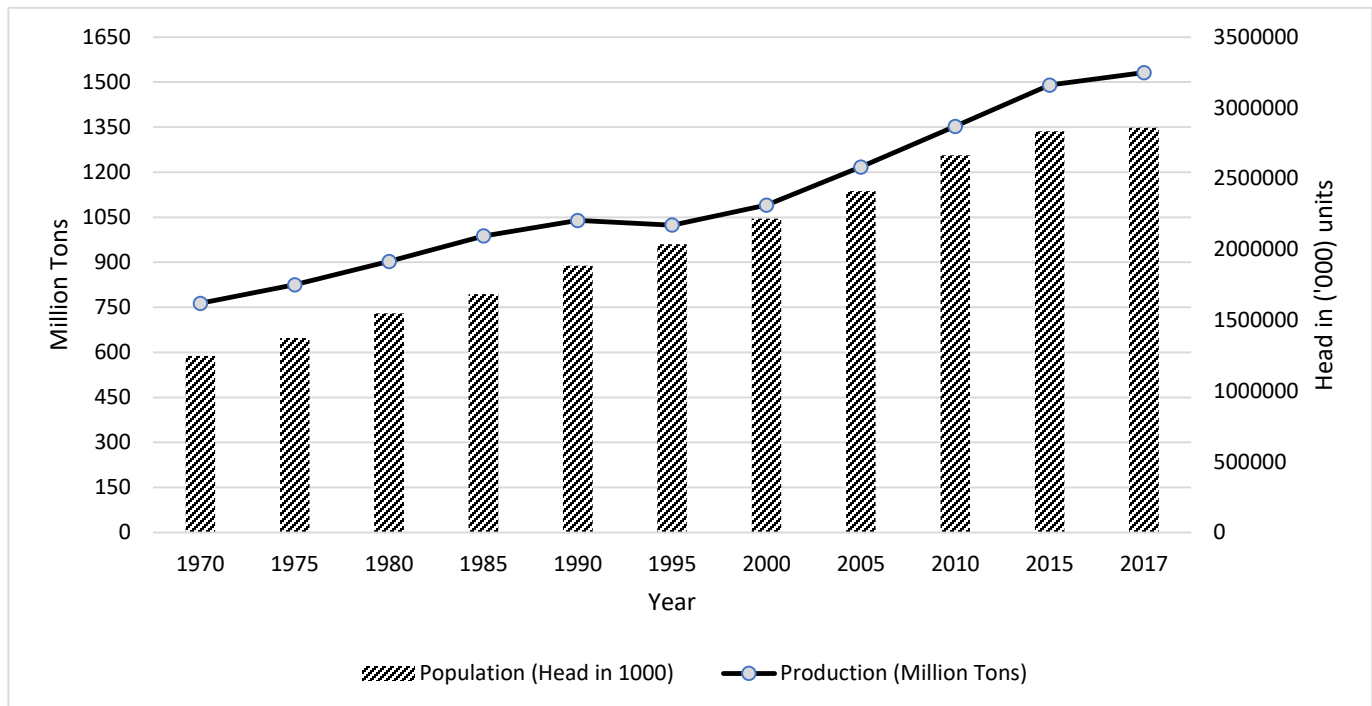
**Keywords:** Dairy and Agriculture, Structural Change, Determinants, Food Security

### 1. Introduction

Over six thousand years ago, the first consumption evidence of dairy can be dated back and now in every corner of the world, dairy products are enjoyed either in the form of ice cream to cheese or butter even in the finest form of processed milk. Over the last millennia, there has been a significant change, growth achieved in the dairy industry all around the world. It is estimated that an amount of about 216 metric tons will be the total size of the global dairy market with an expected growth rate of 1.083 (about 234 metric tons) by the year of 2021 where the emerging key player in the world dairy market would be liquid milk (Shahbandeh, 2019). As such, if it is to keep pace with the growth in demand, dairy (milk) production will need to grow by close to 2 percent per year. For the reduction of poverty and the creation of wealth

among the people of the developing world, the development of the dairy-sector could be a powerful tool (Hemme & Otte, 2010).

The current world we are living in now is dynamic and "Food Security" is the common motto of every individual national. Meanwhile, food-deficit is a problem for developing countries caused by the change in climate, political unrest, uncontrolled population growth, inappropriate trade policies, and so on and developed countries are going through social inequalities, causing change to consumption patterns. Whatever we say, at this moment, in aggregate terms, there is no reason for this world to fall in a crisis of food or be alarmed with a food security issue as some sectors operate in the world irrespective of most common factors hindering food security issue and dairy sector is one of them (Gao & Haworth, 2016).



**Figure 1: World dairy population and production (FAO, 2019)**

Farm size, herd size, and yield has structured the dairy industry differently, mostly across the different European countries. Based on the size, the EU is in the leading position of dairy product supply and has a steady growth in this sector. Holding the sixth position as the largest milk producing entity, the U.S. dairy industry is ensuring more than one-tenth of the aggregate world milk production. On the other hand, Australia possesses the dairy industry as one of the major rural industry, with direct employment of nearly 40,000 people and further downstream processing (Gao & Haworth, 2016). Although Australia exports only 2% of world milk production, with a 10% share of world dairy export, it ranks third in terms of world dairy trade, just behind New Zealand and the European Union. India is the world's largest producer of dairy products by volume, accounting for more than 13% of the world's total milk production, and it also has the world's largest dairy herd (Gao & Haworth, 2016). The milk production in Russia is continuously increasing, and the Government of Russia is subsidizing this sector enormously to be self-sufficient within a few years. As a result, around eight million dairy cows hold the ground of the dairy industry producing a total of 30.7 billion Kgs of milk, as of the end of the year 2017 (Stevens, 2019).

In macroeconomics, structural change refers to the economic condition when the way of operation of an industry and market changes. Caused by different factors, when the functionality deviates from its known assumptions and a new set of rules established, it is called

structural change (Chen, 2018). The world agriculture sector has undergone considerable ups and downs over the last few decades. While continuing to grow in absolute terms, relatively the size and importance of agriculture have declined compared to the rest of the economic components (Productivity Commission, 2005).

Any change that happens globally is not due to a single factor or just because of the unique factors of individual countries. Rather, the factors associated with significant structural change is comprised of universal and renowned determinants. As history shows the dairy sector is going through significant change, there must be some determinants that are governing this change.

Resource reallocation from dairy to other manufacturing or crop sector, change in dairy market structure, coordination problem in investment, credit market failure, domestic and dairy product trade policy, changing trend in farm size, consumption trend, private sector participation, etc. were found as leading factors of dairy sectoral change movement (Fuller et al., 2006). But not all factors were studied separately in all countries and some determinants were never been studied. Considering all the studies obtained from the search, and availability; dairy product market, dairy policy, farm size, resource reallocation, food consumption pattern, credit constraints are considered for the discussion on dairy-producing countries.

## **2. Materials and Methods**

This study is a review study based on published articles obtained through an online search. Searches were performed using all the possible combinations of the enlisted keywords: 'structural change', 'dairy sector', 'dairy and agriculture', 'dynamics of dairy and agriculture' in following online databases: Google Scholar, ScienceDirect, ResearchGate, CABI, and Wiley Online Library. By limiting the search to articles published after 1980, peer-reviewed articles mostly that reported the direct results from surveys, secondary database analysis, or interview research with human participants were retained. Also, reports on recent dairy status were considered from Statistia, Food, and Agriculture Organization (FAO). In Google Scholar, the first 12 pages of the search result were considered for the study. Initially, the abstract of each of the papers was assessed, and when it was unclear from the abstract, and more understanding was required the full paper was analyzed to appropriately assess the study. After the initial search, we searched again with specific determinants that we have considered to have an impact on the change of the dairy sector. The second search was conducted in the same databases to identify the papers that specifically reported the determinants obtained through the first search and focused on changes in the dairy sector, performance trend of dairy sector and factors involved with change.

## **3. Results and Discussion**

### **3.1 Dairy Product Market**

The large livestock population, the favorable climate for improved, high yielding animal breeds, and the relatively disease-free environment for livestock make Ethiopia, a country of Africa to have a significant potential for dairy development. However, the country lacks proper and functional formal marketing and grading system which is geared towards matching the quality of milk and milk products to market prices.

Cooperatives are emerging in India at a huge rate and India has taken this as an opportunity to enable the modernization of the century-old dairy industry to a level where it can meet not only the national but also the global demands for dairy products. Eighty percent of milk is marketed through the highly fragmented unorganized sector, comprised of local milk vendors, wholesalers, retailers, and producers. On the other hand, the organized dairy industry (government and co-operatives) accounts for twenty percent of total milk production. The unorganized sector is leading the market due to its pricing policy, milk and type of animal

policy, and payment policy (Rajendran & Mohanty, 2004). But, aiming at the global dairy market, now India has a double dairy production than it was 10 years ago. As it is a large country with a massive population, the demand and new market are being created steadily, which ultimately increases the trend of dairy production by stimulating producers to move from small to large scale.

A good relationship between Australian dairy companies and their domestic and international market has been established through active and efficient communication. A rigorous buying specification is most common for retail or ingredient customers within Australia and overseas and typically it includes product specification, transport conditions, and the buyers' expectations of the quality assurance approach (Dairy Australia, n.d.). In Australia, the dairy sector operates in an open market where all dairy producers and their incorporated companies are participating without any restriction since the industry deregulation in 2000-01. The open nature of Australia's dairy market indicates a direct link of the domestic market toward international trends, which allows Australia to act as a major dairy exporter and importer.

Recently, a dairy crisis went through the Australian dairy sector and new alliances are being formed by farmers. The era of dairy cooperative operations is rising with the continuous emergence of collective bargaining groups, clubs, and even farmer-owned companies with an ambition of making the dairy industry sustainable. Dairy Farmers of Victoria Consortium (DFVC) manages its own quality control, guaranteeing the requirements of clients and operates in a way that they can increase dairy supply to consumers of all around Australia (Macdonald, 2019).

In rural America, milk and milk products were made primarily for home or local use. However, people are moving from rural to urban at the turn of the century. It became necessary to increase the scale of production, improve the quality of milk, and make sure that customers get demanded dairy products in time, in place. Earlier, the cooperatives and proprietary companies supplied fluid milk and dairy products to the markets. Over time, the numbers of both firm types have declined and whoever survived that phase, the size of those remaining has, on average, increased. Proprietary companies have gravitated toward the fluid milk and frozen products businesses, while cooperatives have played major roles in the hard-manufactured product markets. The markets of milk, retail store cheese, frozen desserts, yogurt, and butter are mostly farm gate or private store based. The U.S. dairy cooperatives are one of the primary marketers of raw milk from U.S. dairy farms, but they are fewer in number with the capacity of handling larger volumes of milk than they were previously. They also process, manufacture, and market significant shares of some dairy products. Over the years, the dairy industry is reshaped by cooperative merger activity and changed the landscape in a different way, perhaps more than of any time (IUF Dairy Division, 2011).

Dairy cooperatives today can be classified as bargaining-only and manufacturing or processing cooperatives. The bargaining-only cooperatives present in the US, usually negotiate terms of trade as well as the price for their members' milk. Many manufacturing or processing cooperatives bargains for prices and market some or all their members' milk through their own processing and manufacturing facilities. The bargaining-only cooperatives tend to be smaller volume milk handlers (averaging about 200 million pounds) and operate with minimal capital, but they may operate milk receiving stations (Manchester & Blayney, 1997). Large corporations and Dairy companies from around the world, during the 20<sup>th</sup> century, have also invested in the dairy industry of the US dairy market because of its higher potentiality and economies of scale.

### 3.2 Dairy Policy

Over three distinct period regarding the policy and regulatory environment is segmented to differentiate the effect on this sector. 1960-1974, 1974-1991 and 1991-present years respectively can be segmented as commercialization, state centralization, and finally market liberalization

of the dairy sector in Ethiopia. Through commercialization-based policies, the target was to improve the dairy sector by establishing dairy milk processing industries, introducing exotic cattle breed, opening milk collection and purchase center in specific areas, providing incentives to dairy farmers and finally allowing different missionaries and foreign organizations to perform activities for the improvement of the dairy sector. In centralization policy, later, without the right to rent, mortgage or sell all the lands were nationalized and distributed through some organizations. For this, Peasant Associations (PAs), Dairy Development Enterprise (DDE) were established, overvalued foreign exchange rate policy was fixed that made export expensive and import cheaper in the country, cooperatives were formed. This created mass dissatisfaction and with the first opportunities, most of these cooperatives got disintegrated. In the later period, the land was made as tenable and can be transferred to children for an indefinite period. This policy stimulated small dairy farmers to produce and satisfy market demand. Financial support was provided at a different level of production. Private dairy industries started to participate and with direct help and funding of different organizations, dairy development project, and intensive extension service structure was rebuilt (Yilma et al., 2011).

In Pakistan, policies taken for the dairy sector were neither frequent nor consistent while all the policies were focused to crop sector and it is exhibited by the milk supply chain in Pakistan which is very unorganized and yield per animal is very low. Initially, just after the independence, the Pakistan government took initiative plans for increasing dairy production in rural areas, making cooperatives of small farmers for better feed production, assembling, transporting, and even processing of milk, purchasing milk from *Gowalas* and controlling adulteration by performing purity test. But, at that time, the plan was too ambitious in case of implementation. In the second plan, policymakers shifted to a large-scale manufacturing sector while the problem in hand was improving production capacity. From the late '60s to the late '80s there was no success in dairy sector improvement, though the Pakistan government tried several times to improve its processing industries. In the early '90s, the private corporate enterprise started to participate in the dairy industry for providing a steady supply in the market. The only development took place in Pakistan's dairy industry was the establishment of multiple milk processing industry with the development of the manufacturing sector. The policy focused on crop-based agriculture has deteriorated the dairy sector's potential to emerge as a highly productive sector for more than half of a century. In 34 years, the milk production increased by four times only while it had a chance of growing more than that (Burki et al., 2004).

Malaysia, a developing country of Asia, which mostly relies on the imports of dairy products to satisfy national needs. It has struggled hard and taken multiple policies regarding the improvement of the Malaysian dairy industry. Since the early 1970s, the government of Malaysia has been trying to avoid the import of dairy commodities. Creating dairy colonies, initiating National Dairy Development Program (NDDP) targeting small scale farmers, assisting them with training, supervising, loan obtaining, transporting, storing, marketing of dairy products; establishing milk collection centers, etc. were included in all Malaysia plan and implemented accordingly for stimulating the production of milk; and, it worked successfully. Within the first four Malaysia plan, milk production increased significantly but after the 1980s, the government of Malaysia emphasized other sectors and dairy sector left at the backseat. As a result, even after the Asia crisis of 1997, Malaysia couldn't revive its dairy sector yet. Still, now, they had to import almost every dairy product. Although, they are trying to cope up with this situation by production, trade, and integration of both they barely can make it (Sim & Suntharalingam, 2015).

Australian dairy farmers have enjoyed the benefits of administered prices which exceeded the prices in the open market. In Australia, only the price of fluid milk marketed for human consumption was controlled, whereas milk used for the production of dairy products traded freely. A subsidy was provided to farmers on the milk they sold to the manufacturing sector.

Over the 1990s, Australia embraced free markets and competition as the basis for its overall economic policy. In 1999, the dairy industry approached the federal government with a plan to end the existing regulated regime and to provide a transition to a deregulated market. In 2000, both the administered price and the subsidy were terminated, and three programs were introduced (Dairy Structural Adjustment Program (DSAP), Dairy Exit Program, Dairy Regional Assistance Program) to provide financial assistance to farmers to adapt, and, if they wished, to exit the industry. Under Australia's former regulatory regime, assistance to dairy farmers was extended under the Domestic Market Support Scheme (DMSS) which imposed controlled prices on fluid drinking milk for domestic consumption and provided subsidies on milk sold to processors. The subsidies paid on manufacturing milk were financed by levies, paid by farmers themselves on liquid milk, and by processors on manufacturing milk. As far as income support from the DMSS program, different farms, regions, and states had come to rely more heavily than others on the inflated price of the market milk while others relied more heavily on the subsidies paid on marketing milk.

The dairy industry was one of the most highly assisted and regulated industries in Australia. The effective rates of assistance in 1999–2000 were 19 percent for manufacturing milk and more than 200 percent for market milk, compared with an average effective rate of assistance for the entire agricultural sector of 6 percent (Edwards, 2003). Because of the regulation, Australia had six separate dairy industries, one in each state, rather than a national industry. Further, within each state, there was an artificial separation of market milk and manufacturing milk. This fragmentation of the national market was precisely what the founding fathers, who saw federation removing barriers to trade between the colonies and establishing a common Australian market, sought a century ago to end. As a part of the overall shift in Australian economic policy towards greater reliance on competition and market forces, the federal and state governments concluded a Competition Policy Agreement, dated April 11, 1995. All this changed on 1 July 2000. The monopoly market of milk has put to an end by the state government statutory marketing authorities. That meant not only the introduction of competition to areas where many elderly farmers, government officials and commercially oriented employees in value-adding firms had known only its absence, but also the abolition of longstanding institutions. The separate Domestic Market Support (DMS) scheme for manufacturing milk, an ingenious regulatory creation of the Commonwealth Government, also ended on 30 June 2000. The initial impacts of the new program have been a significant reduction in the farm income and profitability, which, however, was substantially offset by the new programs. There is preliminary evidence that the retail price of fluid milk for direct consumption has declined (Earl, 2003).

The EU's dairy policy was introduced in the 1960s as part of the Common Agricultural Policy (CAP), initiated in 1962 and followed by the common market organization for dairy products in 1968. In 1984, the milk quotas were introduced to address the structural surpluses caused by high degree of government intervention, constraining EU production for a period of 31 years. Although the level of intervention stocks decreased over the years, the quota system remained questionable whether it was ever a successful policy or not, especially when evaluated against the billions of euros of super levy payments. In 1992 CAP gone through a major change that shifts from producer to income support with the goal to make EU agriculture more competitive while stabilizing budget expenditure. Unfortunately, this change took a long 10 years to reach the dairy sector until another reform in 2003. Intervention prices for butter were slashed by 25% and 15% respectively over a few years and milk producers were granted direct payments for compensation. It was also decided to extend the milk quotas until 2015 and their abolition that year was reconfirmed in 2008.

By the end of the first decade of the 21<sup>st</sup> century, the allocation of the CAP budget had changed completely. The 2008-2009 dairy crisis pushed the Commission to establish the High-

Level Group Milk that should conclude the crisis for future dairy policy measures. The group paid attention to the position of farmers in the dairy supply chain, paving the way for the adoption of the 'milk package' in 2012 which clarified the conditions for collective bargaining and introduced mandatory written contracts for milk deliveries. In 2013, the dairy policy was reformed and appreciated largely by dairy traders and in 2014. A milk market observatory was created for obtaining as much information as possible from the post-quota free market by market participants and the Commission itself. On April 1, 2015, the enthusiasm about the quota removal was however quite short-lived due to global overproduction driven by high milk prices and a simultaneous Russian embargo and a temporary slowdown in global demand, notably in China. The focus of EU dairy policy was increasingly on trade policy, trade barriers (within the EU and beyond), on gathering and assessing market information, and more recently Brexit. Looking forward, the reflections on the future CAP post-2020 have already begun. Budget negotiations will be tough (not helped by Brexit) and a strong focus will be placed on the relations along the supply chain, the environmental performance of the CAP as well as resilience against volatility (Pouch & Trouvé, 2018).

After the great depression in the 1930s, in the USA, in response to it, an active agricultural commodity policy was developed, and today's dairy policy was originated about a century ago. Import barriers and export subsidies, federal and state marketing orders for price regulation, govt. purchase as support etc. comprises the dairy policy of the US which influences the dairy industry. Over the year, selected types of dairy products (dried milk, cheese, butter) production, trade, and consumption showed an upward trend. In the US, the federal government and state governments subsidize milk production, maintain milk supply by controlling import and export level, and regulate dairy prices by stimulating other dairy policy framework which yields additional milk output, raise the price of milk commodities which lead to a gain for the dairy industry (Summer & Balagtas, 2002).

The policy frameworks mostly included: **Dairy Product Price Support Program (DPPSP)**, the federal government stands ready to purchase dairy products at a specified minimum price. When demand declines, the purchase price prevents the dropping of the market price below the support level that ultimately supports farm prices. On the other hand, this price support program doesn't reversely affect the supply-demand condition when the price in the market is over the support price. **Federal Milk Marketing Orders (FMMOs)**, these marketing orders were created in the 1930s to balance market power between farmers and milk handlers while reducing destructive competition between milk producers that can drive down prices to their mutual detriment. The FMMOs mandate minimum prices that processors in milk marketing areas must pay the producers or their agents (like the dairy cooperatives) for delivered milk depending on its end-use. Other programs like **the Milk Income Loss Contract (MILC) Program**, **Dairy Export Incentive Program (DEIP)** are important dairy policy too. The DEIP was first authorized in 1985, and this program provided cash bonus payments to U.S. dairy exporters, subject to limits on both quantity and value. The program was initially intended to counter foreign-mostly European Union-dairy subsidies (while removing surplus dairy products from the market, subsequent market development) (Jabbar, 2010).

Dairy policy controls the growth to a large extent. Like technology, the policy may enable opportunities for all farm size producers. For example, the price of milk in the domestic market is affected by the import price and export price of the same milk. A specified policy allows small farms to sustain with the support of policy as a form of incentive (Jabbar, 2010). Producers get influenced to produce when they feel the price of their product is enough and the producer's price is a ratio. This ratio was expected to be affected by the dairy-related tax, tariff, import quota, and other restrictions. But, the producer's price in the local market is not affected at all because they barely get any incentive or burden from these. Earlier it was assumed that milk

processing industries were affected by dairy-related global policies. In fact, they might be affected for a while, but for the growth of the dairy industry, there is no impact of policies at all.

### 3.3 Farm Size

Among thirty-six OECD countries: Canada, Estonia, France, Germany, Ireland, Latvia, the Netherlands, Norway, Sweden, the United Kingdom (England) and the United States over the period (1995-2010) dairy farm structure has gone through an evolutionary change since its beginning due to country-specific natural, social, and economic conditions and the regulatory and policy environment (Bokusheva & Kimura, 2016). A statistic on average farm growth showed that, in countries where dairy and other livestock practices are present, the growth of farms has changed significantly over time. In most of the OECD countries, inequality in farm size distributions has increased and a trend towards more polarized farm structures started to build (Bokusheva & Kimura, 2016). But structural change is not simply a matter of regional differences. Large farms are emerging, and national production is shifting towards these large-scale farms. Along with farm size, the production level is an intertwined component of structural change (MacDonald et al., 2007). Despite an overall trend towards large-scale farming, many small-scale producers remain in the industry. While exploiting economies of scale is an important driver behind the expansion of farm size, institutional, organizational, product and process innovations may generate a sound economic basis for small-scale farming to continue to operate (Bokusheva & Kimura, 2016).

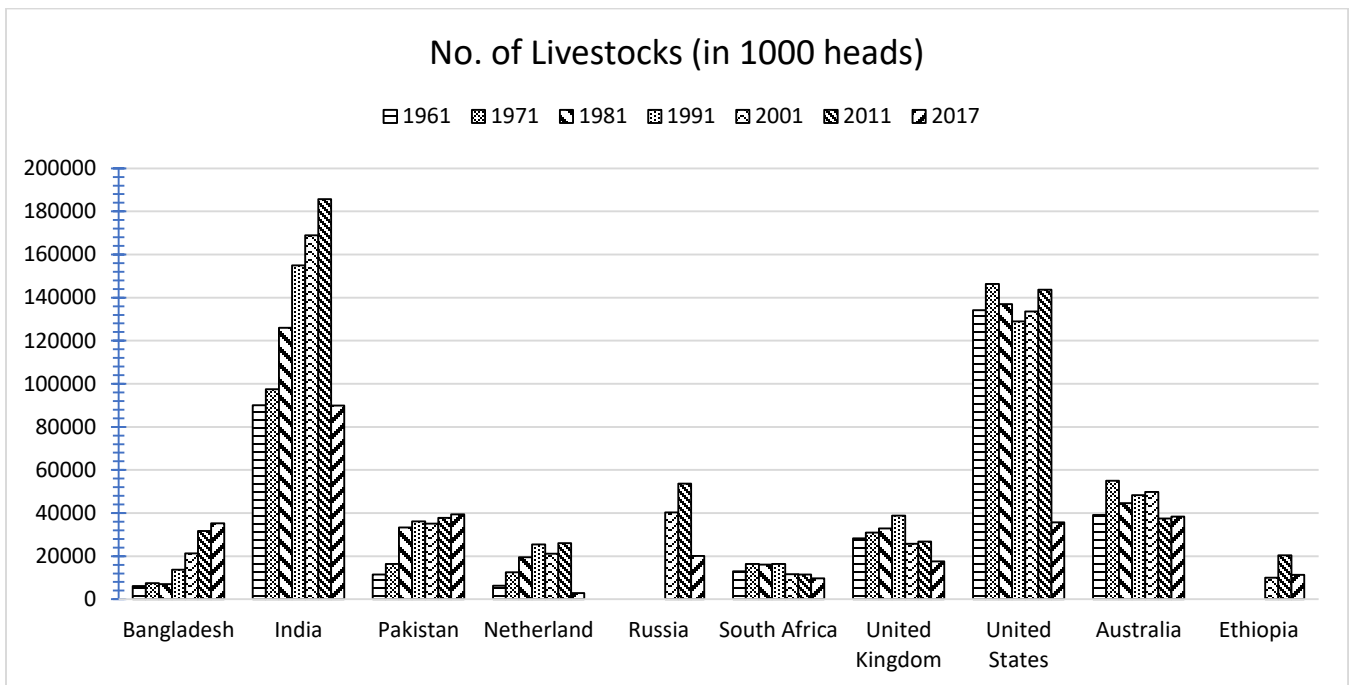
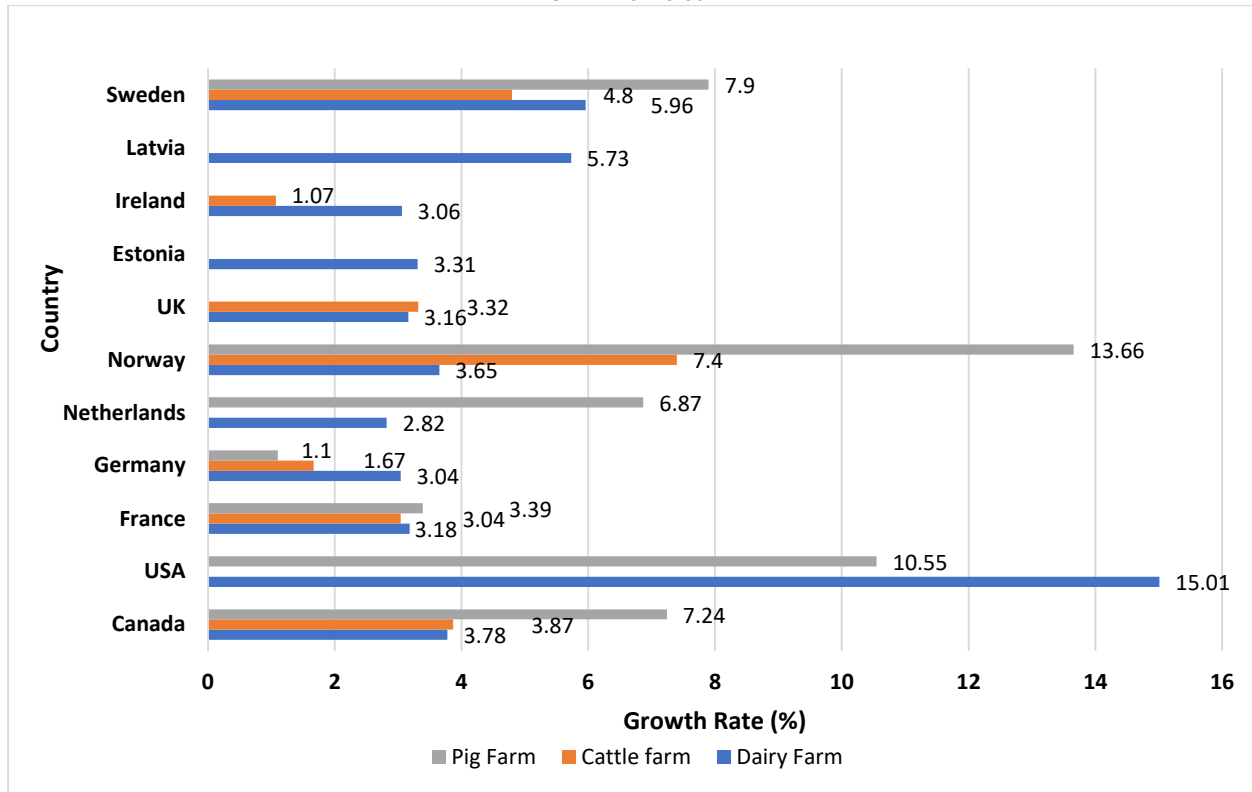


Figure 2: Average livestock size over time (FAO, 2018)

Statistics show that over the decades the number of livestock reared in the farm has increased in almost all dairy-producing countries (FAO, 2018).





**Figure 3: Average farm size growth rate (FAO, 2018)**

### 3.4 Resource reallocation

The problem of inadequate feed is a result of the limited land available for pasture establishment, especially in the productive highland zones that have a potential for dairy development. The scarcity of land is becoming a critical problem in many parts of Ethiopia, in certain localities, an estimated 50 percent of the population has a land scarcity problem. Without halting and reversing land degradation, it would be extremely difficult to expand dairy production, due to the less available land for grazing and growing fodder crops. In the traditional sector, the land becomes a constraint to milk production because of overstocking. In urban and peri-urban dairying, lack of grazing land is often a limiting factor. The intensification of the dairy industry by using fewer numbers of improved dairy cows with increased productivity per cow should be a strategy to be followed (Yilma et al., 2011). Again, the estimated growth rate of the human population of three percent is not at par with that of milk production estimated at 2.1 percent. Because of this huge population pressure, people cultivating more land formerly which used for grazing. As a result, the grazing land has been stretched beyond its capacity and consequently led to low productivity of the livestock. During the rainy season when milk production increases following a relatively increased feed availability, milk producers are faced with the problem of acute lack of milk outlets (Yilma et al., 2011).

Dairying in India is more inclusive compared to crop production in the sense that it involves many of the vulnerable segments of the society for livelihoods. Land fragmentation also impacts the distribution of dairy animals because of integrating agricultural land with dairying. An increase in the number of agricultural holdings and their continuous sub-division among the family siblings seemed to be affecting the consolidation of milk animal holdings. As a result of land fragmentation, the numbers of operational holdings across the landless, marginal and small categories have increased over the years resulting in a reduction in the average size (Singh & Datta, 2013; NSSO, 2006).

The study showed that among nearly 60.66 million households in India who are associated with dairying, landless, marginal, and small landholders (<2 ha of land) is of about 89 percent. Interestingly, marginal, and small farm households possess 54% and 16% milch cow respectively while they have fifty percent of agricultural resource ownership. Similarly, the households who were landless had about 13 percent of milch animals. So, when this resource shifts to other sectors, the dairy practice is stopped, which ultimately causing the decrease of dairy population in India and countries alike (Singh & Datta, 2013).

One of the largest of the world, the Australian dairy sector is mostly export-oriented, and it provides almost 10% of the total world's dairy supply (Statistics, 2003). Due to resource allocation from 1979-2013, steady growth, and fall in the dairy sector is found (Sheng & Jackson, 2016). Resource movement from small farms to large farms was controlled through deregulation policy. For ensuring dairy sector growth, the market competition was ensured, premium price ensured for market milk producers and restricting resource allocation from less efficient to more efficient farms to segregate small scale industry from the large one (Edward, 2003; Sheng & Jackson, 2016).

In the European dairy sector, resource reallocation has a minimum or almost no significant effect. As the European dairy industry is mostly pasture-based dairy production without any critical issue in pasture land, usually there has no production problem.

Even in the last few decades, the US dairy industry has gone through major structural changes. Significantly the number of US dairy farms has declined, but this declination took place mostly among small farms. In the meantime, the average dairy herd size increased from 19 cows in 1970 to 175 in 2010, and milk yield per cow doubled over the same period. Herd size, exit, and technical efficiency are related in varied ways. Without obtaining economies scale in production, just producing in a small portion with fewer resources and day by day requirements for resources in daily life is forcing small farms to leave the industry (Dong et al., 2013).

### 3.5 Food Consumption Pattern

Throughout the world, growth of income, urbanization, trade liberalization, franchise, and manufacturer, food industry development, retail marketing, even the consumer behavior is taking place and people care for a disease-free healthy life. Considering health consequences, people of all nationalities passing through a transitional period of nutritional consciousness which ultimately changed the pattern of food consumption (Kearney, 2010).

Christians of the Ethiopian Orthodox Church that represent more than 43 percent of the population, abstain from consuming animal products including milk and milk products for about 250 days a year and the faithful do not eat anything at all until the daily service is finished. The demand for milk and milk products generally declines during fasting periods among the Orthodox Christians. Although milk and milk products form part of the diet of many Ethiopians, liquid milk as such is not part of their diet. Most people use the bulk of their milk in tea/coffee and for feeding infants or the elderly and/or infirm. They, however, regularly consume other dairy products such as butter, *Ayib*, and *Ergo*. But, In Ethiopia, the production is basically of milk production. Except for some dairy processing industries, most of the firms prefer to rear dairy animals for milk and milk products (Yilma et al., 2011).

Over the past decades, the amount of meat consumed by the people of developing countries (Asia, Africa) has risen by three times than that of in developed countries. In everywhere, people of all income group, especially who are in the lower group are eating more animal-based protein products to meet their protein requirements as there is a significant rise in the income level and they are shifting to urban areas from rural. It is expected that not only in developing countries but in the whole world the meat consumption will expand to 63% from 52% of current. In volume, this rise would be an additional amount of 107 million metric tons (mmt) meat and 177 mmt milk. This is far more than the consumption level of 1996-1997.

Nonetheless, the inflation-adjusted prices of livestock and feed commodities are expected to fall marginally by 2020 compared to the last 20 years. Structural change in the incomes, nutrition knowledge, and diets of billions of people is a primal force behind this change (Delgado, 2003). In the USA, about three-fourths of the population has a food consumption pattern that is low in vegetables, fruits, dairy, and oils but contained too high calories. More than half of the population is meeting or exceeding total grain and total protein foods recommendations while completely exceeding the recommended limit for added sugars, saturated fats, and sodium. On the contrary, they are not meeting the recommendations for the subgroups within each of these food groups. It is found that more than 80% of people have a food habit consisting of the dairy product below and only 15% consume dairy products above the recommended level (USDHHS, 2015).

### 3.6 Credit Constraint

In countries like Ethiopia and Kenya where production technologies of dairy are available or can be availed from surrounding countries and many farmers are aware of the existence of improved technologies that can offer them higher returns as compared with their conventional practices (Rey et al., 1993; Freeman et al., 1998). However, most of the poor farmers do not have the financial means required to make the initial investment and acquire the associated technological inputs. Financial support or credit facilities to smallholder dairy farmers are very much limited. The importance of establishing credit facilities is a crucial step to the country's dairy sector as indicated in the livestock development master plan. A different study conducted with cross-sectional survey data collected from Kenya and Ethiopia showed that in Ethiopia there is no significant relationship between farmer's borrowing status and their credit constraint condition, while in Kenya the relationship is positive. The reason behind this variation is the credit distribution system of the cooperatives. Small farmers do not get timely access to credit, which caused almost no impact on dairy production through credit policies (Freeman et al., 1998). This simply leads to small scale farmers deprived of the potentiality of shifting to medium scale production level.

Financial constraints and credit market imperfections are a major constraint on investment, growth, and poverty reduction in transition and developing countries. In a study on the Polish dairy sector, it appeared that merging up the activity of private institutions really yields benefits for the growth of the dairy sector in this aspect. With the help of qualitative and quantitative evidence, in that study, they showed that private dairy companies, processing industries are of importance in financial assistance as well as helpful in increasing investment of small to large-scale dairy farms (Dries & Swinnen, 2010). Farms in rural and backward areas have problems accessing credit and without associating root producers with private institutions, growth cannot be ensured for small household dairy producers.

## 4. Conclusions

The changing trend of the dairy industry is at a steady pace. Not all the determinants causing the dairy sectoral change can be controlled. Some of these are natural (e.g., producer preference to shift in crop sector from dairy, consumers demand preferences, etc.) and some are controllable. Dairy policy in most of the developing countries are inefficient and barely changed on a requirement basis. The policy measures need to be taken care of by understanding the needs of the producers and consumers. Vertical integration of small-scale dairy sector with the active participation of private organization will create a generic binding to dairy production as private companies are profit-motivated. The efficient use of resources in small dairy farms need to be ensured by training farmers, making them capable of minimizing waste. The change in the dairy sector cannot be stopped and it should not be but controlling

change is required to cope up with any unwanted economic crisis if aroused by the dairy sector soon.

**Authors' Contribution:** Md. Salauddin Palash conceived the idea, guided, and reviewed the writing; Md. Ruhul Amin collected, processed the information, and wrote the paper.

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