

Dairy Export Potential of Indian Dairy Products in International Market

Supriya Lamba Sahdev

Amity International Business School, Amity University, Noida, Uttar Pradesh
E-mail: ¹lamba.supriya9@gmail.com/ slamba@amity.edu

Abstract—Indian dairy industry has undergone major increase in production after independence period and emerged as thriving enterprise. It gives loads of opportunities to entrepreneurs and investors worldwide, for capitalizing on one of the world's largest markets for dairy and dairy products. In 1991, the economic policy reforms widened the market opportunities for international trade including dairy products. The factors supporting Indian dairy export are low cost of value added products, abundant raw material availability, systemic breeding, improved feeding and superior healthcare management. These positive notwithstanding, the Indian dairy industry has a very small share in the global dairy market due to the major constraints curbing the growth of Indian dairy sector. In this context, this paper examines the issues of trade possibilities for Indian dairy, in view of growing demand and augmented supply in global market. It has been revealed that the Indian dairy production is competitive in comparison with other countries and has a geographical advantage to capture the market of milk deficit areas in neighboring countries. India needs to focus on improving quality and hygiene standards of the dairy products and bring more efficiency in milk production. This will help India in emerging as one of the leading Dairy exporters in the world and capture the international market.

Keywords: Global dairy, India Dairy Export, International Trade Distortion, WTO, SWOT analysis.

1. INTRODUCTION

Food scarcity is one of the major global challenges and is forcing people to look for ways of ensuring the available land for farming. Dairy products are emerging as balanced nutritious food and are a key element in household food scarcity. In past three decades, India has shown tremendous change and has become world's leading milk producer with 132.4 million tons production in 2012-13, as compared to 97 million tons in 2005-06. (National Dairy, 2015) .This success has been achieved because of a government initiative popularly known as Operation Flood (1970-1996) and the kind of focus it has given to dairy development activities. This initiative resulted in enhancement of dairy production, as it ensured the availability of veterinary services, feed, and farm related education.

Indian dairy industry being one the largest industries in India is having the characteristics of large number of cattle and low output, in terms of productivity. 16% of world cattles, including 57% of buffaloes are there in India, but the contribution in world milk production is just 15%[11]. The sector generates livelihood for around 60 -70% of rural households. India is a minor contributor in the world dairy market, with 1.6 % of the world dairy exports whereas it is the largest producer of milk in the world[3]. India exported 1.59 thousand MT of dairy products in 2013-14[1]. Even after the onset of operation flood, the exports of dairy sector from India are still low.

This paper throws light on the present scenario of dairy industry in India and potential for export in global market. There are numerous challenges which are faced by the dairy sector in trading its product in global arena. Therefore, this paper maps the challenges in international trade of same time can improvise its product quality, for the world market. Indian Dairy products and strategies have been enlisted for improving the Indian dairy sector and uplift the production, processing and marketing of dairy products in international market. This can help in increasing the possibilities of India' entering into the global milk & milk products market, and at

2. OBJECTIVES

The major objective of the study is to evaluate the export potential of Indian dairy products and extract the critical issues hindering the growth and development of the sector. Following are the specific objectives:

1. Design an overview of export potential of Indian dairy products.
2. Examine the WTO issues restricting international market access.
3. To analyze the factors responsible for low share of Indian dairy products in global market, despite been world's largest dairy producer.

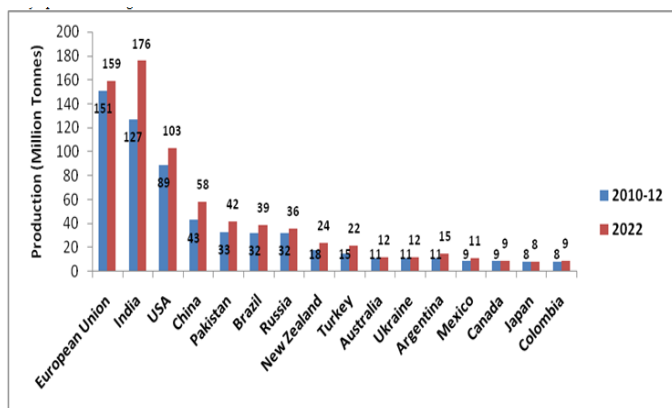
4. To provide suggestion for development of Indian dairy industry and enhancing the exports of Indian dairy products.

3. RESEARCH METHODOLOGY

The study is related to the export potential of Indian dairy products in global market. The research method adopted was based on secondary data and it is collected from the books, journals and Internet.

4. GLOBAL DAIRY PRODUCTION

The current annual growth rate of global milk production is 2.3% and it is estimated to grow at an average rate of 1.8 % in the coming 10 years. World milk production has increased to 754 million tons in 2012, as compared to 482 million tons in 1982. (Food and Agriculture, 2015) Apart from few exceptions like Russia and Ukraine, milk production has increased significantly in almost all countries around the globe.



Source: OECD-FAO agricultural Outlook 2013-22

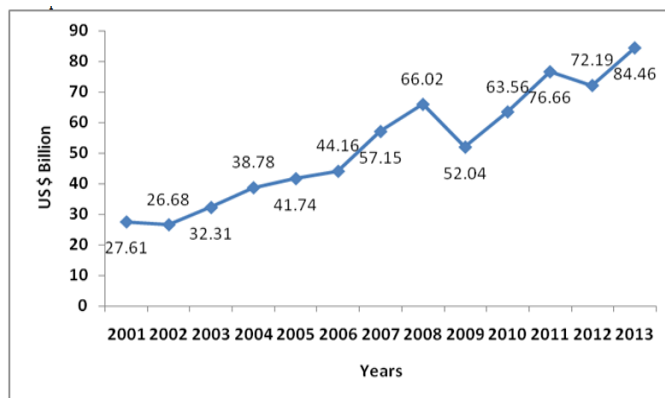
Graph 1: World milk production: India would take over the production of European Union by 2022

In the developed countries, average growth in milk production is expected to grow at 1 percent per annum as compared to current 0.8 percent. This is due to higher yield experienced in developed countries. Despite that, the milk production growth in developing countries is set to be at the rate of 2.5% per annum which is double the rate of 1% in developed countries. It is estimated that the contribution of developed countries in the world milk production is expected to fall by 50% in 2022.

5. GLOBAL DAIRY TRADE

Globally, major traded products are cheese and curd with 38% share of world exports, followed by milk and concentrated cream (29%), milk and cream not concentrated (11%), butter and milk fats (10%), natural milk products(7%) and buttermilk and yoghurt (6%).The consumers now a days are becoming more concerned about health and nutrition is increasing the consumer preference for dairy products, which is going to bring

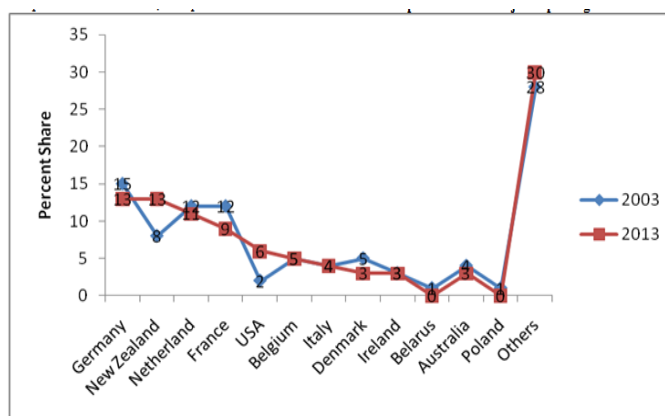
opportunities and challenges to the global dairy industry. The various benefits by the dairy product on human health is providing tremendous marketing opportunities for high value added dairy products. International trade is major source of bridging the gap between demand and supply. The graph 2 represents that world dairy exports have grown upto US \$ 84.46 billion in 2013, as compared to US \$ 27.61 billion in 2001.



Source : <http://worlddairyexpo.com/>

Graph 2: World dairy exports

The largest exporter of dairy (Milk & Milk products) is Germany, contributing 13.3 percent as per 2013(Graph 3). The share of France has significantly declined from 12% in 2003 to 9% in 2013. As compared to last decade, the position of the US improved from 1.9% in 2003 to 6.1% in 2013. On the contrary, there has been a significant growth in share contributed by other countries from 28% in 2003 to 30% in 2013.



Source: <http://worlddairyexpo.com/>

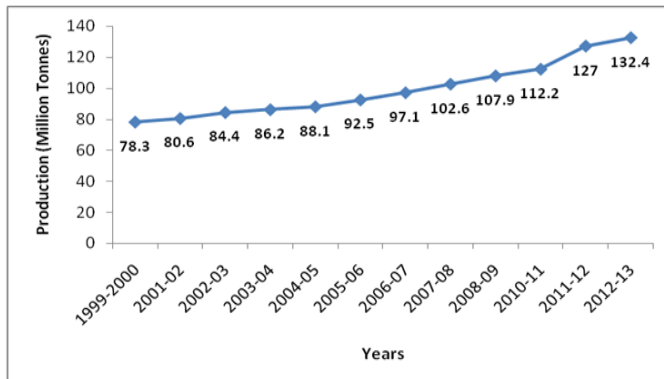
Graph 3: World's major exporting countries

In past years, milk consumption has increased due to two major factor, first factor being human population growth and second is increasing per capita consumption. There is an increase in the population growth rate 1.2 to 1.3 % ,which means 75 to 80 million people addition to world population per year. This means population growth will lead to an increase in milk consumption by 7 to 9 million tons per year.

The second factor affecting is the per capita income developments. Therefore, the increasing per capita income is leading to increased per capita consumption of dairy products. (Food and Agriculture, 2015). Asia has a major market for dairy products, having 55% of world imports, whereas Africa has 15%. Rest of the demand can be from China, Singapore and Pakistan. In Latin America and the Caribbean countries, most of the people use milk powder and importing milk will cost them high prices. On the contrary, because of the strong demand of butter and SMP, imports by the Russian Federation are expected to shoot. (Food and Agriculture, Jan 2015)

6. INDIAN DAIRY INDUSTRY

India, the world's largest milk producer is having production of more than 100 million tons of milk, having 16% of world's total milk production. (Food and Agriculture, Feb 2015) In the past decade, the dairy sector of India has shown significant growth and has become the one of the largest producers of milk.



Source: National Dairy Development Board

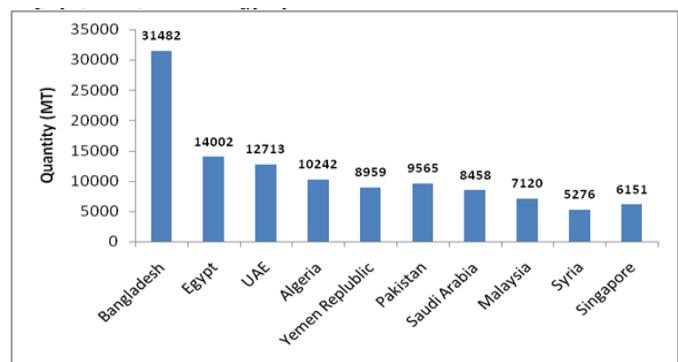
Graph 4: Indian milk production growth trend

The Government of India, at the union level has started a central scheme, known as the National Dairy Plan – Phase 1, for a time duration of six years (2011-12 to 2016 – 17), which is focusing on increase the milk production. This scheme has a budget of 2242 crore. Its main objective is to help in offering rural milk producers with better access to the organized milk processing sector and ultimately, filling the gap in the demand & supply of milk.

7. INDIAN DAIRY INDUSTRY: EXPORT POTENTIAL

Indian dairy industry has an illimitable scope for capturing the global market with rising population from 7 billion to 8 billion by 2030. FAO has analyzed world dairy and their analysis says that when people have better incomes, they begin to spend a greater part of their food budget on meat consumption and animal protein-dairy, as compared to food crops. Expectedly, the past few decades have witnessed tremendous growth in the consumption of livestock product[1]. In developed countries, the demand for dairy products remains

low in upcoming years, because of hardly any change in eating habits & population. It is difficult for India to enter developed countries market as they have stringent sanitary & phyto- sanitary regulations, whereas it can have growing demand in Asian Countries. In the Asian market, change in eating habits will have a significant role to play in rising the demand for dairy products. In future, demand will go up of products which are having more proteins & lactose. Although the country has distinct competitive advantages for enhancing export and capturing a better share in global market, it has not been able to capitalize on the opportunity. Despite of having the highest milk production, India is still a minor player in the world market, ranked at 18th position with a 1.6 percent share in the global world market. (Bhasin, 2014) The major factors responsible were poor quality and unhygienic standards of milk production, lack of experience and information. Only about 35 percent of milk is processed and this is also bound with hindrances in terms of support services, operation efficiencies, marketing and quality. A robust plan is needed to strengthen the current animal breeding services. On account of poor infrastructure for animal breeding, farmers are not willing to adopt AI as a technique for animal breeding. They have to resort to services by stray bulls of poor pedigree in rural areas. While most advanced countries are resorting to latest technologies like sexed semen, we are still lagging with breeding service by bulls of unknown genetic quality. (Bhasin, 2014). Further, for developing the capacity of feed industry a lot of investments are needed, as well as incentives and subsidies, in order to set up mineral mix plants, for better nutrition to animals. This will enhance the quality and yield of production, enabling Indian dairy to comply with international quality standards. For Indian dairy industry the major export destinations are Mid East, Singapore, Pakistan, Bangladesh, US, Russian Federation, Algeria, Hong Kong, Japan, Vietnam, Indonesia and Egypt. Apart from SMP, casein, and ghee, butter and whole milk powder are the other important products exported from India. Indigenous milk products and desserts, for example paneer and chhana based sweets like Rasogulla, have been exported. In both frozen and ready-to-eat form, Paneer is being exported. These products have a huge demand from ethnic of the world. Looking at the global market, India is an exporter of almost all dairy products.

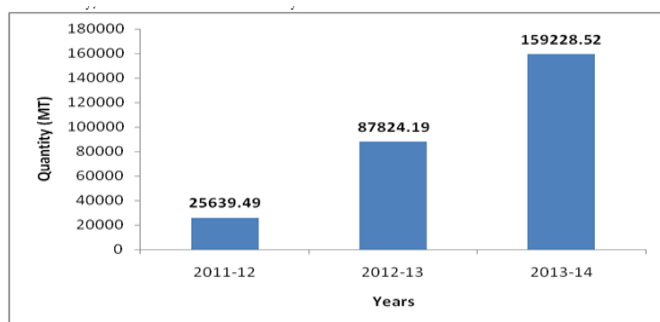


Source: APEDA

Graph 5: Major Importer of Indian Dairy Products

Nevertheless, Indian dairy industry as a huge potential in future and will keep influencing world trade. Recently, AMUL has entered the world dairy trade to bid with global dairy giants. India's cost of production is lowest in the world, and that's the reason it enjoys a comparative advantage in milk production. Another factor that gives India an edge, is the fall of Europe as a key exporter of dairy products, as subsidies it was enjoying earlier has reduced under the WTO regime. These above stated reasons have increased its chances to export more of its dairy products.

Some of the major milk producing areas of India is Uttar Pradesh, Maharashtra, Himachal Pradesh, Madhya Pradesh, Punjab, Rajasthan and Tamil Nadu. India in 2013-14, exported 159229 MT of dairy products to the world, valued around 3318.53 crores.



Source: APEDA

Graph 6: Indian Dairy Export Growing Trend

8. SWOT ANALYSIS (APEDA, 2015; [20]; [17]; [12] AND BINDU, SUBRAHMANYAM & BHAT, 2014)[4]

Strengths

1. In dairy farming, there is a huge contribution by small and marginal farmers to the total production of the country. To strengthen the economic viability there is a need of intervention from input side and ensure better farm gate prices.
2. Milk, the raw material for dairy industry, is available in exuberance.
3. India consists of large number of cattle population, which can be an advantage to improve the productivity by strengthening the indigenous breed.
4. To support, industry operations and R&D, India has highly qualified and technically trained manpower.
5. India is equipped with latest technological infrastructure for the development of dairy industry.
6. Indian dairy sector is self-sufficient as it has artificial insemination (AI), feed, and veterinary services, To improve the conditions, it is necessary to develop agri-clinics in rural areas and educate the farmers through awareness programs.

7. Dairy sector of India consists of tremendous product mix.
8. The trends predict that with increase in income, households tends to spend a higher percentage of their budget on dairy products consumption. So, there is scope to capture the huge demand by spreading the awareness of milk benefits and make the products available to consumers.

Weaknesses

1. In India, large number of farmers is contributing tiny quantities in milk production. There should be support to dairy sector in form of investments, cluster formation by cooperatives, government policies and much more. This will support dairying as an enterprise to encourage commercial dairy farming.
2. Quality is a major concern, even then large share of milk (70-85%) travel through informal channels. To maintain the quality of the informal channel, there should be training of the farmers and trader which will ensure the quality restrictions.
3. Because of poor governance at the cooperatives level, the Indian farmers are unable to take the advantage of high demand. The cooperatives should be transformed to be the true representatives of farmers.
4. Quality of dairy products is becoming a hindrance/obstacle for Indian firms to enter global. Quality improvement can be done through training the farmers, traders and processors on various quality management techniques and implement strict quality restriction through standards like HACCP, ISO, and GMP. Also, there is need to develop the infrastructure facilities.
5. There is fluctuations in the milk quality because of seasonal change, variation species-wise like cow, goat, buffalo, camel, etc.
6. In India, we have Ad hoc export policies and even ban on exports. To overcome this weakness, it is required that the authorities should make more rational trade policies to support farmers.
7. Low access to loan reduces risk taking ability of farmers. This should be made available through dairy farmer organization and other government agencies, at reasonable interest rates.
8. Miserable condition of infrastructure in the forms of roads and power supply, makes it difficult to get and supply good quality milk. Huge volume of the milk is spoiled due the delay in transportation to the chilling centers. This can be improved by establishing chilling centers in the rural areas and develop the transportation facilities.

9. There is no reliable and comprehensive data available on milk production, market intelligence, and there is hardly any investments done by authorities in dairy research.
10. Only 15% of the milk is produced in organized dairy sector.

Opportunities

1. High potential for Indian dairy sector to capture the rising demand in international market. New GATT treaty will provide opportunities for export of agri-product and dairy product in particular.
2. There is huge scope for development for market information intelligence system for milk and milk products. Customized software can be developed for enhancing the dairy information system which will benefit farmers, traders and processors.
3. Enhance employment opportunities.
4. There is an increased demand for fluid milk and value added products. This can be fulfilled through integrated structure for milk marketing.
5. Potential to capture global market due to low production costs. One of the major barriers which need to be focused is the quality issues.
6. Entry of large corporations in retailing, leading to higher investments. Further, there should be establishment of policy environment to enhance investment
7. Quality packaged products can be used as consumer sophistication is growing slowly.
8. Dairy products are emerging as balanced nutritious food and are a key element in household food scarcity.

Threats

1. Indian farmers have no awareness about quality parameters, like residual antibiotics, microbiological and chemical contaminants. This can be addressed through various education programs by governmental bodies, NGOs, Processors and related organizations.
2. There is a threat to the domestic dairy industry as MNCs can enter the same market.
3. Adulterated liquid milk including synthetic milk is again a threat to the dairy industry.
4. There is high cost of transportation because of low productivity. The productivity can be increased through breed improvement leading to higher productivity.
5. There is a high competition from the global players due to the low cost and better quality products.
6. Lack of infrastructural facilities is an obstacle in maintaining the quality of dairy products and thus products been rejected from international market. This issue needs to be addressed to develop an adequate value chain.

7. Middlemen control a huge proportion of the milk procurement. Direct procurement by the processors will result in better quality and reduce cost of production.

Restricted Market Access: Distorting International Trade – [17] and [16]

WTO has been majorly contributing for creating a major market in the agricultural sector. Some of the developed countries protected their high cost of production by imposing the qualitative restriction and high import tariffs. The market of developed countries became impregnable to developing countries due to high tariffs, and sanitary and phyto-sanitary (SPS) norms.

The two major reasons for blocking the developing countries' exports to developed world are:

1. Import tariff peaks by developed countries.
2. Reduction in tariffs in developing countries and export subsidies by developed countries made the domestic markets overflow with cheap and highly subsidized products, which would lead to large scale resentment.
3. For developing countries, diversifying their exports in horticulture, meat and dairy products, Sanitary and Phyto sanitary (SPS) is a major barrier.

Despite, of these challenges India can capture the international market for its dairy products, along with its commitment under WTO.

- India can impose dairy tariff rates at WTO final bound levels, which is much higher than the present situation.
- No effect will be seen due to export subsidies as India is out of range.
- India can also extend its domestic support to dairy under green and special & differential (S&D) treatment boxes of WTO due to the exemption from reduction commitments.

Export Subsidies: Distorting International Trade

The agreement on agriculture makes it necessary to avail export subsidies only when it is specified in a member's list of commitments. Also, it was made compulsory to reduce the amount of money spend on export subsidies and the size of exports that enjoys subsidies. The reduction on export subsidies were:

1. In term of money, 36 percent by developed and 24 percent by developing countries.
2. In term of quantities, 21 percent by developed and 14 percent by developing countries.
3. No cuts were required to be made by Least developed countries.

To dispose off large agricultural surplus in other countries, the developed countries continue to offer high export subsidy. As a result, Indian dairy sector find it difficult to compete with subsidized exports in international market because most of the international market in captured by developed countries due to low cost and better quality.

Quality Standards- [17] and [16]

Under the GATT agreement, the agreement on Sanitary and Phyto sanitary (SPS) Measures fixed the basic rules on food safety and plant health standards. This has permitted the nations to fix their own standards which have to be based on science and should be applicable only to the extent which is necessary to protect humans, plants and animals. Member countries of GATT are encouraged to use international standards like FAO/WHO Codex Alimentarius Commission for food, International Animal Health Organization for animal health etc.

The Agreement on Technical Barriers to Trade (TBT) tries to remove obstacles to trade by ensuring regulations, standards, testing and certification procedures do not create unnecessary hindrances.

With reduced import tariffs and quota restrictions disappearing from international arena, most of the developed countries have started adopting quality standards as a tool to restrict dairy exports from India and other developing countries. The research institutions and scientists in India need to keep a close vigil on such mandatory quality specifications of global arena and to overcome the emerging international trade barriers.

Issues and Challenges in Indian Dairy sector [6]**Farm Level**

The Indian dairy industry is majorly occupied with small and marginal farmers. They don't have basic resources like, land, labour, capital, etc. The other constraints are:

1. Inadequate nutritional feed for animal.
2. Lack of veterinary services in rural areas and unavailability of quality medicine.
3. Low genetic potential of animal
4. Low productivity.
5. Lack knowledge on milk handling practices and poor infrastructure, leading to poor quality.

Collection Level

1. Majority of farmers are small and marginal. So, unable to supply adequate quantity of milk.
2. Number of intermediaries result in high cost of production.
3. Inadequate screening system for raw milk, resulting in poor quality product.
4. Gaps in information recording or transfer due to the lack of Dairy information system.
5. Lack of infrastructure like roads, chilling centers, automated collection centers, and many more.

Co-operative level

1. Poor management leading to losses.
2. Inefficient services in terms of feed, artificial insemination and veterinary services.

3. Huge government interference leading to low participation in decision making.
4. Gaining faith of farmers, on joining the co-operatives.

Processing Level

1. Absence of quality standards like HACCAP, codex, etc.
2. Obsolete packaging technology.
3. Fluctuating quality and quantity supply, due to seasonal fluctuations.
4. Lack of trained and skilled workers.

Storage and logistics

1. High cost of refrigerated transportation to international market.
2. Lack of cold storage facilities.
3. Inadequate number of reefer vans and containers.

Marketing Level

1. In developed countries only cow milk is popular and India produces significant quantity of buffalo milk which hardly people knows about.
2. Most of the people of the world have the perception that Indian cattle have foot and mouth diseases. India needs to make efforts to eradicate FMD.
3. Unable to meet export quality standards.
4. Competition from global players.
5. High cost of production due to low productivity.
6. Poor marketing strategies.

Technology

1. Poor utilization of Information Technology or dairy information system.
2. Lack in knowledge of technological improvements in term of production, processing and packaging, results to poor quality, time wastage, low yield, and high cost of production.

9. RECOMMENDATIONS

The major factors responsible for making the Indian dairy sector globally competitive are:

1. Lowering the cost of production and increasing productivity.

In India the cost of production is high due to the low yield of Indian cows i.e. 987 kg as compared to 6273 Kg in Denmark, 5289 kg in France, 5462 kg in United Kingdom, 5938 kg in Canada, 7038 kg in USA and 11000 kg in Israel [5]. Emphasis should be laid on cross-breeding, feed management, proper healthcare, leading to increased productivity and lowering the cost of production. Further reduction in cost can be achieved through use of technology for production and processing, efficient supply chain, enhancing backward linkages for milk procurement, implementing quality standards. Also, as most of the western countries prefer low fat milk, India need to

encourage low fat milk production and use buffalo milk for making high butter fat. (Dutt, 2001)

2. Quality management for Export.

Adoption of the quality standards like PFA, GMP, GHP, HACCP, ISO and codex is necessary for better governance of international trade, consumer safety and high quality dairy products. The research institutions and scientists in India need to keep a close vigil on such mandatory quality specifications in international arena in order to overcome the emerging international trade barriers. Workshops should be conducted for exporters to provide them easy platform for quality certification. Such efforts are necessary through coordination of organization like EIC, CITA and the Ministry of Agriculture.

3. Infrastructural Development

The need for conforming international quality parameters makes it essential to improve the infrastructural facilities like road, chilling centers, agri-clinics, and latest processing units. This will improve the quality and help in total cost reduction.

4. International trade.

India needs to cope with trade distortion policies of developed countries, need to focus on non-tariff barriers like quality restriction by developed countries. The improved quality and low cost will help in overcoming the tariff barriers.

1. Demand Generation of Indian dairy products.

Indian dairy industry need to take initiatives to spread awareness about traditional Indian dairy products and the attributes of buffalo milk, with the main objective of export promotion of these products. This can be practiced through media campaigns, market intelligence, food festivals and various other promotions techniques. There is an opportunity for Indian dairy sector to capture the niche market for Indian ethnic dairy products by developing products meeting the international quality standards.

2. International Marketing.

Both multilateral and bilateral negotiations are required to be done by India with importing countries as the Indian dairy industry is supported through innovative policies. Regulation and monitoring of Indian dairy production is important as per international standards. Effective marketing strategies require availability of databases having assessment of national and international production, prices, production conditions, consumer preferences, risks and the quality of dairy products. Therefore, this can be analyzed through customized market intelligence model. Efforts should be made to develop innovative packaging and labeling to compete with global competition. Exporter should have expertise in international marketing and export management i.e. export laws and regulations. Institutions such as EIC, CITA, NDRI and NDDB, should be encouraged to take up these activities.

3. Strategic alliance.

For the export of dairy products, diplomatic initiation should be made at international level (Australia and New Zealand

who compete with each other but enter the world market as strategic partners). In this context, India could play an active role with the dialogue initiated by it with the 22 member countries of the Austral Asian Animal Productivity Society (of which India is also a member) for strategic alliances towards export of animal products to importing countries in Asia, SAARC nations, Africa, and South America, many more.

4. Awareness or training programs

Dairy industry stakeholders should be sensitized to the emerging issues related to WTO and their impact on the Indian dairy industry. To make producers and exporters understand the implication of trade agreement under the WTO regime, there should be awareness programs. There should be training of dairy personnel by exposing them to semi-commercial technology for the development of new products, processes, and the concept of computer integrated manufacturing for achieving TQM through statistical quality control (SQC)/statistical process control (SPC). For new information and knowledge related to global developments/trends in the dairy industry, awareness programs should be conducted. Training programs on hygienic milk production, processing, packaging, marking, labelling and marketing should be organized.

Agencies like CII, EIC and CITA should actively conduct training programs.

5. Model Villages

Since there is instability in quality of raw milk due to variation in animal breed and feed according to regions, there is a need to setup model village which are going to focus on dairy sector development. These model villages would have characteristics like feature community training centers for model breeding, housing, feeding, health care, machine milking, milk chilling, and support services like water, power, and hygiene in the villages, in order to produce and handle quality milk.

6. Product diversification

Market intelligence needs to be developed by Indian dairy industry, in order to produce products required in global market. Factors responsible for varying global demand are dietary, social, economic, political, legal and industrial factors. That's why product diversification plans must match the anticipated demands of the market abroad.

7. Logistics

There is need to develop cold chain facility to transport milk from farm to dairy plant and further to international market. Latest technology should be used to reduce the cost of logistics and transport the dairy product under appropriate conditions.

8. Enhancement of shelf life

Shelf life plays a vital role in international trade because dairy products being perishable in nature need to stay fresh during shipping and storage. Innovative technologies like innate antimicrobial components of milk coupled with natural metabolites of microbial/biotechnological origin.

9. Developing Business ethics

Among the trading countries, the reputation of Indian dairy industry is very low, especially when it comes to ethics. Training of dairy personnel in business ethics and developing internal value systems is needed.

10. Hygienic milk production and processing

The major hurdle in export of dairy product is unhygienic conditions at dairy farm and poor quality produce. Factors responsible for poor hygiene level are poor animal health, polluted food and water and unclean surrounding in the farm.

11. Small Dairy development

Dairy industry should be encouraging small dairies at district levels. Milk processing at small scale industries will help in reducing the cost of handling, maintain hygiene levels and adding value to the product. This will fulfill additional demand of milk and generate employment in rural India. Reduction in costs of milk handling will lead to retail price of milk and significantly result in competitive edge of Indian dairy in international market.

12. Milk collection

Efforts made by groups should be made for the collection of milk in rural India. Example: Cooperative system. Also, there should establishment of milk collection centers at the rural level. This will help in maintaining the quality of the milk and bulk milk can be transported to processing unit, leading to reduced cost.

13. Export Inspection Agency

Presently, there is lack of adequate testing facilities to maintain international standard (Codex). Therefore, for the enforcement of PFA there is an urgent need to develop quality testing network and have labs at least in every district and every port.

14. Information Technology (IT) development

Current developments in IT enable creation of cost effective solution that strengthen the exchange of useful information between farmers and the processor, in addition to opening a window to the world of opportunities. Today, e-commerce is emerging as a tool for future market. The IT implosion is rapidly evolving by reducing the communication barriers between the business organization and consumers, between manufacturers and end-users. In India, AMUL functions as first national cyber store, operational in around 120 cities and an AMUL cyber store gifting service has the capacity of serving consumers in around 220 cities. This has been made possible only through the IT developments. Also, IT sector can develop a dairy information system which can be used to as database for dairy industry. This will enable the farmers, processors, and trader to access the information regarding the feed management, veterinary services, technological updates, market prices, quality management, target markets and traceability. Some IT model been operational in India are; automated milk collection centers, Dairy portals, VSAT, GIS and many more.

10. CONCLUSION

Indian dairy sector contributes maximum to India's GDP in agriculture sector. India produces 16% of the world total milk. Indian dairy sector is one of the potential business sectors for the investors, researchers and entrepreneurs to invest and earn high returns. With growing global population and increased concern for the health and nutrition, the demand for dairy products is emerging as one of the most balanced nutritious food and a key element in household food scarcity. India has the strength to lead in milk and milk product exports, due to its abundant production of raw milk and ability to process milk to value added products at low cost. The major advantage to India is the favorable location, amidst major milk deficit countries in Asia and Africa. The biggest challenge for India dairy industry in capturing the global market is cost of milk production, low productivity, poor quality, weak supply chain, and lack in utilization of technology. To meet WTO's Sanitary and Phyto-sanitary (SPS) and Technical Barriers of Trade (TBT) agreements and Codex Alimentarius Commission guidelines on quality and safety, India needs to work really hard. Also there is a need to improve the supply chain and in curtailing the cost of milk production by using the latest technology and increasing the productivity. This will strengthen the India's entry into Global dairy market and also help in economic development of India.

REFERENCES

- [1] APEDA Agriexchange: Dairy Products. APEDA Agriexchange website. http://agriexchange.apeda.gov.in/product_profile/prodintro/Dairy_Products.aspx (2015). Accessed 27 January 2015
- [2] APEDA Agriexchange: Dairy Products. APEDA Agriexchange website. http://apeda.gov.in/apedawebite/SubHead_Products/Dairy_Products.htm (2015). Accessed 1 February 2015
- [3] Bhasin, N.R. (2014, October). Indian Dairying in Future. *Indian Dairyman*, Vol. 66(10), pp 1.
- [4] Bindu, T.M., Subrahmanyam, S.E.V., and Bhat, M.S. (2014). SWOT Analysis of Dairy Industry in India. *International Journal of Scientific Research*, Vol. 3(1), pp. 249-251.
- [5] Chawla, A., Chawla, N., & Pant, Y., (2009): Milk and Dairy Products in India-Production, Consumption and Exports. Hindustan Studies & Services Ltd, Bhopal IN.
- [6] Dutt, T. (2001). Improving milk production in Cattle and buffaloes- vision and challenges. *Indian Farming*, Vol. 1, pp. 61-66.
- [7] Food and Agriculture Organization: Milk and Milk Products. Food and Agriculture Organization website. http://www.fao.org/fileadmin/templates/est/COMM_MARKETS_MONITORING/Dairy/Documents/November_2013.pdf (2015). Accessed 1 February 2015
- [8] Food and Agriculture Organization. Dairy Production and Products. Food and Agriculture Organization 30 January 2015. <http://www.fao.org/agriculture/dairy-gateway/milk-production/en/>

- [9] Food and Agriculture Organization. "Dairy Production and Products". Food and Agriculture Organization website. <http://www.fao.org/agriculture/dairy-gateway/milk-production/en/#.VQB1xPmUdet> (2015). 27 January 2015
- [10] Hegde, H.G. (2001). WTO Challenges for Indian Dairy Farmers. *Yojana*, Vol. 45, pp. 34-35.
- [11] Ingavale, D. A Study of International Trade of Indian Dairy Industry. (2012). *Indian Journal of Applied Research*, Vol. 12(1), pp. 127-128.
- [12] Joshi, R.M. (2015). India's Dairy Exports: Opportunities, Challenges and strategies. In Seminar in Indian Dairy Industry- Opportunities and Challenges. Indian Institute of Foreign Trade, New Delhi IN.
- [13] Karmakar, K.G., and Banerjee, G.D. (2006). Opportunities and Challenges in the Indian Dairy Industry. *Technological Change*, Vol. 9, pp. 24-26.
- [14] National Dairy Development Board. Milk production in India. National Dairy Development Board website <http://www.nddb.org/English/Statistics/Pages/Milk-Production.aspx> (2015). 25 January 2015
- [15] Ramakrishnappa, V., & Jagannatha Rao, R. (2006). Emerging microfinance issues in dairy development: a case study from Karnataka, India. *International Journal of Agricultural Resources, Governance and Ecology*, Vol. 5(4), pp. 399-412.
- [16] Shodhganga INFLIBNET centre. "SWOT and STEEP analysis for the Dairy Industry in India". Shodhganga INFLIBNET centre website. http://shodhganga.inflibnet.ac.in:8080/jspui/bitstream/10603/14849/10/11_chapter%203.pdf (2015). 27 January 2015
- [17] Srivastava, A.K. (2011): NDRI Vision 2030. National Dairy Research Institute, Karnal IN.
- [18] Bhowmilk, P., Sirohi, S., & Dhaka, J.P. (2006). Gains from Crossbreeding of Dairy Cattle in the North East: Micro Evidence from Tripura. *Indian Journal of Agricultural economics*, Vol. 61(3), pp. 306-307.
- [19] Food and Agriculture Organization. "Global Dairy Sector: Status and Trends". Food and Agriculture Organization website <http://www.fao.org/docrep/012/i1522e/i1522e02.pdf> (2015) 18 February 2015
- [20] Morgan, N. (2009). *Smallholder dairy development: Lessons learned in Asia*. Bangkok TD: FAO Regional office for Asia and Pacific.