Global Marketing Systems in the Dairy Sector : A Comparison of Selected Countries

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Abstract

This paper focuses on the global dairy sector in general, and milk marketing systems in particular. The dairy sector is multifunctional in nature, and contributes to sustainable agricultural development and food security. The global trade is dominated by developed countries, contributing to 62% of the imports and 92% of the exports. Global production and consumption are increasingly imposing pressure to produce and process more, keeping in the mind the aspects of quality and efficiency. The development of dairy markets is affected by access to milk markets and market distortions. Additionally, the development of dairy markets depends on the governments' involvement in regulating production and marketing of milk and milk products. In this regard, comparison of marketing systems across countries considering supply, demand, prices, and trade is important for a clear understanding of the complexities, performance, and challenges in the systems. The analysis indicates that although the production has increased over years in regulated (USA), deregulated (Australia), and informal (India) dominated milk markets, but consumption has increased only in the informal dominated markets. The processing is greater than 90% in Australia and USA, while this is only 18% in India, indicating backwardness of the Indian dairy sector. The farmers' share in consumers' basket is increasing in Australia, decreasing in USA, and is stable in India, representing a higher benefit to producers in deregulated markets and stability of the market in the informal sector dominated market. The milk prices are closer to the world market price in regulated markets as compared to the deregulated and informal markets, signifying higher regulation of production and marketing in USA. The self-sufficiency and performance of the Australian dairy sector is comparatively better because the dairy farms are competing in the international markets. The successful policy interventions in informal markets of Kenya and India indicates that these markets have the potential to improve income and employment, but impose constraints on quality and trade. These issues can be tackled by following an integrated approach in gradual conversion of informal to the formal sector through proper education and training, which has the potential for the overall development of the dairy industry.

Keywords: **global dairy marketing systems, regulated, deregulated, informal milk markets, trade**

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The dairy sector provides a multitude of benefits: nutrition, income, employment, manure, and fuel. According to Du, Liu, and Huo (2007), the three main benefits are : Firstly, milk as a source of nutritional diet provides carbohydrates, vitamins, proteins, and most of the minerals for the human body and is considered as a provider of immunological protection (Douglas, 2007). Secondly, milk production is a generator of employment and income. For instance, in India, every 6 to 10 kg of milk production requires one labour. This figure varies across economies; in Kenya, it requires one labour to produce 10 kg to 25 kg of milk (Sansoucy, 1995). Globally, dairy is considered as a strategic sector contributing to the gross domestic product (GDP) of state and national economies, and has a significant social impact. At the global level, 1.2 billion people live in extreme poverty ; out of 1.2 billion, 800 million are engaged in agriculture, and 600 million are poor livestock keepers (Otte & Mack, 2006). One in three farmers lives in extreme poverty, and livestock offers great potential for farmers to improve their income levels (Otte & Mack, 2006). Finally, dung from the animals is rich in NPK content, and is used as manure (Sansoucy, 1995). In addition, cow dung is used as manure that improves soil fertility and water holding capacity and reduces emissions respectively. In this way, the dairy sector contributes to reduction of poverty, increases food security, and helps in achieving the goal of sustainable agricultural development.

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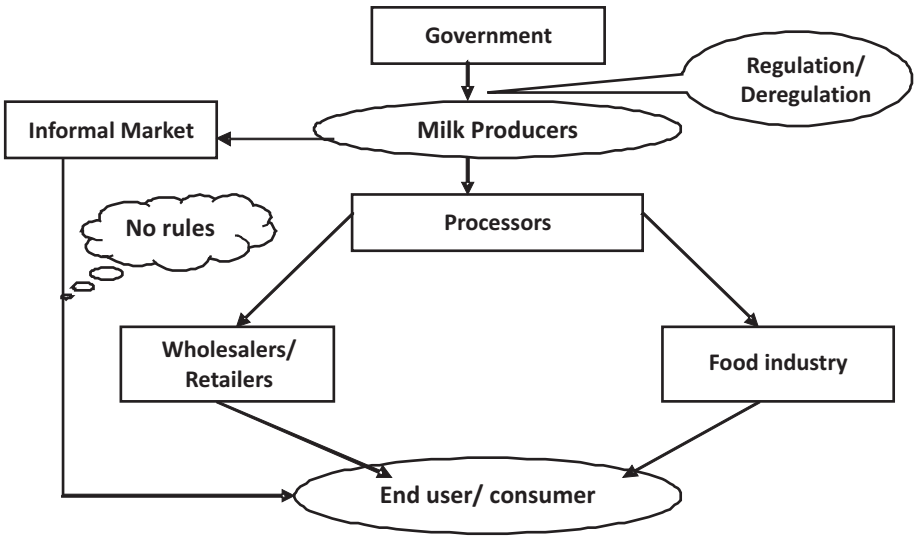
In the world, the market for livestock products, livestock milk, and cattle meat comprises of the largest share (31%), followed by pig meat (21%), poultry meat (15%), eggs (9%), other meat (6%), and other livestock products (1%). The growing importance of milk and milk products due to changing lifestyles, increase in income levels, population growth, and the consumption of milk is projected to increase to 648 million metric tonnes in 2020 from177 million tonnes in 1997. Most of this increase is attributed to developing countries (De Haan, Schillhorn, Bradenburg, Gauthier, Le Gall, Mearns, & Simeon, 2001). Thus, the dairy sector has wide prospects in the developing countries in particular.

Importance of Dairy Marketing Systems

The basic model of the dairy marketing system is explained in the Figure 1. The model shows the flow of milk from the producer to the consumer in regulated, deregulated, and informal markets.

Figure 1. Dairy Marketing Systems



Source: Adapted from P. Jachnik (2006). The Dairy Value Chains and Comparative Marketing Systems : An Overview. *Paper presented at FAO Symposium on the dairy value chains and comparative marketing systems*. FAO, Rome, Italy. November 2006.

Milk is highly perishable and bulky, which requires huge storage and transportation costs, and is produced in small quantities by a large number of small producers in developing countries, and a small number of large farmers in developed countries (Joe, 2009; Knips, 2005). The common constraint for both developing and developed countries is the lack of access to markets. In developed countries, producer subsidies have encouraged surplus production, which has led to market distortions and several countries have a mix of policies to protect the domestic dairy industry against unfair competition through appropriate technologies and institutions (Knips, 2005). In the world market competition, India and China are less affected because of the tradition of consuming milk and milk products in their cuisine and hence, these countries reflect the comparative advantage to overcome impediments of dairy producers (Beghin, 2006). Additionally, quality, choice, and safety have assumed great importance in the wake of urbanization and development (Joe, 2009).

In developing countries, which are dominated by traditional and informal sectors, the focus is on increasing production - not the productivity - and the role played by marketing systems for efficient and sustainable development of the dairy industry, which can benefit all players involved in the dairy value chain, is neglected. In developed countries, marketing systems such as deregulated, pseudo, and highly organized markets are prevalent with various levels of development (Jachnik, 2006). Analyzing marketing systems is crucial for regional and small-scale development. In this regard, comparison of marketing systems across countries is important for a clear understanding of the complexities, performance, and challenges in the systems. With this background, the present paper focuses on

the global dairy sector in general, and the milk marketing systems in particular.

Comparative Dairy Marketing Systems

The dairy marketing systems are divided into three main systems based on the involvement of the government in regulating production and marketing (Jachnik, 2006).

Types of Dairy Market Systems

Regulated Dairy Sector - USA : The dairy sector in USA is highly regulated. The milk price at farm gate, milk processor, and retail levels depend on the national and state milk marketing order. They use the quota system for regulating production. About 80% of the milk is marketed through farmer-owned cooperatives in USA. These cooperatives process half of the procured milk, and the rest is supplied to the milk processors (Ling, 2004). These cooperatives function within the American dairy policy framework that consists of milk marketing orders, trade programs, generic commodity advertising, and the price support programs (Wolf & Hamm, 1998). Milk prices are influenced by the federal dairy support program and the federal milk marketing order program at the national level. In addition, milk prices are also influenced by several provincial programs. The annual minimum target price for milk and milk products is fixed by the Government. If the milk prices are less than this annual minimum price, then milk producers can sell milk to the Government at an annual fixed minimum price. In the milk marketing order program, multiple prices are fixed for the milk sold to the dealers in milk marketing areas.

Milk marketing cooperatives fix prices above the federal order minimum prices through collective bargaining. The efficacy of the cooperative action is estimated by their ability to manage revenues and maintain membership to remove the incentive for independent processors to weaken cooperative price margins (Hoveid & Hammond, 1994; Knips, 2005 ; Wolf & Hamm, 1998). Consumers and producers derive a multitude of benefits from the milk marketing institutions - such as orderly marketing, health and food safety, bargaining income distribution, and data and knowledge of the market. In the absence of milk marketing orders, dairy cooperatives will not be capable of handling these services (Wolf & Hamm, 1998).

The regulated marketing system also exists in the European Union (EU) and Canada. In EU, milk production plays a key role in the agricultural economy, contributing 14% of the value of the European agricultural production. EU has the quota and pricing system to regulate milk marketing. According to ECA (2009) :

> The milk quota regime provides member states a national delivery quota for milk delivered to buyers and a national direct sales quota for direct sales and transfers of milk to consumers, and for all sales and transfers of other milk products. Producers receive individual quotas for their deliveries and/or their direct sales within the limit of national ceiling. If either the national quota is exceeded, the member state becomes liable to pay a levy to the community.

EU has to reduce the milk quotas in order to counteract an increase in production of butter and increased use of export subsidies for the commodities (Pajic, Blandford, & Bailey, 2009). Consumer prices are closely monitored according to the developments in the international dairy market. Between 2000 and 2007, nominal consumer prices for milk products increased by 17%, and nominal prices paid to the producer reduced by 6% (ECA, 2009). The quota system ties milk producers and processors not to freely react to global markets, which are totally contrary to the common agricultural policy, which gives a lead role to farmers to take part in the market and hence, the EU has decided to end the quota system by 2015 and enter the deregulation regime.

Deregulated Dairy Sector - Australia : The dairy sector is the prime rural industry contributing significantly to the GDP and to the employment in Australia. The industry deregulated the dairy sector through the removal of price regulations on the sold milk for consumption on 1st July 2000-2001 (SACES, 2000). Deregulation is defined as the removal of state and national legislation specific to the dairy sector. In deregulated milk markets, the states discontinued the provision of financial assistance and pricing schemes for primary milk ; at the federal level, financial support for value added milk prices through domestic market support scheme was stopped (Dairy Australia, 2009). The deregulation effect was to merge the milk markets and the manufacturing milk markets asking for adjustments by producers, processors, and retailers in efficiency and contractual arrangements (Issar, Cowan, Woods, & Wegener, 2004). The Australian dairy markets were deregulated, and the Government had no role to regulate the dairy markets

and production. The prices were determined based on the international market, and milk products were sold at international prices. As a result, the Australian dairy sector was exporting 45% of their manufactured products. The voice on deregulation started in early 1999; the Australian Dairy Industry Council (ADIC), which is the highest policy body, approached the national government with the proposal of orderly federal approach for deregulation of primary milk markets and to end the manufacturing milk price support. In the same year, on 28th September, the national government announced the implementation of the Dairy Structural Adjustment Program (DSAP) (Dairy Australia, 2009; Edwards, 2003). The DSAP comprises of the imposition of a dairy adjustment levy of 11% per litre on consumers of the products marketed as dairy beverages. The accumulated money from these levies was given to dairy farms to adjust to the deregulation regime, and to minimize social and economic disruptions over a period of eight years. All States cancelled the governing assistance and pricing of fresh milk, and closed its operation from July 1, 2000. The impact of deregulation has had mixed results across states and farms, which depended on the relative importance of dairy compared with other activities. Furthermore, in the process, several farms took advantage of the incentives of the DSAP scheme (Dairy Australia, 2009).

The main share of the deregulation package in 1998-1999 was an extraordinary structural adjustment worth half a billion dollars (Edwards, 2003). The industry took some time to adjust to the deregulation policy. In 2001-02, the industry achieved a new record by producing more milk than before, and the dairy sector continues to grow till today (Dairy Australia, 2009). On one hand, the deregulation policy has benefited consumers in terms of lower prices, and on the other hand, it has had a negative impact on farmers, in the form of reducing incomes in spite of packages provided by the Government (SACES, 2000). Intermediaries such as processors and distributors have benefited since the market power rests with them (Gouin, 2009). The higher the world market price for milk, the higher are the benefits for the Australian dairy sector since the milk prices are dependent on the world market prices and vice versa. The deregulated dairy sectors are also found in New Zealand and UK (ILRI, 2011).

↳ **Informal Dairy Sector - India :** The term informal marketing system is used to illustrate the marketing system in which the government does not get involved in marketing. Furthermore, such markets are called parallel markets (Yigrem, Beyene, Tegegne, & Gebremedhin, 2008). In these markets, prices and production are not regulated by the government. In addition, variable pricing is followed and quality is not regulated. The informal dairy sector domination is also found in Kenya (88%), Tanzania (98 %), Uganda (90%), Nicaragua (90%), and Pakistan (98%) (Jachnik, 2006). Informal collaboration with marketing and processing is the common feature mostly found in case of developing countries. Many developing countries tried to adopt the formal group concept, but the rate of development is very slow. The government slowly reduced the supportive legislation and tax concessions for promoting and strengthening the producer organizations (Joe, 2009).

Supply, Demand, Costs, Prices, and Trade of Milk and Milk Products

A wide variation is seen in the supply, demand, prices, and trade in milk and milk products. In India, dominated by the informal sector, about 88% of the milk is marketed in the informal market (Jachnik, 2006). The milk production is the highest in India because of the highest number of livestock population in the world, comprising of 55% and 16% of the world's buffalo and cattle populations respectively (the world's largest bovine population) (Phansalkar, 2006). Between 2002 and 2007, the production per year increased at the rate of 4.5% in India, whereas in USA and Australia, production increased by 1.7% and reduced by 3.8% respectively. The productivity and quality of milk are comparatively low in India than it is in milk produced in the regulated and deregulated sectors of USA and Australia respectively. Comparing delivery status to processors, India (18%) has the lowest as compared to USA (99%) and Australia (97%). Thus, India is processing only 18% of the milk due to lack of infrastructural facilities and low quality of milk. The price of milk is lower by 40% as compared to the world market prices because of low quality and high role of intermediaries in milk marketing. On the other hand, milk prices are lower by 22% than world market prices in the deregulated dairy sector (since the dairy sector is not regulated by the Government and the dairy sector has to compete directly in the international markets). The Australian dairy market reacts to dynamic changes in the international market. The milk prices are close to the world market prices in the highly structured and regulated dairy markets of USA since the Government regulates the production and marketing of milk. The Government of USA has several policies to protect the interests of farmers and consumers through suitable interventions (Tables 1 and 2).

The farmers' share in the consumers' basket is increasing in the deregulated markets, decreasing in the regulated

markets, and is stable in the informal markets. In the long run, the deregulated markets are a better option for the farmers to profit more as compared to the informal and regulated sectors, since the price showed an increasing trend between 2002 and 2007 (Table 2). Although the production is the highest in India, the per capita consumption levels are low, mainly because of population growth, which is increasing at a rate of 2.5 % per year from 2002. The consumption levels in regulated and deregulated sectors are higher because of almost zero population growth rates per year since 2002. The production and productivity in regulated and deregulated countries have improved over the years because of suitable interventions through research and development and by setting up appropriate institutions (Table 1 and 2).

Table 1. Comparison of the Status of the Dairy Sector in Different Marketing Systems, 2007

Indicators	USA (Regulated)	Australia (Deregulated)	India (Informal)
Milk production(MT)	79.3 (99%delivered)	9.6 (97%delivered)	114 (18%delivered)
Milk Price (in comparison to world market)	-3 %	-22 %	-40 %
Milk consumption/ capita/year	257 Kg	320 Kg	103 Kg
Milk processing	51 %	57 %	25 %
Export from total production	4 %	37 %	0.22 %
Import from local consumption	2 %	9 %	0.03 %
Self sufficiency	102 %	144 %	100 %

Source: Adapted from IFCN (2009). Dairy Report 2008: For better understanding of milk production worldwide.

Milk processing is almost the same in regulated and deregulated sectors, with 51% and 57 % respectively, since these countries have well developed infrastructure and technology for converting primary products into value-added products. On the other hand, India -dominated by the traditional and informal sector - has low infrastructure and technology in addition to domination of informal actors in milk marketing (Table 1). The trade of milk is high in the deregulated market because of freedom given to the dairy farms, processors, and distributors for exporting and importing without restrictions. Export and import quantities are less than 5% in regulated and informal dominated markets. The low trade potential in regulated markets of USA and informal markets of India is because of the highly regulated production and low quality of milk respectively (Table 1). The self-sufficiency and performance of the Australian dairy sector is better because the dairy farms are competing in the international markets. They are taking more risks to produce more and benefit more. Even USA and India have reached the self-sufficiency stage, but they have reached this stage by taking different routes. India reached self-sufficiency mostly by increasing the number of livestock, whereas USA reached self - sufficiency by increasing the productivity and nutrition levels in addition to reducing the number of livestock (Table 1).

Table 2. Comparison of Key Developments in Different Dairy Marketing Systems from 2002- 2007

Indicators	USA (Regulated)	Australia (Deregulated)	India (Informal)
Milk production/year	+ 1.7%	- 3.8 %	+ 4.1 %
Milk consumption/ capita/year	+ 0 %	- 0.1 %	+ 2.4 %
Population/year	+ 1 %	+ 1.2 %	+ 1.6 %
Farmers' share	Decreasing	Increasing	Stable

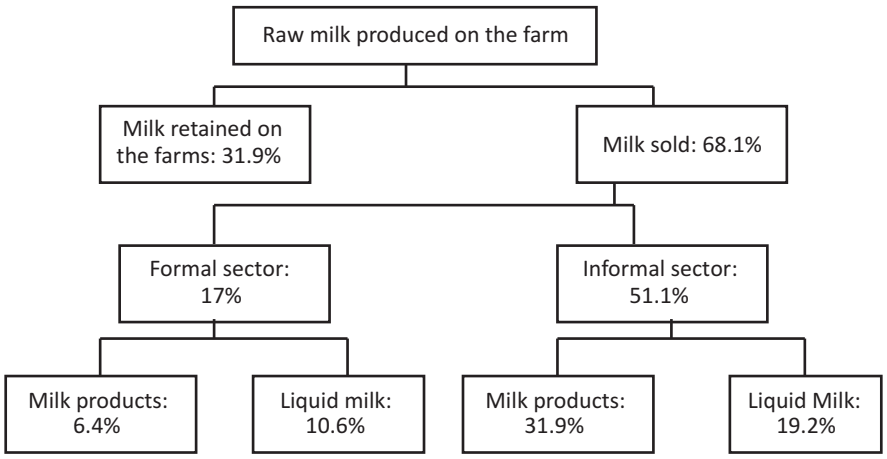
Source: Adapted from IFCN (2009). Dairy Report 2008: For better understanding of milk production worldwide.

Cases of Successful Policy Interventions/Models and their Impact

↳ **India - The Anand Cooperative Model :** Growth rate in agriculture is 2%, but in livestock, it is 4.5% in India, indicating the importance of dairy for the country (Meeta, 2008). Dairy farming has been a tradition in India since time immemorial, and is an integral part of agriculture, contributing supplementary income to seventy million farmers (Jesse, Dobson, Armentano, Olson, & Sharma, 2006; Rajendran & Samarendra, 2004; Sansoucy, 1995). Dairy animals provide income and employment from milk production, but not from meat production (Jesse et al., 2006). The milk

production has increased more than four times over the last four decades, from 21 million tonnes in 1961 to 114 million tonnes in 2007, which formed around 15% of the world milk production (IFCN, 2009; Rajendran & Samarendra, 2004). It is predicted that the consumption of milk will double by 2020 (Datta & Ganguly, 2002). Despite this impressive growth in milk production and consumption trends, the industry is facing problems of lower productivity of 1000 kg/year (world average 2038 kg/yr) (Meeta, 2008), low quality milk and feeding, inadequate infrastructural, processing, and marketing facilities in addition to domination of informal players in the milk markets. The informal markets are influenced by the role of intermediaries, which has led to low bargaining power to the producers in price formation. The prices in the informal sector are fixed just above the cooperative sector in order to attract the milk producers. The informal sector (milk vendors, wholesalers, retailers, and producers) market more than 80% of the milk and the rest is marketed through the formal sector (government and cooperatives). The manner in which milk is marketed in India is depicted in the Figure 2.

Figure 2. Marketing of Milk Production in India (2005)

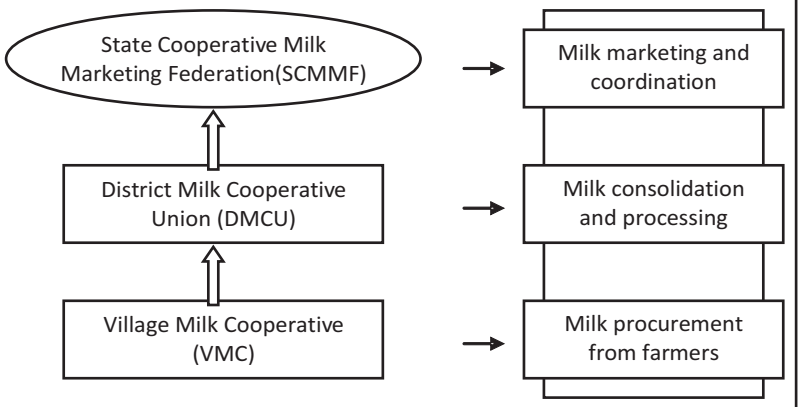


Source: Nestle India cited in Jesse et al. (2006). *The dairy sector of India: A country study.* Babcock Institute Discussion Paper No. 2006-2. USA. Retrieved from http://ageconsearch.umn.edu/handle/37353

The unorganized sector dominates the marketing of milk, though the cooperatives provide remunerative prices and other services because of four reasons : **(i)** fat content in the milk determines the price in cooperatives, whereas a flat rate is paid in the informal market irrespective of the fat content (Rajendran & Samarendra, 2004), **(ii)** Variation in milk yields and prices across cross breed cows, buffaloes, and local cows and the fat contents. Buffalo milk fetches 30% more premium price as compared to cow milk as per FAO estimates, **(iii)** cooperatives are paid for the sold milk on a weekly basis, whereas private organizations pay everyday (Jesse et al., 2006; Meeta, 2008; Rajendran & Samarendra, 2004), and **(iv)** consumers are not ready to pay the prices of the cooperative milk because it is higher than the price in the informal market. Consumers are not ready to pay the additional price of pasteurization. They consider the milk coming from formal and informal markets to be of the same quality (Jesse et al., 2006).

The basic foundation for the development of the dairy industry in India was the cooperative movement in the state of Gujarat in 1952, now popularly called as the Anand Cooperative Model (Jesse et al., 2006). The Anand Cooperative Model has a three tier structure - milk procurement at the village level by village level cooperatives - the district cooperative milk producers buy milk from the village level cooperatives and then process and market milk and milk products. The District Cooperative Milk Unions (DCMUs) provide inputs and services such as feed, veterinary services, artificial insemination, and other services to the village level societies. At the State level, the State Cooperative Milk Marketing Federation (SCMMF) aims at providing the milk producers with their own networks of production and distribution and particularly, consumers as well (Figure 3). Most of the farmers have realized that marketing is the key to the ANAND model. For instance, Gujarat Cooperative Milk Marketing Federation (GCMMF) is India's largest food products marketing organization, and the AMUL brand is among the most famous brands in India

Figure 3. Three Tier Structure of the ANAND Cooperative Model



Source : Authors' Research

(Jesse et al., 2006; Rajendran and Samarendra, 2004). India exports approximately 0.22% of the total production (114 million tones) and 0.03% of the total consumption (117 million tonnes). India's dairy trade is low because of protective measures and export subsidies, so Indian dairy policy focuses on the protection of the domestic industry (IFCN, 2009; Jesse et al., 2006). The dairy sector should focus on increasing competitive advantage in terms of quality and quantity, costs, and its integrity in international markets. In this process, the Government should coordinate all types of formal and informal organizations involved in dairy production and marketing at the national and international level, aiming to overcome challenges facing the dairy industry. In this regard, enhancing the power and size of the cooperatives can solve these problems to a great extent (Rajendran & Samarendra, 2004).

↳ **Kenya: The Small Holder Dairy Project (SDP) :** Kenya is an agriculture-based country, with agriculture contributing 30% to the GDP and providing 75% employment (EPZA, 2005; Muriuki, 1992). The Kenyan dairy industry is the largest in sub-Saharan Africa, comprising of three stages in dairy development :

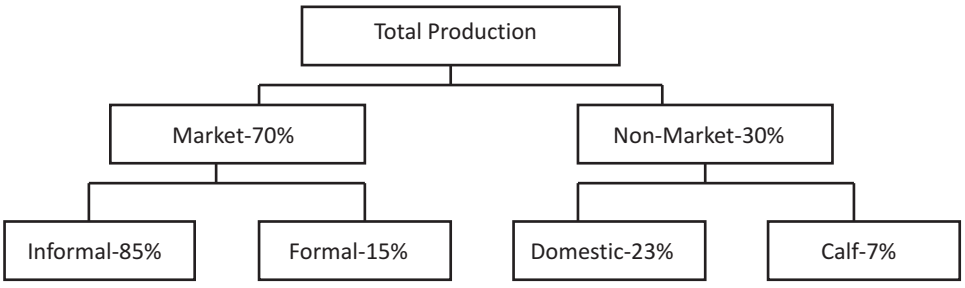
(i) Upto 1960 : Open market with independent dairies as market players,

(ii) 1969-1992: Monopolistic market situation due to rationalization of the dairy industry by the government, and

(iii)After 1992: Liberalization of the industry.

Upto 1992, the Government controlled the dairy industry, and Kenya Cooperative Creameries (KCC) enjoyed a monopoly position in dairy marketing (EPZA, 2005; Ngigi, 2005). Currently, the dairy industry is controlled by Kenya

Figure 4. Milk Marketing Structure in Kenya



Source: Adapted from Export Processing Zones Authority (EPZA) (2005). *Dairy industry in Kenya 2005. Research Report*, Nairobi, Kenya. Retrieved from http://www.centralbank.go.ke/cbk/FXrates/archives.html and W. Thorpe, H.G. Muriuki, A. Omore, M.O. Owango, and S. Staal (2000). Dairy development in Kenya: The past, the present and the future. *Paper presented at the Annual Symposium of the Animal Production Society of Kenya (APSK). Theme: Challenges to Animal Production in this Millennium*, KARI Headquarters, Nairobi, March 22-23, 2000. Nairobi (Kenya): ILRI.

Dairy Board (KDB). Marketing of milk in Kenya is either formal or informal. Around 85% of the milk is marketed through traditional and informal sector by Small Scale Milk Vendors (SSMVs) (Figure 4).The formal market is restricted to KCC, the cooperative societies, licensed traders, and is regulated by KDB (ILRI & ODI, 2006; Muriuki, 1992 ; Thorpe et al., 2000). The price of milk is 22% higher in the informal market as compared to the formal market (Karanja, 2003). For instance, in Central Kenya, the milk prices are higher in the informal market (17 Ksh) as compared to the formal market (13.5Ksh). In Nakuru of Kenya, the price of milk sold in informal markets is lower (25Ksh) as compared to the milk sold in the formal market (41 Ksh) (Staal, 2006). The milk marketing structure in Kenya is illustrated in the Figure 4.

The main reasons for dominance of SSMVs is attributed to **(i)** traditional preferences of fresh milk, and **(ii)** consumers' unwillingness to pay additional costs of processing and packaging. The fresh milk market offers benefits to producers and consumers in addition to providing employment in rural and urban areas (Thorpe et al., 2000). Small Holder Dairy Project (SDP) was jointly implemented by the Ministry of Livestock and Fisheries Development, Kenya Agricultural Research Institute (KARI), and the International Livestock Research Institute (ILRI) during 1997 to 2004. SDP conducted an intensive research on the constraints affecting milk markets considering small-scale producers and traders aiming at influencing policy changes for development of a good system suitable for small-scale farmers and traders. The SDP has been successful in protecting the interests of the producers by improving income levels and by assuring consumers of good quality products (ILRI & ODI, 2006).

Before 2004, the Kenyan Government and the Kenya Dairy Board (KDB) neglected these SSMVs and followed modern processing and packaging processes that were dominated by rich and powerful companies (ILRI & ODI, 2006; Thorpe et al., 2000). In 2004, the 'Safe Milk Campaign' organized by the processors and the KDB led to reactions from the NGOs using the SDP case in protecting the interests of SSMVs and the consumers. This led to milk wars in media, and opened the eyes of the policy makers. This led to the inclusion of SSMVs and the provision of services to them. The success of SDP in bringing about a change was widely acknowledged (ILRI & ODI, 2006).

In 2004, the Kenyan Government included the SSMVs in the Dairy policy. The main features of the policy included providing services such as **(i)** cost effective technologies, **(ii)** education and training on safe milk handling, **(iii)** incentives for better handling of milk, and **(iv)** establishment of the certification system. The policy has made a tremendous impact, which is reflected in changes in the market. KDB is actively involved in training and education of SSMVs for safeguarding the public health and assuring quality (ILRI & ODI, 2006). Between 2000 and 2004, the percentage of farmers selling to traders increased from 16.5% to 34 %, sales to the cooperatives declined from 24% to 7%, and direct sales to consumers declined from 40.2% to 29.8% (Staal, 2006). This scenario led to unnecessary loss in milk due to lack of proper handling and logistics along the dairy value chain. This also imposed a high risk on health and imposed a negative impact on exports. In order to overcome these problems, the private sector has to play a key role, and the public sector has to play the role of coordination in addition to gradual integration of informal players into the formal system (Karanja, 2003).

Evidence suggests that informal and traditional markets play a key role because they are demand driven and benefit the poor farmers. The informal market has stimulated dairy development, has provided market access to all sections of the population, and has generated employment. The quality and efficiency issues need to be addressed through proper training and education in addition to providing incentives for technology update. However, formal markets can provide greater consistency and chance to scale up (Staal, 2006).

Conclusion

The dairy sector provides a multitude of benefits - nutrition, income, employment, manure, and fuel aiming at sustainable agricultural development and food security. Growing importance of milk and milk products has imposed a great pressure on the dairy industry to produce and process more considering the factors - quality and hygiene. However, global production is not keeping pace with the growing demand due to declining production in developed countries because of intensification efforts and reduction in livestock numbers. In addition, the global consumption is stagnant due to declining population (in developed countries). The developing countries have been successful in increasing production and consumption because of increase in livestock animals. But they face issues of quality and efficiency in milk production and marketing.

The marketing systems are categorized as regulated, deregulated, and informal based on the involvement of the

governments in milk marketing and production. Analyzing marketing systems is crucial for national, regional, and small-scale development. The milk prices and production are highly regulated in USA at all levels of production and marketing for protecting producers' and consumers' interests. In deregulated markets of Australia, milk prices and production are not controlled by the Government, but are controlled by intermediaries, and the prices and production keep changing according to the international markets. Similarly, in the informal markets, the production and prices are not regulated by the governments, but are controlled by intermediaries. The farmers' share in consumers' basket is increasing in Australia, decreasing in USA, and is stable in India, indicating higher benefits to producers in deregulated markets and stability of the market in an informal dominated market. The milk prices are closer to the world market price in regulated markets as compared to the deregulated and informal markets, indicating regulation of production and marketing in USA. The self-sufficiency and performance of the Australian dairy sector is comparatively better because the dairy farms are competing in the international markets.

The successful interventions in informal dominated milk markets of India and Kenya shows that the informal markets play a key role in providing income, employment, and access to markets to all sections of the population, but failed to fully address the issues of efficiency, quality, and trade. These issues need to be addressed through incentives for education, training, and technology. In addition, an integrated approach for gradual conversion of informal to the formal sector needs to be implemented through farmer's participation, since formal markets can provide greater consistency and chance to scale up.

Managerial Implications

In a global sense, the demand for dairy products and the dynamics for international trade are changing, with milk supply becoming more constrained in some parts of the world and less so in other regions. This factor alone requires international dairy companies to reposition themselves in global markets. The U.S., as a low-cost milk producing country, is benefiting in the current scenario. The efforts of U.S. milk suppliers, processors, and product marketers to improve competitiveness depends more on innovation, flexibility, and investment than on policy support.

The best way to help small companies become aware of the resources available to them is to create a real one stop shop that covers the services of all Federal and State Departments. These services are likely to be useful for small companies wanting to export for the first time and for a national body such as Dairy Australia, which is looking at ways to achieve industry trade development objectives. They are less relevant to larger companies, which are well established in export markets and, which are well aware of the services provided by Dairy Australia and the Government agencies.

These issues need to be addressed through incentives for education, training, and technology. In addition, integrated approach for gradual conversion of informal to formal sector needs to be implemented through farmer's participation, since formal markets can provide greater consistency and greater chances to scale up.

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