

# Dairy Sector Study of Nepal



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## Acronyms

APP	Agriculture Perspective Plan
BEP	Break-even Point
BMSS	Biratnagar Milk Supply Scheme
BO	Butter Oil
CDCAN	Central Dairy Cooperative Association, Nepal
CLDP	Community Livestock Development Project
CoP	Code of Practice
DDC	Dairy Development Corporation
DDP	Dairy Development Policy
DFTQC	Department of Food Technology and Quality Control
DLS	Department of Livestock Services
DMPCU	District Milk Producers Cooperative Union
DoA	Department of Agriculture
DoC	Department of Cooperatives
EC	Executive Committee
ED	Executive Director
FAO	Food and agriculture Organization
FIRR	Financial Rate of Return
GoN	Government of Nepal
ILP	Intensive Livestock Production
KMSS	Kathamndu Milk Supply Scheme
LMSS	Lumbini Milk Supply Scheme
MCC	Milk Chilling Center
MoAC	Ministry of Agriculture and Cooperatives
MPA	Milk Producers' Association
MPCS	Milk Producers' Cooperative Society
MPPSS	Milk Products Production and Supply Scheme
MSS	Milk Supply Scheme
MWMSS	Mid-western Milk Supply Scheme
NCDB	National Cooperative Development Board
NDA	Nepal Dairy Association
NDDB	National Dairy Development Board
NGO	Non-government Organization
SMP	Skim Milk Powder
SNF	Solids-not-fat
TLDP	Third Livestock Development Project
WMP	Whole Milk Powder

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# Dairy Sector Study of Nepal<sup>1</sup>

## I. INTRODUCTION

Organized dairy development activities in Nepal began in 1952 with the establishment of a Yak cheese factory in Langtang of Rasuwa district under Food and Agriculture Organization (FAO) assistance in 1953. In 1954, a Dairy Development Section was established under the Department of Agriculture (DoA) and also a small-scale milk processing plant was started in Tusal, a village of Kavre district. In 1955, a Dairy Development Commission was formed.

The First Five Year Plan (1956-61) stressed on the need to develop a modern dairy industry. Accordingly, in 1956, a Central Dairy Plant, with an average milk processing capacity of 500 liters/hr was established in Lainchaur, with the financial assistance from New Zealand and technical assistance from FAO. Around the same time, a second mini milk processing plant was established at Kharipati, in Bhaktapur district. The plant started processing of milk and marketing activities from 1958. In the process, prior to 1960, two additional cheese factories were established under the DoA in other two alpine districts of the country. In 1960, a Cheese Production and Supply Scheme was also established. The Dairy Development Commission was converted to the Dairy Development Board in 1962. So as to meet the growing demand for milk in Kathmandu, the Board was converted to Dairy Development Corporation (DDC) in 1969.

### 1.1 Dairy Related Institutions

#### 1.1.1 Dairy Cooperatives

*History of dairy cooperatives dates back to the First Five Year Plan (1956-61) when the dairy cooperatives were formed in Tusal Village of Kavre district. However, the dairy cooperatives were became more effective only after December 1981, when DDC initiated the milk producers oriented program by encouraging the farmers to form their own Milk Producers' Associations (MPAs) along the lines of cooperative principles. The MPAs operated under the by-laws prepared by DDC. The MPAs had no formal legal status and they operated as single purpose primary cooperatives with milk trade and support to milk production as their main activities.*

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<sup>1</sup> This report is prepared by Mr. Mahendra Raj Sapkota, FAO Consultant for the NMTPF Formulation Team.

In order to enable the MPAs with the formal legal identity and to make them more autonomous, DDC took initiation to convert these MPAs into Milk Producers' Cooperative Society (MPCS) in February 1989. For this, it encouraged and facilitated to register these MPAs in the Cooperative Office of Government of Nepal (GoN). According to the available information, presently about 1,603 MPCSs are registered in 53 districts of the country (Annex 1). The Cooperative Act, 1992 of the government governs these MPCS.

Like the MPAs, majority of MPCSs also operates as single purpose primary cooperatives. The main function of these MPCSs is to collect milk from the farmers (both the members as well as non-members), test it for quality, transport it for selling to the nearest milk chilling centers/milk processing plants of DDC and/or private dairies; receive payment for the milk from them; and distribute the payment to the individual milk supplier farmers. Apart from milk collection business some of the MPCSs have also started the operation of milk chilling vats; and milk processing for producing various dairy products.

The dairy cooperatives in Nepal have adopted a three - tier system of which the MPCSs are the first-tier primary level cooperatives. In the second tier, MPCSs in different districts have formed district level District Milk Producers' Cooperative Unions (DMPCUs), which are registered under Cooperative Act as district level bodies. Presently, there are 36 DMPCUs in different districts (mainly in Terai and mid-hills) and their main objectives are to deliver programs designed to support the increased production and processing of milk and milk products and to contribute to the financial and social upliftment of the rural milk producers.

In the third tier, the MPCSs and DMPCUs have formed Central Dairy Cooperative Association Limited Nepal (CDCAN). CDCAN is registered as their central-level cooperative organization. Established in 1993, CDCAN is a national level tertiary organization of all the milk producers' cooperatives at primary and secondary levels. CDCAN aims to bring increased economic benefits to milk producers and to contribute to make the country self-reliant in clean and high-quality milk and related products. It also implements policy advocacy activities at the central level to represent the interest of member organizations. Currently, 36 DMPCUs and 1,329 MPCS are affiliated to CDCAN.

### **1.1.2 Dairy Development Corporation (DDC)**

DDC is the pioneer public sector dairy entity. It was created in July 1969 under the Corporation Act of 1964.

Its major objectives are to:

- provide a guaranteed market for milk to the rural farmers with fair price,
- supply pasteurized milk and milk products to urban consumers,
- develop organized milk collection system to meet increasing demand for pasteurized milk and milk products, and
- develop an organized marketing system for milk and milk products in urban areas.

A Board of Directors appointed by the GoN governs DDC. The General Manager or the Executive Chairperson is also appointed by the Government. Currently, DDC operates 6 milk supply schemes (MSS)

(Annex 2A) and a Milk Products Production and Supply Scheme (MPPSS) (Annex 2B). DDC's milk collection network exists in 31 districts<sup>2</sup> where 55 milk chilling centers (MCCs) and about 800 MPCs are operating.

### **1.1.3 National Dairy Development Board (NDDB)**

In 1990, the GoN approved the "Ten Year Dairy Development Plan (1991-2000)" as a blueprint for dairy development in the country. Based on the recommendation of the Plan, the GoN established NDDB in 1992 under a separate Act. The Board is an apex level autonomous institution of dairy development in Nepal. The major objectives of the Board are to:

- assist GoN in formulating national level dairy development policies and plans,
- develop dairy industries,
- find remedies to problems relating to livestock development and animal health sector for dairy development,
- maintain coordination among the public and private dairies,
- carry out dairy development related high level studies and research works, and

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<sup>2</sup> Panchthar, Ilam, Jhapa, Terhathum, Dhankuta, Morang, Sunsari, Saptari, Solukhumbu, Dhanusha, Udayapur, Dolakha, Ramechhap, Sindhuli, Kavrepalanchok, Sindhupalchok, Bhaktapur, Lalitpur, Kathmandu, Makwanpur, Dhading, Nuwakot, Rasuwa, Chitawan, Nawalparasi, Rupandehi, Kapilvastu, Dang, Banke, Bardia and Surkhet.

- make arrangements for fodder and pasture resources.

The functions of NDDB include:

- Policy formulation and recommendation on import of goods necessary for production and promotion of milk and milk products as well as animal feeds, and implementation of the approved policies,
- Formulation and recommendation of milk pricing policy to the GoN,
- Recommendation to GoN on well being of dairy processors and consumers,
- Development of cooperative sector dairies,
- Registration of dairy industries,
- Management and mobilization of national and foreign grant and loan for dairy industries,
- Technical assistance for setting-up, improving, promoting and safeguarding dairy industries,
- Review, monitoring and evaluation of dairy development programs, and
- Carry out other necessary activities for dairy industries.

NDDB has an executive committee (EC) composed of 14 members, which is Chaired by Minister of Agriculture and Cooperatives (MoAC). An Executive Director (ED) whose serving period as specified by the Act is 4 years heads its Secretariat. The Minister through Cabinet approval appoints the ED. The Secretary of MoAC is the Vice-Chairperson and the ED is the member-secretary. The members include representative of farmers (4), private dairy entrepreneurs (3), General Manager of the Dairy Development Corporation (1), Representative of Federation of the Nepalese Chamber of Commerce and Industries (1), Director General of Department of Livestock Services (1), and Joint Secretary of the Ministry of Finance (1).

#### **1.1.4 Department of Livestock Services (DLS)**

DLS aims to contribute to poverty reduction in the country through livestock development by improving living standard of the people through sustainable livestock development. DLS strives to develop livestock sector by diversification and commercialization as an income generating and prosperous farming.

Presently, one of the major activities of DLS related to dairy development is Community Livestock Development Project (CLDP) which is the continuation of Third Livestock Development Project (TLDP); both funded mainly by Asian Development Bank. The overall project objective is to reduce poverty amongst rural poor through gender and socially inclusive development. Its purpose is to improve the levels of food

security, nutrition, incomes, and employment for 69,000 families (with an additional 95,000 indirect beneficiaries) through increased productivity of the livestock sub-sector in an environmentally sustainable and socially equitable manner. FAO was sole sourced to provide technical assistance for training, guiding process-related activities, technical support, privatizing the delivery of farmer services and inputs, agro-processing and marketing.

The project functions on market/demand led approach, gender mainstreaming in all components, public/private partnership arrangements, flexible project management, local body capacity improvement and environmental management. The Project covers 43 districts and is implemented in three modules: (i) Intensive livestock production (ILP) in 22 districts; (ii) Processing, marketing and commercialization in 21 mainly Terai districts in addition to the emerging areas in the ILP districts; and (iii) Multi-sector-approach-based higher altitude pilot project in five districts.

The project works with the Non-government Organizations (NGOs) for social mobilization, farmers for productivity enhancement, entrepreneurs for processing and marketing and stakeholders for synergy and avoidance of program duplication. It also promotes private para vets to expand veterinary services and artificial insemination in dairy animals.

As of 2008/09, among others, CLDP claims it has provided direct benefit to 59,000 farm families (71 per cent women, 32 per cent *dalits*, 27 per cent *janajati* and 41 per cent others); 407 dairy entrepreneurs and 46 para vets, animal productivity has been improved by 50 per cent in its working area of 22 districts; it has developed 76 retail milk centers, 19 small scale dairies and 28 MCCs under enterprise development; and it has created 228 new jobs in dairy shops, 95 jobs in small scale dairies and 84 jobs in MCCs.

### **1.1.5 Department of Food Technology and Quality Control (DFTQC)**

DFTQC was established in 1961. From the very beginning of its establishment, DFTQC has played a pioneer role to lay down foundation stone for food control system, research and development of food processing and nutrition support programs. As mandated by GoN, DFTQC is the sole governmental agency for implementing Food Act and Regulation as well as Feed Act and Regulation for the enhancement of quality and safety of food and feed in the country. DFTQC strives to maintain safety and quality of food and feed products in the country by implementing updated food and feed act and regulations, promote entrepreneurship by developing and disseminating appropriate

technologies, and improve the nutritional status of people through food-based approaches.

### **1.1.6 Department of Cooperatives (DoC)**

DoC is a regulatory body to regulate all the cooperatives from primary to federation level operating in the country. The DoC has three main functions: registration of cooperatives, making recommendations for improvement of cooperatives, and dissolving such cooperatives which fails to operate for two consecutive years or acts against its objectives. Additionally, the DoC is also responsible to regularly monitor the cooperatives to assess their performance. Accordingly, the DoC is also responsible to register and monitor and the MPCs, district and central level dairy cooperative associations.

### **1.1.7 National Cooperative Development Board (NCDB)**

NCDB was formed under the NCDB Act, 1992. The Board has been constituted to promote and develop cooperatives. Its EC is composed of 2 members representing government, private sector and professionals. The Secretariat of the Board is headed by an Executive Director appointed by GoN. The NCDB is also responsible for mobilizing funds, entering into joint venture agreements, extending technical support and coordinating the functions of non-government organization involved in cooperative activities.

### **1.1.8 Private Sector**

The private sector started getting involved in the dairy-processing sector from late 1970s with very small-scale operations in Kathmandu. Today, there are many private dairies (including cooperatives) of various sizes both within and outside the Kathmandu valley. Prominent among the private dairies with modern milk processing facilities are Nepal Dairy, Himalaya Dairy, Sitaram Dairy, Anmol Dairy, Kathmandu Dairy, Adhunik Dairy etc in Kathmandu Valley; Sujal Dairy in Pokhara Valley, and Kamdhenu Dairy in Sunsari. These dairies produce pasteurized milk and other dairy products such as yoghurt, ice-cream, butter, ghee and the like. Besides, there are many small scale mechanized dairies and numerous cottage type dairies handling limited quantity of milk for producing different milk products particularly pasteurized milk, ghee, ice cream and yoghurt. Similarly, the private entrepreneurs have also involved in producing cheese in the mid and high mountain regions from cow and *nak* milk. According to available information, altogether 250 dairies of varying scale are operating in the country (Annex 3).

The private dairy entrepreneurs have established an association called Nepal Dairy Association (NDA) in 1998. It has 136 small, medium, and large scale member dairy industries scattered throughout the country. The main objectives of the association are to work for common causes of the dairies in Nepal, and make technical support available to its members. Its commitments are to support dairies for their professional development, explore new technologies, and transform these among its members.

## **1.2 Role Review**

The MPCs have become one of the major actors in the present day dairy sector of Nepal by being a strong channel between the rural milk producers and the milk processing industries. However, majority of the present MPCs is found to be operating in a condition of disarray. The available information shows that the MPCs have not been able to generate enough capital bases for providing real support to their member milk producers except acting as an agent between the milk producers and the milk processing industries. Presently, the dairy cooperatives in Nepal are playing a limited role of collection and selling of raw milk to either DDC or private dairies. Neither the DoC nor other related institutions have taken any initiation to regularly monitor the performance of the MPCs and suggest measures to make them more professional and commercially oriented. Similarly, NCDB has not been effective in promoting and providing technical support for MPCs except for providing some occasional financial support to CDCAN when requested.

DDC is engaged in commercial activities of collecting milk from rural areas, processing it to milk and milk products and distributing them to urban consumers. It is also the leading agency of fixing the price of milk and milk products. The main problem facing DDC is the shortage of good quality raw milk whereas demand for its milk and milk products in the urban areas is increasing. In an effort to fulfilling the increasing demand for milk and milk products, DDC has expanded its milk collection network in distant rural areas. However, DDC is not engaged in executing neither milk production programs by providing technical as well as financial supports to the rural milk producers nor milk quality improvement programs in its milk shed areas. Its activities are limited only to milk collection.

Although the NDDB is mandated for overall dairy development activities, it has not been able to fulfill its mandate due to some major problems regarding composition of its EC, financial constraints and weak staff position. As the Minister of MoAC is the chairperson of the EC, difficulties have been experienced to conduct the EC meetings due to the frequent changes of Government/Ministers resulting in difficulties to give continuity of

NDDB's activities. Secondly, the Board is financially constrained. The government contribution to the Board is very less which is not enough even for the salary of staff. For the current fiscal year (2009/2010) the Board received NRs. 4 million from the government of which NRs. 3.5 million is allocated for staff salary and only NRs. 0.5 million is allocated for program implementation. Finally, a weak staff position of the NDDB has been another serious problem. Presently, the Board has one politically appointed ED, and 5 officer level supporting staff including two Second Class Technical Officers (one M.Sc. Dairy Technology and one B.V. Sc.) one third Class Technical Officer (B. V. Sc.), one Second Class Administration Officer and one Third Class Administration Officer. There is only one assistant level technical staff and 5 assistant level administration staff. Other include lower level drivers, office assistants etc. Thus, the actual technical working force is comprised of 4 persons. In order to be in a position to assume the responsibilities according to its mandate, its service departments should be adequately staffed with highly professional technical manpower for which its staff members must be recruited with the provision of adequate incentives. But the government regulations regarding salary and incentives did not allow any kind of allowances and incentives, except prescribed by the GoN. Consequently, the Board is lacking competent technical manpower. It is technically too weak and unable to discharge its duties effectively.

The mandate given to NDDB also overlaps with the functions of DLS with regard to finding remedies to problems relating to livestock development and animal health sector for dairy development and making arrangements for fodder and pasture resources. Because, these are the areas of DLS and it is carrying out these activities since a long time even before the establishment of NDDB.

Moreover, NDDB also is mandated by Act to formulate and recommend pricing policy to the government whereas the Dairy Development Policy has adopted the free market policy of price of milk and milk products. But in practice, being the leading government institution, the DDC is the main actor in fixing the raw milk price. Price of milk has remained a sensitive issue among the producer farmers and the buyers (i.e. DDC and the private dairies) due to which marketing of milk has occasionally been constrained. The milk producers seek to overcome this problem through their collective action because to be assured of a secure market is their real need. The DDC's raw milk pricing is mainly based on the negotiations with the rural milk producers. The same system applies in case of pricing of raw milk by the private dairies. However, the private dairies pay some additional price so as to remain in competition for milk collection. Although the private dairies also follow the same price for the processed milk as fixed by DDC, DDC and private dairies set their own price for other milk products. Thus, the pricing of milk and milk products is characterized by conflicting Act and Policy; absence of an

established pricing mechanism in terms of basis of pricing and pricing intervals; and involvement of many actors, but without any clarity on their roles.

Although the all the actors related to dairy development such as DFTQC, DLS, DDC, NDDB, dairy cooperatives and private dairies principally agree on the production of good quality milk and milk products, they have not been able to play their role in improving the quality of raw milk as well as finished products. Milk produced from a healthy animal would contain very little bacterial population. It gets contaminated during subsequent handling processes. The contamination is very high in the Nepalese context. One reason for the high bacterial load in raw milk is unhygienic practices in milk handling and lack of knowledge on clean milk. The other reason is that the milk travels fairly long hours, especially in the hills, before it reaches for processing; either chilling or pasteurizing that checks bacterial growth. In the Terai areas, when the contamination in milk is high, the higher ambient temperature triggers the multiplication of bacterial population.

In addition, raw milk quality also deteriorates due to some malpractice, which include addition of water for increasing volume, sodium bicarbonate for reducing acidity, starch, sugar and urea for increasing solid content and preservatives for longer shelf life. The law prohibits using these chemicals in milk. Accepting milk of any standard due to competition among buyers has led milk quality to deteriorate. In some areas such as Ilam and Chitwan districts, the collectors' experience have shown that milk delivered in these areas is comparatively better quality than in other districts.

Since the quality of raw milk is not up to the mark, the resulting processed products are also of not high quality. The problem of poor quality is intensified when the products are not processed using optimum parameters and post-processing handling is bad. The result is that not only the shelf life of finished products is short (for instance less than 2 days under refrigeration for pasteurized milk), but also the products are harmful for consumption. The pasteurized milk, which should be safe to drink directly from the packet, in reality, may not be safe.

In 2001, NDDB and Danida Support Project conducted a Benchmark Survey of Quality of Milk and Milk Products in Nepal. The survey has shown that many of the products did not meet the minimum compositional standards laid out by the Food Act and the major problem was in the microbiological quality. In this new millennium, quality philosophy is considered as password to the market. Quality, as in other products, is considered as an indispensable attributes of the milk and milk products too.

Most of the dairies have neither laboratory manual nor company standards of milk and milk products. Although there is GoN approved Code of Practice (CoP) for Dairy Industries (Annex 4), it has remained unimplemented. Had this CoP been implemented in true spirit, the dairy industries and the quality of milk and milk products they produce would have been of higher quality standard. But, unfortunately, neither the CoP is implemented by the dairy industries nor the Committee constituted for monitoring the implementation status of the CoP is active and functioning. The Committee meeting, which is to be held at least bi-monthly, has not been held since a long time and neither the Committee members nor persons designated by it have regularly visited the dairies to know their working system and supervise their working conditions. Consequently, the quality of milk starts gradually deteriorating from source (farmer level) due to unhygienic animal keeping and milking practices, adulteration of water and other substances, use of inappropriate and contaminated milk vessels (e.g. black polythene tanks) and open transportation. In addition, lack of cleanliness, use of contaminated water, absence of strict quality control system and use of uncertain quality packing materials in the dairy industries, and use of dirty milk crates, inappropriate transportation of processed milk and its disorganized selling (such as in footpaths) further deteriorate milk quality. Ineffective system to take action against the defaulters is another critical issue in maintaining the quality of milk. As such, quality of milk and milk products is doubtful. As the Coordinator of the Committee, NDDB should have been more active in enforcing the CoP and regularly monitoring the dairy industries. But, unfortunately, it has not happened so far and is uncertain when it will happen.

## **II. CONSUMPTION AND SUPPLY OF MILK AND MILK PRODUCTS**

In earlier days when there were no organized dairies, demand for milk was fulfilled by raising cows/buffaloes by the people themselves or through the direct supply from the professional milk producers. These producers used to go house by house and deliver the required quantity of milk to the households. *Dahi* (yoghurt) filled in clay containers were produced by some traditional *dahi* makers and milk-based sweets were prepared by traditional sweet makers (*haluwain*). But after the advent of DDC, the scenario began to gradually change with the increasing supply of pasteurized milk and modern dairy products such as cheese, butter, ice cream etc. Many new sweet shops also started to emerge. Now, particularly in the urban areas, the situation has completely changed because many dairies in the organized sector have come up with varieties of dairy products. Besides, different dairy products are also imported to cater the consumers' demand.

Although an effort was made to estimate the annual consumption of milk and milk products through internal supply and imports, it could not be done in the absence of

data. Data of the private dairies and informal milk market is absent for internal supply. For imports, the Customs data gives only the aggregated monetary value of the imported dairy products (Annex 5). The Nepal Living Standard Survey, Statistical Report Vol. II (2003/04) has a Chapter on Consumption which shows only the amount spent for food consumption. It reports that on average 59 per cent of household consumption is spent on food expenditures in the country, and urban households spend less than 40 per cent on food, especially in Kathmandu where the share is just 29 per cent. Similarly, Household Budget Survey of Nepal (2008) conducted by Nepal Rastra Bank shows combined consumption expenditure on milk products and egg, and ghee and oil. Thus, both the reports do not give separate data on consumption quantity of milk and milk products. Import data published by Trade and Export Promotion Center (which is also based on the Customs data) shows that total milk products worth of NRs. 497.103 million was imported in 2007/08.

The National Milk Marketing and Strategy Study (2001) has projected the demand for liquid processed milk for up to 2010 on the basis of growth trend of processed fluid milk demand from formal sector (sale by DDC and private dairies), population growth and income elasticity. The Study assumed three annual growth rate scenarios of 8.1 per cent, 11.1 per cent and 14.1 per cent as low, medium and high range, respectively. Similarly, the same Study has also projected an annual growth rate of 10 per cent for milk products. Mr. Surya Bahadur Singh, Deputy Coordinator of CLDP in his recent literature entitled Lessons Learned from Nepal Community Livestock Development Project has also stated “the demand for milk and milk products is expected to grow by about 11 percent per annum.”

Although demand for milk and milk products could have been projected based on this information, it is not done so since the above mentioned demand projections of milk and milk products are made by a study carried out almost a decade ago as well as personal estimation without supporting data. The projection could be unconvincing and it would be inappropriate to base any future actions based on such projection. A detail national study about milk and milk product marketing is felt essential to assess the current consumption, demand for and supply of milk and milk products.

## **2.1 Supply of Liquid Milk**

Processed liquid milk is the prominent product of the dairy industry as almost 80 per cent of milk collection in the formal sector is used to produce processed milk. It is very difficult to know the supply of private dairies mainly because of the absence of data collection and reporting system. As such, the estimate of private dairies' supply is based on the available literature as well as proportion of private dairies' milk vis a vis DDC milk

sold by the milk selling booths in the major markets. Table 1 depicts the supply of processed milk by the formal sector.

**Table 1: Estimated Processed Milk Supply by DDC and Private Dairies**

Year	DDC Annual (mt.)	Private Annual (mt.)	Total Annual (mt.)
2005/06	56,957	53,187	110,144
2006/07	53,328	55,846	109,174
2007/08	52,262	58,639	110,901
2008/09	52,049	61,571	113,620
2009/10	55,316	64,649	119,965
2010/11	58,082	67,882	125,963
2011/12	60,986	71,276	132,262
2012/13	64,035	74,839	138,875
2013/14	67,237	78,581	145,818
2014/15	70,599	82,510	153,109
2015/16	74,129	86,636	160,765

**Source:** DDC for up to 2009 and Consultant's estimate thereafter and for private supply.

## 2.2 Consumption and Supply of Milk Products

Various brands of the locally produced as well as imported modern and traditional milk products of varying categories are sold in the urban markets of Nepal. Kathmandu valley is the main market of the milk products. The major milk products available in the markets are imported Skim Milk Powder (SMP), Full Cream Milk or Whole Milk Powder (WMP), infant milk formula, dairy whitener, cheese, butter, sweetened condensed milk, ice cream and ghee; and locally produced cheese, butter, ghee, ice cream, *paneer* and yoghurt. Milk products from more than 20 countries from Asia, Europe, Australia and North America compete in the Nepalese market. Different varieties with various sizes and from ordinary to advanced packaging are available for most of the products.

Milk products being available in the local urban markets indicate that there is ample demand for the modern as well as traditional dairy products. The demand for dairy products in the urban markets is expected to grow in the future mainly due to the increasing population and rise in income. Additionally, exposures to outer world mainly through the TV have particularly attracted the educated younger generation to consume the modern dairy products. Moreover, their demand is also expected to rise due to the increasing establishment of hotels and restaurants. Some years ago many people even in the urban areas did not hear the name of Pizza. But now it has become

a popular food item among the younger generation resulting in high demand for mozzarella cheese. Similar is the case with ice cream and *paneer*.

It is very difficult to assess the response of local production as well as imports to this demand. This is mainly due to the absence of supply data of the private sector dairies. Moreover, there is also absence of data regarding the quantity of imported dairy products. However, indications are that almost all demand for SMP, WMP, baby food, dairy whitener and condensed milk is met by imported products; demand for cheese, butter, ice-cream and ghee is fulfilled by both the local production as well as imported products; and almost all demand for *paneer* and yoghurt is fulfilled by local production. Although DDC also produces SMP, it is used by DDC itself during the lean season when milk collection is low. Supply of milk products by DDC in the past 5 years is given in Table 2.

**Table 2: Supply of Milk Products by DDC (mt.)**

S. N.	Milk Products	Year				
		2005/06	2006/07	2007/08	2008/09	2009/10
1.	Cheese	143	143	148	164	187
2.	Butter	710	150	201	165	137
3.	Ghee	644	658	823	628	459
4.	Yoghurt	985	1,274	1,705	2,009	2,299
5.	<i>Paneer</i>	50	58	78	96	123
6.	Ice cream	39	37	51	53	65
7.	Sweets ( <i>Rasbari, Lalmohan and Peda</i> etc)	-	-	168	176	196

Source: DDC

### III. OPPORTUNITIES AND CONSTRAINTS OF INCREASING MILK PRODUCTION AND PRODUCTIVITY

#### 3.1 Opportunities

Nepal has tremendous opportunities for increasing dairy livestock production and productivity. These opportunities exist because:

- *Livestock are widely distributed* with even distribution of cattle and buffaloes throughout the country.

- *Market opportunities of milk and milk products have increased* particularly in the densely populated urban areas.
- *Involvement of private sector in dairy business has greatly increased* with the establishment of new dairy industries and cheese factories.
- *Growth of tourism* is also likely to provide increasing demand for modern dairy products.
- *Dairy cooperatives have strongly developed* with their presence from the grass root level to the central level and have become a strong channel between the rural milk producers and the milk processing industries.
- *Donors' support* has created a positive environment for dairy livestock and dairy business development.
- *Increasing involvement of NGOs and private sector* in livestock development activities particularly in providing technical support services and veterinary health care.

### 3.2 Constraints

Despite the above opportunities, there are also several constraints relating to livestock development in Nepal. These are:

- *Nepal has a large dairy animal population* with 7.09 million cattle and 4.49 million buffaloes with very low annual average productivity with 670 liter/milking animal (438 liter/milking cow and 854/milking buffalo).<sup>3</sup>
- *Serious depletion of animal feeding base* due to deterioration in the forest areas for fuel wood and timber, and additional land for settlement and cultivation.
- *Inadequate government support services due to lack of resources* as many of the district and sub-district level (livestock service centres) face shortage of manpower as well as necessary equipments and veterinary medicines.
- *Inadequate and inappropriate breeding support services* as there is shortage of improved breeding bulls as well as artificial insemination services;
- *Weak farm advisory services and training* as there remains a big gap between the specialized and expanded farmers' service needs and those delivered by DLS resulting in lack of knowledge among the farmers regarding improved dairy farming and hence limiting their capacity to adopt new technology for production enhancement.
- *Critical shortage of dairy animals* as dairy heifer rearing practice is not common due to small landholding and lack of cost effective heifer rearing technology.

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<sup>3</sup> Statistical Information on Nepalese Agriculture, 2007/2008, MoAC.

- *High opportunity costs of land and labour* particularly around the main highways and townships where the dairy farming activities is mostly carried out.
- *Shrinking farm labour* is becoming a serious problem due to migration of youth for off-farm jobs within or outside countries.
- *Inadequate financial service* is a serious problem particularly in the rural areas as the rural branches of the financial institutions were closed down due to insurgency in the past resulting in drastically curtailed investment in dairy animals.
- *Poverty and illiteracy* among livestock raisers is severely hampering effective communication and the ability of livestock raisers to respond to new opportunities as lack of basic literacy among them complicates the extension process by requiring more face to face communication.
- *Limited market opportunities* for a large proportion of the farming population caused by distance from market, poor access or lack of marketing mechanism and market information.
- *Rising awareness on carbon trade* among people has resulted in increasing closure of community forests (which are presently the main source of fuel wood and fodder to the community in many part of the country) for animal grazing and tree cutting which has pushed the poor further away from livestock keeping because they have been depending on free forest feed to the animals.
- *Higher cost of milk production* due to rising cost of inputs and absence of mechanism to regularly assess the farmers' cost of milk production and relating it to the pricing of milk.
- *Discouraged farmers* due to frequent closures and strikes by different political parties resulting in shifting from farming to other occupations.

#### **IV. ASSESSMENT OF POLICY ENVIRONMENT**

##### **4.1 Dairy Development Policy (DDP)**

For more than 5 decades, dairying has developed in Nepal in absence of a comprehensive policy document. However, Dairy Development Policy, 2064 (2008), approved by GoN, is now the guiding policy for overall development of the dairy sector. The policy is prepared in accordance to the spirit of Agriculture Perspective Plan (APP, 1995-2015); National Agriculture Policy, 2061; National Milk Marketing and Strategy Study, 2001; and Agriculture Business Promotion Policy, 2063. Being based on these documents, all the aspects relating to dairy development in them have been incorporated in the policy.

The long-term vision of the policy is to qualitatively contribute to national economic development by commercially, qualitatively and competitively developing the dairy sector for contributing employment generation and poverty reduction with the participation of government, cooperative and private sector and extending the efforts and programs of making good quality milk and dairy products easily available to the consumers as a complementary to each other.

The policy aims at increasing milk production and productivity; extending milk collection, transportation arrangement and processing industries; substituting import and promoting export of the dairy products; developing milk and dairy products; making milk and dairy products easily available to the consumers through quality improvement and regulation.

Policies for **increasing milk production and productivity** include development of dairy business for poverty reduction, development of resource centers for increasing production of improved breed animals, and preservation, conservation and promotion of the improved as well as productive local breed animals; expansion of effective animal health care and disease control services; arrangement of pasture and feed; mobilization of cooperatives/groups for providing and extending livestock insurance services; easy and convenient credit to the farmers for purchasing milking animals; development of appropriate animal feed, breeding and grass harvesting technology for increasing milk production also in the lean season; group-based collateral-free low-interest loan and technical services particularly to the women, *dalit* and other disadvantaged groups; prioritization of highly milk production potential districts; expansion of milk chilling centers.

Policies for **extending milk collection, transportation arrangement and processing industries** contain arrangements providing concession in the tariff of electricity used by the milk chilling centers and dairy industries established in the cooperative sector; arrangements for providing concession in the custom duty for NDDB sanctioned dairy machines and equipment; priority to the movement of dairy vehicles as essential service; encouraging establishment of import substituting and export promoting internal/external joint venture dairy industries that produce value-added dairy products including powder milk and baby food; convenient credit facility and technical support to the dairy industries particularly for the Yak cheese; support for cooperative/private sector for capacity development for producing cow milk cheese; establishment of dairy institute/training center for developing necessary technical manpower for the dairy industries; capacity enhancement of technical as well as management personnel involved in dairy sector; research and development of appropriate technology for milk production, processing and product diversification; tax exemption on the expenses

made for dairy research and development along with appropriate incentives by cooperative and private sector; implementation of necessary programs for goat milk production and producing cheese and other dairy products from goat milk.

Policies for ***substituting import and developing milk and dairy products as exportable commodities*** consist of free market policy for pricing of milk and milk products; collection and analysis of information on price, demand and supply of milk and dairy products through regular monitoring and study; exemption of income tax for certain period to the dairy industries of the specified locations that fully use local milk for producing milk and dairy products; convenient custom duty in the import of printed packaging materials; and removing bi-lateral and regional tariff and non-tariff barriers for making export of milk comfortable.

Policies for ***making milk and dairy products easily available to the consumers through quality improvement and regulation*** comprise consumer targeted public awareness programs for promoting consumption habit of more milk and dairy products; regular quality monitoring of the market milk and dairy product; consumers' awareness about keeping methods, consumption duration, consumption methods etc. of these products; review and update of quality control of milk and dairy products; preparation and implementation of appropriate packing standard of milk and dairy products; implementation of milk collection and processing code of practice at the milk chilling centers and dairy processing factories; and strengthening of laboratories at different levels for ensuring quality of milk and dairy products.

Policies for ***institutional arrangements*** are development of NDDB as a strong organization having institutional representation of farmers and dairy entrepreneurs to formulate policy for the development of dairy sector and prepare related development plan, monitoring and regulation; enhancement of NDDB's capacity for planning, investment, monitoring, regulation, study and development of the dairy sector; registration of government, cooperative and private dairies at NDDB; establishment of dairy fund through service charge on milk per liter sold by the dairy industries for financing in overall development and expansion of dairy sector; developing dairy statistics and information management system; and support for enhancing technical and managerial capacity of milk producer cooperatives.

For the ***implementation and monitoring arrangements*** of the policy, NDDB and other related institutions are made responsible. NDDB is also required to prepare necessary working procedure for implementing the policy and also for taking initiative to make necessary amendment on the existing legal provision for implementing the policy.

The unofficial translation of the Dairy Development Policy is presented in Annex 6.

## **4.2 Nepal Agriculture Perspective Plan (APP)**

The livestock policy including dairy sector in APP (a 20 year plan designed in 1995 and implemented since 1996) has given first priority to dairy within livestock and in the short run buffalo is the priority animal. Buffalo has been more emphasized for milk production because of its importance in supplying both milk and meat. Livestock products including milk and milk products have been considered as demand driven signifying that these products will be greatly influenced by per capita income and population growth. APP has also emphasized that increased internal per capita income be the main impetus for increasing demand for milk and milk products. Livestock sector is considered as one of the key contributor to poverty alleviation and employment generation, particularly for women.

The broader policy framework for livestock component in APP include enhancement of the private sector with realization that livestock sector is a private sector and livestock policy be guided by this realization; and public policy be only complement and help the private sector. Elimination of all subsidies in livestock processing and marketing is duly emphasized to provide free entry for the private sector. It underlines the privatization of public institutions or their existence as self-sustaining free-units. To help develop a competitive private sector, the APP stresses to set grades and standards, establish marketing information systems, improve veterinary services, and scrutinize imports of products like SMP. Expansion of roads and electric power, improvement of present extension program with focus on women, and expansion of credit facilities is some other major policy guidelines of APP.

## **4.3 National Agriculture Policy**

National Agriculture Policy, 2061 is the guiding policy for agriculture sector. It aims to improve living standard through sustainable agriculture development by transforming subsistence agriculture system to commercial and competitive. In order to contribute for food security and poverty reduction through commercial and competitive agriculture system the policy intends to increase agriculture production and productivity, make agriculture competitive with regional and global market by developing bases for commercial and competitive agriculture system, and conserve and utilize natural resources, environment and bio-diversity.

Development of appropriate agriculture technology; development of agriculture resource centers; participatory and competitive agriculture research and development by involving private and non-government sectors; collaboration, transfer of technology and specialists with international organizations related to agriculture research and development; regular monitoring of agriculture inputs for its guaranteed supply; farmers' training for capacity enhancement at local level; priority to produce such agriculture products which have comparative advantage; increase in women's involvement in agriculture programs etc. are some of the major policy to increase agriculture production and productivity. Similarly, development of large production pockets and mobilization of such facilities as technical services, agriculture roads, rural electrification, irrigation, agriculture credit, markets arrangement in these pockets with an integrated approach; expansion of animal insurance; priority to cooperative-based agricultural industries; institutional development of cooperatives and development of these cooperatives as local delivery point for providing required inputs and channeling farmers' produce to markets are some other major policies to make the agriculture commercial and competitive. Besides, this policy has other various provisions including special facilities to the targeted groups.

#### **4.4 Agriculture Business Promotion Policy**

In line with the National Agriculture Policy, the Agriculture Business Promotion Policy 2063 also intends to support market-oriented and competitive agriculture production, contribute to internal market and export promotion by developing agro-industries, and help poverty reduction through commercialization of agriculture. This policy also guarantees for an integrated approach to provide such facilities as agriculture inputs, technology and technical services, agriculture roads, rural electrification, irrigation, agriculture credit, insurance, markets, information system, appropriate mechanization of agriculture, and processing facilities with joint efforts of government, non-government, private and cooperatives sectors. Development of e-commerce, concession on interest of agriculture credit, encouragement to direct foreign investment, special programs for establishment of agro-industries by disadvantaged groups, women and *dalits*, 25 per cent concession on electricity charge for chilling vats and 75 per cent concession on import duty of machine and equipment to be used for agro-enterprises for 10 years, group loan, collateral of projects for loans, human resource development, capacity development of training institutes, free market price etc. are the major features of this policy.

## **4.5 Industrial Policy**

The Industry Policy 2049 stresses for development of private sector. It intends to privatize the government sector industries and assures for creation an environment of competitive free market price of the products produced by the private sector industries. The main objectives of this policy are to increase industrial production and productivity to contribute to national economy, emphasize local raw material based and export promoting industries, reduce unemployment and under-employment in agriculture sector by employment-oriented industries, and adoption of appropriate industrialization policy for balanced development of all sectors of the country. The policy has categorized integrated dairy industries including livestock farming as national priority industries.

The main features of this policy are development of industries through fair competitive environment; protect industries through custom duties; development of such industries that use national labor, skill and resources and are of national importance; speeding-up the growth of national economy through export of industrial production; emphasis on the development of small, cottage and agro-based industries particularly for creating employment opportunities in the rural areas; emphasis to attract foreign investment and transfer of high technology and efficient management. The policy has various provisions relating to facilities including concession on excise duties and income taxes and prioritized availability of infrastructural support such as government land/land within industrial districts, water and electricity, telecommunication etc. Moreover, the policy also includes one-door service delivery to the industries, emphasis on import substituting industries, encouragement to industrial investment in less developed areas, gradual transfer of government owned industries to the private sector, securing cottage and small industries only to the Nepalese citizens etc.

## **4.6 Constraints in Policy Implementation**

Among the above policies, the Dairy Development Policy is the most relevant policy relating to the development of dairy sector in the country. The policy is very comprehensive and encompasses all the major aspects of dairy development. It has emphatic provisions for increasing milk production and productivity in rural areas, making production of milk and dairy products commercial and competitive, dairy product diversification based on the potentiality of internal and external markets for import substitution and export promotion, easy availability of good quality milk and dairy products to the consumers, free market price of milk and dairy products, expansion of dairy processing plants, capacity enhancement of dairy cooperatives and other dairies,

various facilities for dairy development, creation of dairy fund, and involvement of all related institution in its implementation.

The policy has given important responsibilities to NDDDB for its implementation and monitoring. It has directed NDDDB to prepare working procedures for its implementation and take initiatives to make required changes in the present legal provision. Accordingly, the policy could be implemented only after the working procedure is prepared by NDDDB and approved by MoAC. According to the available information, NDDDB has already prepared the draft working procedure and submitted it to the MoAC almost a year back for necessary action. But neither MoAC has finalized and approved it nor has NDDDB taken any initiative to get it through. In fact, the policy has not come into effect despite being approved by GoN for more than two years. This has remained as the major constraint in policy implementation.

Similarly, NDDDB is yet to take initiatives for making required amendment of the existing legal provisions. As per the Act, the activities that NDDDB is supposed to do are vague. Some of its objectives are duplicated with other organizations. For example, objectives like finding remedies of problems in the field of livestock development and animal health, and arranging and developing fodder and pasture are duplicated with the roles of DLS.

One point to note here is that the policy has given due importance to NDDDB. But, presently the Board is very weak both in financial and technical terms. The GoN contribution to the Board is not sufficient even for the salary of its staff. Under the present Act, NDDDB has an autonomous status and is permitted to make its own staffing rules and fix its own salary levels. However, due to GoN contribution in salary, government rules and regulations practically remain in force, which did not allow any kind of additional allowances and incentives, except prescribed by the GoN. There is no clear vision about creating alternative financial resources for running the Board; and no significant avenue for generating financial strength is invented or implanted, so far. Consequently, the Board is lacking competent technical manpower.

Lack of competent technical manpower and a weak staff position of the NDDDB is another major problem for its capacity enhancement and to be more effective. There are only 4 professional technical staffs including only one M.Sc. level dairy technologist (class II officer), 2 B. Sc. level veterinary graduates (one class II officer and one class III officer), and one undergraduate level assistant. For NDDDB to be in a position to assume the responsibilities according to its mandate given by NDDDB Act and Dairy Development Policy, it should be professionally and adequately staffed and fully equipped with up to

date information. For this, there should be some special provisions of adequate incentives for qualified professional.

## **V. IDENTIFICATION OF DAIRY VALUE SYSTEM**

### **5.1 The Key Actors and their Functions**

The key actors in the formal dairy value system include milk producer farmers, MPCs, MCCs, and milk processing plants/cheese factories. Firstly, there are rural farmers and their function is to be engaged in milk production. The next are MPCs established in the rural areas. Farmers from the surrounding villages carry their milk production to the nearest MPC where their milk is received, measured, recorded and samples are taken for quality check [mostly fat and solid-not-fat (SNF) test]. After receiving milk from all farmers, it is then transported by available means (vehicles, porters, carts, rickshaws, bi-cycles, horses) to the nearest MCC or cheese production center (in case of cow milk cheese). Some of the MPCs have their own chilling system where they chill the milk, deliver it to the DDC and/or private MCCs or sell in the local market. A few MPCs located near to the milk processing plant directly deliver milk there. In case of Yak cheese, the farmers under cheese production centers directly deliver their milk in the centers where milk is instantly processed to produce cheese and butter.

Next are the MCCs or cow cheese production centers where milk received from the MPCs is measured, recorded, and platform quality control tests are performed that generally include organoleptic test, fat and SNF test, clot-on-boiling (COB) test etc. Occasionally, adulteration test is also performed. Milk in the MCC is cooled by either instant chilling system or in the bulk milk cooling vat. In the cheese production centers, milk received from the MPCs is directly processed to produce cheese, butter and other dairy products such as *paneer*, and sweets. Milk from the MCCs is transported to the milk processing plants in insulated bulk milk tankers.

Then there are milk processing plants. Here milk from the MCCs and MPCs after being received in the reception dock firstly undergoes quality control tests and quality passed milk is then measured and cooled prior to keeping it in an insulated milk storage tanks for further processing and producing pasteurized milk and milk products. After processing, milk and milk products are kept in cold store for sales.

The last actors are the milk selling booths/dairy shops and institutional buyers. The milk booths sell only milk to the consumers/tea shops, and dairy shops mostly sell milk products to the consumers. The milk selling booths operate for only 2-3 hours in the morning but the dairy shops are open from morning to evening. There are some such

shops also which buy milk from the booths in the morning and put it in the refrigerator and sell it later with extra charge. The institutional buyers include hotels, supermarkets/departmental stores and fresh houses. Among these, hotels use milk and milk products for their own purposes whereas supermarkets/departmental stores and fresh houses sell milk products to the consumers.

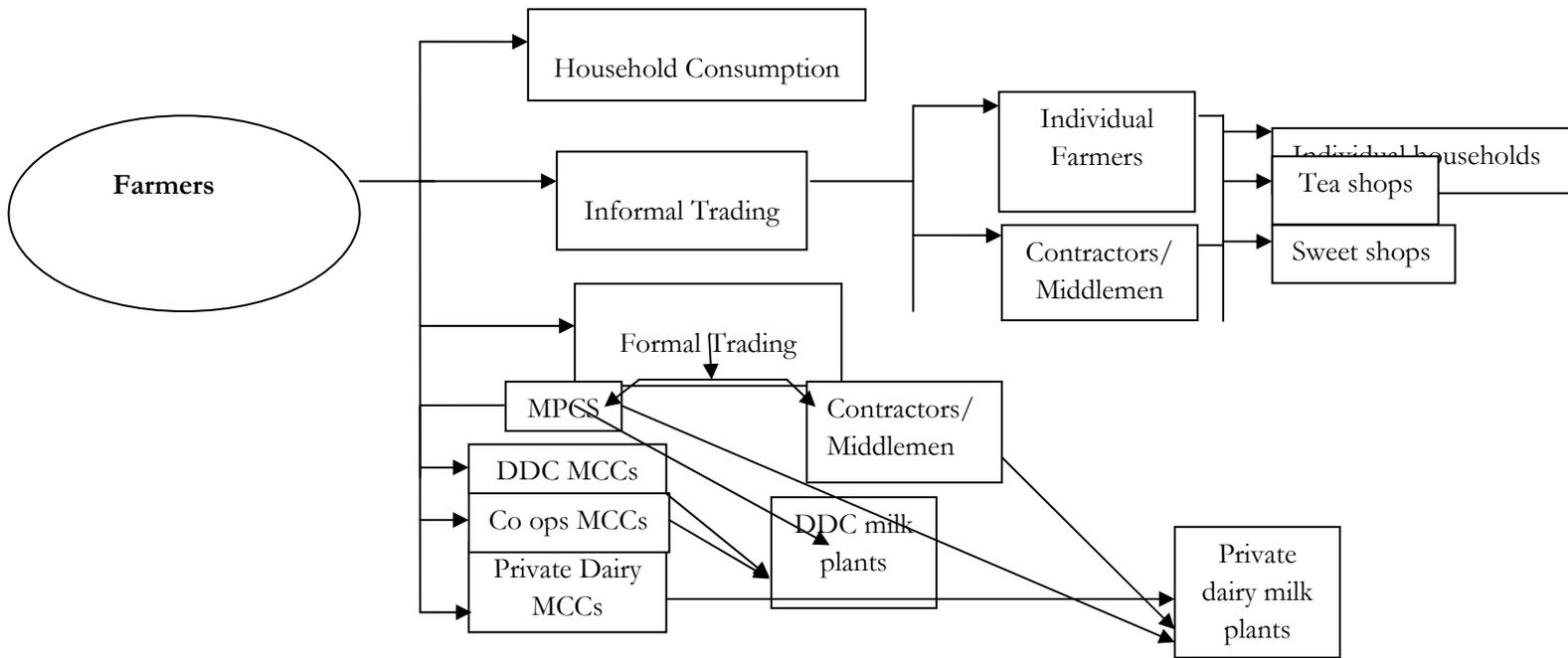
Milk also passes through the informal channel. In this system, individual farmers or the contractors are the main actors who directly deliver milk to the individual households/tea shops/sweet shops etc.

## **5.2 Existing Channels Within the Value System and Volumes Going through These Channels**

### **5.2.1 The Existing Channels**

Dairy industry is said to be a process from “Grass to Glass” which passes through different channels involving various actors. Figure 2 depicts the formal channel of raw milk to the milk processing plants as well as informal trading of raw milk. Seasonal variation in milk production and hence milk collection has been a regular phenomenon in Nepal due to dominance of buffalo milk. The main reason is attributed to seasonal breeding and calving pattern of this species. However, availability of green forage is also responsible indirectly for animals to set their breeding season physiologically. Figure 3 depicts the pattern of seasonal variation in milk collection by month.

**Figure 2: Formal and Informal Flow of Raw Milk**



**Figure 3: Pattern of Seasonal Variation in Milk Collection**

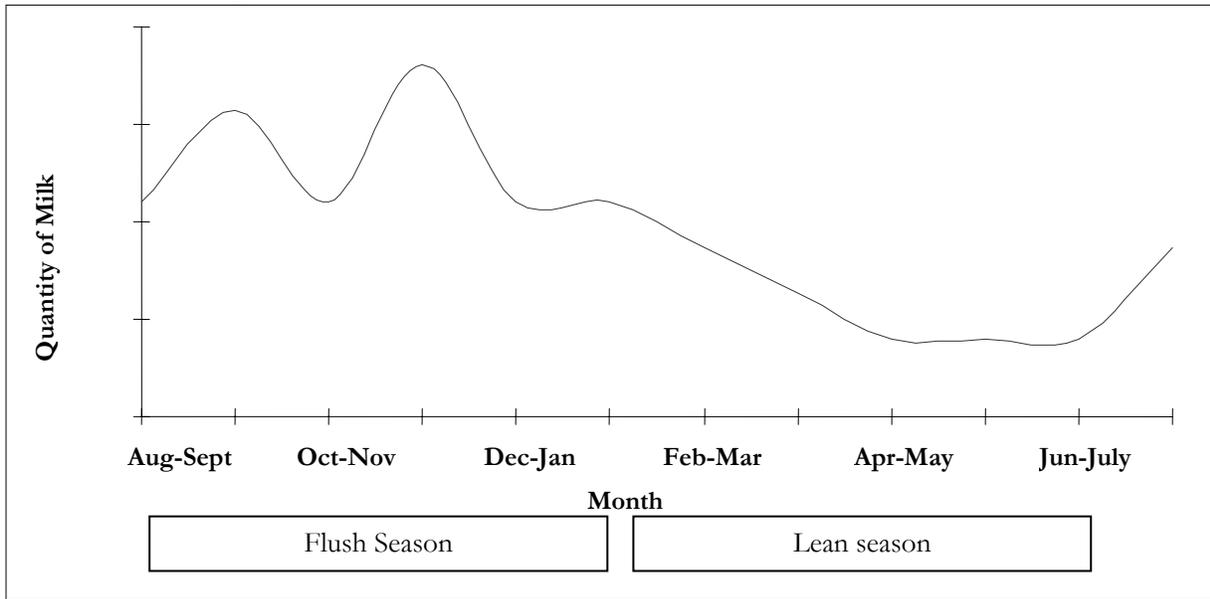
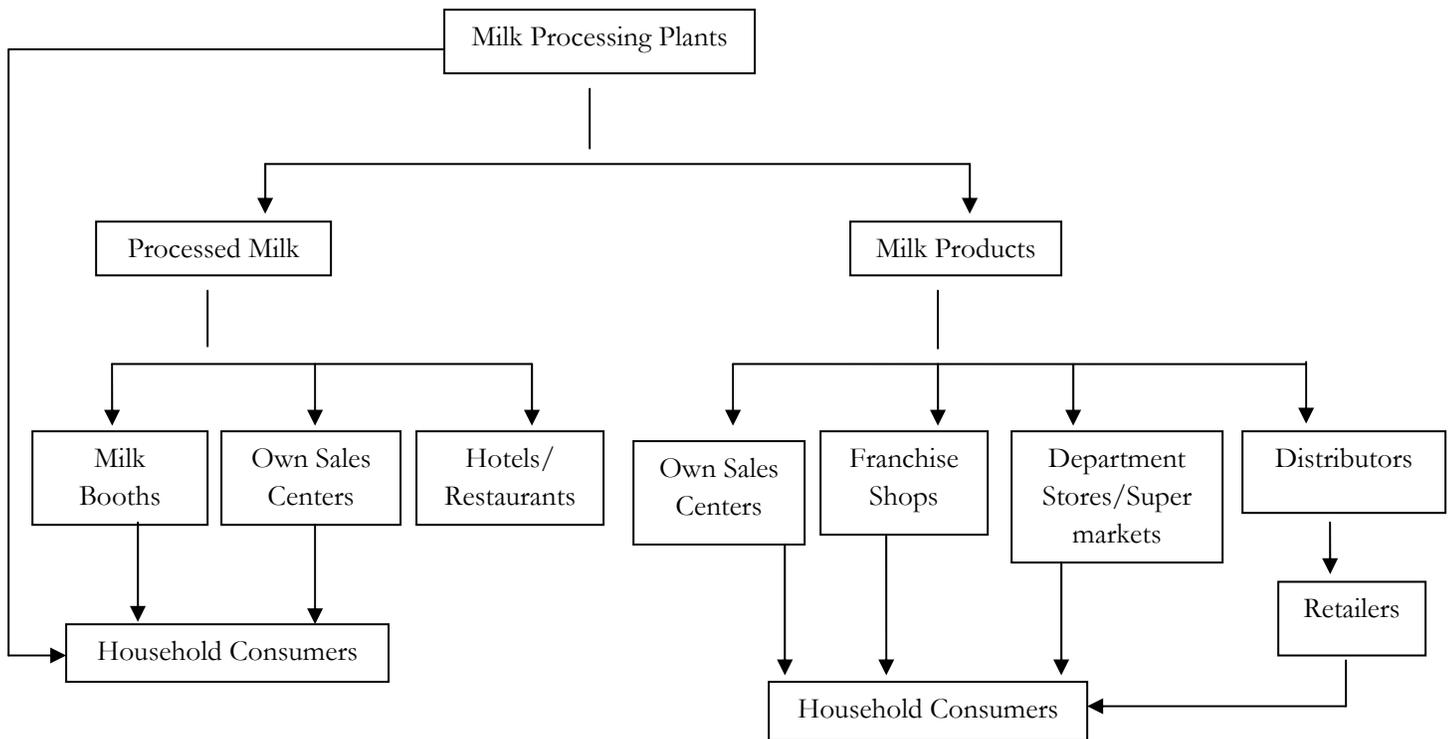


Figure 4 shows the channels of processed milk and milk products from the milk processing plants to the consumers.

**Figure 4: Flow of Processed Milk and Milk Products**



## 5.2.2 Volume of Milk Passing through the Channels

The latest milk production data of Nepal shows that 1,388,730 mt of milk with cow milk 400,950 mt (28.87 per cent) and buffalo milk 987,780 mt (71.13 per cent) has been produced in 2007/08<sup>4</sup>. Of this volume, only about 10 per cent of milk (138,873 mt) is estimated of being used by the formal sector dairies.

In the formal sector most of the milk passes through the MPCs ⇒ MCC ⇒ milk processing plants channel. In this system, whatever volume of milk is received in the MCC from the MPCs is accounted regardless of the volume dispatched by the MPCs. The same practice prevails in case of milk directly received in the milk processing plant from the MPCs. As such, the volume passing from the MPCs to either MCC or milk processing plant remains the same. Since the MCCs are operated by the concerned milk processing plants and their own vehicle is used for transporting milk from the MCC to the processing plants, there is virtually no difference between the milk dispatched by the MCC and received at the milk processing plant. Similarly, a small volume directly passes from MPCs to cow milk cheese factories and from farmers to the Yak cheese factories.

It is very difficult to track the volume of milk passing through all these channels, particularly in case of private dairies and cooperatives that are not supplying milk to DDC (as all cooperatives are not the part of DDC system)<sup>5</sup>; and informal milk trading mainly due to unavailability of data. Even if the private dairies are also a part of the formal sector, they are very reluctant to share their data and information. As learned, although some years back Livestock Market Promotion Directorate of DLS had developed an information system with the consent of private dairies to share their data; the system did not work even for a short period mainly because of the erratic and inconsistent data received from the private dairies. As such, presently there are no ways to find out the reliable data of the private sector. For that reason, only that volume of milk received (milk collection) in the milk processing plants and cheese factories of the DDC could be presented (Table 3).

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<sup>4</sup> Statistical Information on Nepalese Agriculture, 2007/08, MoAC

<sup>5</sup> Of the total 1,603 cooperatives in 2009, only 738 were supplying milk to DDC.

**Table 3: Volume of Milk Passed in the DDC System**

S. No.	Milk Plants/Cheese Factories	Milk Reception (mt)		
		2006/07	2007/08	2008/09
1	<b>Milk Processing Plants:</b>			
	Kathmandu MSS (KMSS)	31,693	29,488	30,367
	Biratnagar MSS (BMSS)	8,487	8,427	10,060
	Hetauda MSS (HMSS)	5,652	5,182	4,646
	Lumbini MSS (LMSS)	4,098	3,722	4,975
	Mid-western MSS (MWMSS)	1,531	1,306	1,216
	<b>Sub-total</b>	<b>51,461</b>	<b>48,125</b>	<b>51,264</b>
2	<b>Cheese Factories:</b>			
	Gosainkunda	234	235	226
	Chordung	34	58	70
	Thodung	48	42	37
	Chankhu	47	46	53
	Pike	26	29	29
	Langtang	65	54	49
	Pasupatinagar	408	462	747
	Rakse	386	373	389
	Ranke	232	296	258
	Nagarkot	471	638	550
	Chipa Bhyanjyang	160	143	143
	Trisuli	121	139	62
	Bihimkhori Pauwa	-	-	163
	<b>Sub-total</b>	<b>2,232</b>	<b>2,515</b>	<b>2,776</b>
	<b>Total</b>	<b>53,693</b>	<b>50,640</b>	<b>54,040</b>

Source: DDC

Within DDC, regular transfer of milk from HMSS, LMSS and MWMSS to Kathmandu MSS and sometimes from HMSS to BMSS is common. Since the HMSS and LMSS cannot sale all the milk they collect in their local markets, the surplus milk is sent to KMSS, and MWMSS sends its entire milk collection to KMSS as it has no processing facility. The quantity of milk thus transferred is higher during the flush season and less in the lean season.

Although there is absence of data regarding the passing of milk through various channels to the private dairies, based on the discussion with the private dairy people, it is estimated that they annually receive (collect) about 81,000 mt of milk from various

channels that include MPCs ⇒ MCC ⇒ milk processing plant channel, MPCs ⇒ milk processing plant channel, and farmer ⇒ milk processing plant channel. Thus, the share of DDC and private dairies in milk channeling milk from the rural areas through different channels is estimated to be 40 per cent and 60 per cent, respectively.

### **5.2.3 Cross Border Trade of Milk**

In the recent past, during flush season (November-February) there used to be oversupply of milk from the farmers mainly due to the seasonal variation particularly in buffalo milk production. The milk processing plants could not accept all the milk offered by the farmers and they were asked not to bring milk in the MCCs for once or twice a week. The days during which farmers were asked to halt milk supply to the MCCs was referred as “Milk Holidays.” The “Milk Holidays” started in 1991/92 but the problem was resolved by exporting milk by DDC to HIMUL of West Bengal, India for about one and half years in 1992/93. This was done with limited success again in 1990/2000. The volume of this cross border trade was not available in DDC. During 2000-2007, no any concrete measures were taken to ease the problem of “Milk Holidays” except organizing seminars, discussions and conducting studies. But, in the last fiscal year (2008/09) DDC again exported 1,223 mt of milk to Patna Dairy, Bihar.

Apart from this formal cross border trading of milk, there is also informal trading in the border areas of Nepal and India by individual farmers/contractors. The actual volume of this trade is difficult to ascertain because of the trade occurring at individual level in the long border between these two countries. This trading is mainly guided by the price factor i.e. milk flows to either cross border where price is higher.

### **5.2.4 Volume of Milk Products Passing through the Channels**

From the milk processing plants, milk after being processed is out in the form of pasteurized milk and other dairy products with ultimate destination to the general consumers. The dairy products include different types of yoghurt, ice-cream and cheese; butter, ghee, *paneer*, flavored milk, and traditional sweets. Table 4 shows the quantity of milk and milk products channeled through these networks by DDC. Private sector data could not be presented due to unavailability.

**Table 4: Milk and Milk Products Channeled by DDC**

S. N.	Milk and Milk Products	Quantity (mt.)		
		2006/07	2007/08	2008/09
1	Pasteurized Milk	52,262	52,094	55,315
2	Yoghurt	1,705	2,009	2,299
3	Ice-cream	52	53	65
4	Cheese	148	164	187
5	Butter	201	165	137
6	Ghee	823	628	459
7	<i>Paneer</i>	78	96	123
8	Flavored Milk	89	94	113
9	Sweets	168	176	191

Source: DDC

To channelize the above dairy products, DDC has established a network of sales outlets in different markets of the country.<sup>6</sup> Table 5 depicts present sales outlets of DDC.

**Table 5: DDC Sales Outlets**

Schemes	Milk Booths	Franchise Shops	DDC's Own Sales Shops	Distributors
KMSS	1,285	-	-	-
BMSS	137	12	2	3
HMSS	200	8	2	1
LMSS	60	9	2	-
MPPSS	-	25	3	5
JMSS	20	-	1	4
<b>Total</b>	<b>1,702</b>	<b>54</b>	<b>10</b>	<b>13</b>

Source: DDC

Among the above sales outlets, some of the milk booths sell both the DDC milk and milk from the private dairies whereas the franchise shops, DDC shops and distributors sell DDC milk and milk products only. To sell their products, the private dairies have their own sales shops and retailers.

<sup>6</sup> Kathmandu, Lalitpur, Bhakatpur, Biratnagar, Dharan, Birtamod, Lahan, Hetauda, Narayanghat, Birgunj, Butwal, Palpa, Bhairahawa and Pokhara.

## 5.3 Scale and Size of Operation and Cost and Revenues

### 5.3.1 Scale and Size of Operation

Various sizes of milk processing plants operate in the country. These comprise small scale manually operated cottage type, batch pasteurizing type, and modern high-temperature-short time (HTST) continuous pasteurizing type of varying capacity from 5,000 liters/day to 80,000 liter/day. A new powder plant in the private sector with the capacity of 150,000 liters/day has just started trial production and is expected to come into full operation after some time.

The total milk processing capacity in the country is estimated to be 650,000 liters/day of which the share of DDC's combined capacity is 182,000 liters/day (Table 6).

**Table 6: Capacity of DDC Milk Plants**

<b>MSS</b>	<b>Capacity (liters/day)</b>	<b>Present Handling (liters/day)</b>	<b>Present Capacity Utilization (%)</b>
KMSS	90,000	147,000	163.33
BMSS <sup>7</sup>	60,000	29000	48.33
HMSS	18,000	9000	50.00
LMSS <sup>8</sup>	2,000	1450	72.5
JMSS <sup>9</sup>	12,000	1,450	12.08
<b>Total</b>	<b>182,000</b>	<b>187,900</b>	<b>103.24</b>

Source: DDC

Except KMSS, the DDC plants are running below capacity. KMSS's capacity is over-utilized by 63 per cent. The KMSS plant is being excessively used because of higher demand for processed milk in the Kathmandu Valley. Due to the over-capacity utilization of KMSS (the largest plant), the DDC's overall capacity utilization has been pulled-up a little more than its total processing capacity.

The private dairies' combined milk processing capacity (including large and medium mechanized dairies and small and cottage dairies) is estimated to be 468,000 liters/day. The private sector dairies are running below their capacity as shown by the capacity utilization of some large mechanized private dairies (Table 7). The available information

<sup>7</sup> BMSS also includes a skim milk powder plant having a capacity of 3.5 metric ton/day.

<sup>8</sup> LMSS has the facility of batch pasteurizing which can pasteurize 1,000 liters of milk in 3 hours.

<sup>9</sup> JMSS has just started its operation.

as well as informal discussions with the private dairies has revealed that, on the whole, around 50 per cent (234,000 liters/day) of the total capacity is being utilized in the private sector.

**Table 7: Capacity Utilization of Some Prominent Private Dairies in Nepal**

S. N.	Name of Dairy	Capacity (liters/day)	Production Quantity (liters/day)	Capacity Utilization (%)
1	Sitaram Gokul Milks	80,000	35,000	43.75
2	Himalaya Dairy	80,000	20,000	25.00
3	Sujal Milks <sup>10</sup>	75,000	35,000	46.66
	<b>Total</b>	<b>235,000</b>	<b>90,000</b>	<b>38.29</b>

**Source:** (1) National Milk Marketing Strategy Study for capacity of Sitaram Gokul Milks and Himalaya Dairy

(2) Report on Expansion of KMSS, EMESS Consultancy Services, Kolkata, 2009 for production Quantity of Sitaram Gokul Milks and Himalaya Dairy.

(3) Informal information for Sujal Milks.

### 5.3.2 Costs and Revenues All Levels in the Chain

The major cost items in the dairy industries are cost of raw milk, collection chilling and transportation cost of raw milk; processing and packing cost, sales and distribution cost; and administrative overheads. Cost of raw milk is the price of milk paid by the milk processing plants to the farmers through the MPCSSs.

Cost of raw milk is the major constituent of the processed milk. In the DDC system, different price is fixed for the MPCSSs belonging to various MCCs depending on the seasonal and spatial variation, i.e. higher price is fixed for lean season and lower price for flush season, and higher price for the MPCSSs operating under the nearer MCCs and lower price to the MPCSSs operating under the distant MCCs for the compensation of transportation cost. The dual-axis pricing system (based on fat and SNF per cent) is implemented. Apart from the milk price, the MPCSSs are also paid commission for MPCSS per kg of total solids in milk (which is referred as TS commission) for management of MPCSSs and milk transportation. Similarly, if any cooperative or private MCC delivers chilled milk to the DDC's MCC/milk processing plants, chilling and transportation cost is also additionally provided. Although DDC pays the MPCSSs on the basis of dual axis, in

<sup>10</sup> Sujal Milks Pvt. Ltd. has also the capacity of producing 7.5 mt. of SMP/day.

some cases the MPCSSs pays the farmers only on the basis of fat content by adjusting the price of SNF also in the fat price. This practice is mostly common in the milk shed areas of KMSS. Table 8 depicts the price of a liter of milk for DDC accepted minimum quality of 5 per cent fat and 8 per cent SNF.

**Table 8: DDC Raw Milk Price**

Component	Lean Season		Flush Season	
	Price Range (NRs.)	Lean Average (NRs.)	Price Range (NRs.)	Flush Average (NRs.)
Fat	2.37 - 3.06	2.72	2.31 - 2.98	2.65
SNF	1.38 - 1.78	1.58	1.34 - 1.74	1.54
Milk Price to farmers (NRs./liter)	22.89 - 29.54	26.22	22.27 - 28.82	25.55
TS Commission (NRs./kg)	18 - 22	20.00	18 - 22	20.00
TS commission (NRs./liter)	2.34 - 2.86	2.60	2.34 - 2.86	2.60
Price paid to MPCSSs (NRs./liter)	25.23 - 32.40	28.82	24.64 - 31.68	28.15

Source: Calculated by Consultant based on DDC prices for Fat and SNF.

Note: In addition, if any cooperative/private MCC delivers chilled milk at its MCC it gets NRs 3.18/ liter as TS commission to compensate milk collection and chilling cost. Further, if any cooperative/private MCC delivers chilled milk to the DDC's MCC/milk processing plant extra NRs. 0.46/liter is also paid to cover the cost of transportation. Thus, if any cooperative/private MCC delivers chilled milk to the DDC's MCC/milk processing plant, it receives NRs. 3.64/liter as TS commission. However, quantity of such milk received in the DDC's MCC/milk processing plant is very less.

The private dairies also follow the same pricing system of DDC. However, depending upon the competition for milk collection, the private dairies pay additional amount ranging from NRs. 0.50 to NRs. 1.50 per liter of milk. The competition for milk collection is intense during lean season when milk production is low. Although processed milk can also be produced by recombining imported SMP and butter oil (BO), cost per liter of such milk is much higher compared to the cost of local raw milk (Table 9). As such, the private dairies try to collect as much local raw milk as possible even by paying some extra payment.

**Table 9: Comparative Cost of Local Raw Milk and Recombined Milk**

<b>Cost Particulars</b>	<b>Local Milk (NRs.)</b>	<b>Recombined Milk (NRs.)</b>
Raw milk price	28.50	-
SMP	-	22.73
BO	-	12.59
Collection Cost	2.40	-
Total	30.9	35.32
Less\$ income from extra fat	7.00	-
<b>Net cost</b>	<b>23.90</b>	<b>35.32</b>

Source: Calculated by Consultant based on DDC data

Note: Local milk containing 5% Fat and 8.0% SNF. Rate of SMP: NRs. 250/kg and BO: NRs. 403/kg  
(This is the prevailing procurement price of DDC).

Based on the available DDC data of 2008/09 for milk processing and present raw milk purchase price, the total cost of processed milk/liter comes to be NRs. 42.71/liter. The sales price of processed milk is NRs. 38. Thus, the DDC is expected to lose NRs. 4.71/liter of processed milk (Table 10) in the current year. Although the DDC also produce other milk products too, their share in total revenue is very less being only about 20 per cent of the total revenue. Therefore, revenue from processed milk is the most important factor determining DDC's profitability. Private sector data could not be analyzed due to unavailability of data.

**Table 10: Cost of Processed Milk and Margins at Different Levels**

<b>S. N.</b>	<b>Cost Particulars</b>	<b>Cost/liter (NRs.)</b>	<b>Margin (NRs.)</b>
<b>1</b>	<b>Cost of Raw Milk</b>	<b>23.90</b>	<b>14.10</b>
<b>2</b>	<b>Collection Cost:</b>		
	Salary and allowances	0.64	
	Fuel	0.78	
	Maintenance	0.24	
	Others	0.26	
	<b>Sub-total</b>	<b>1.92</b>	<b>12.18</b>
<b>3</b>	<b>Processing Cost:</b>		
	Staff salary and allowances	0.72	
	Packing materials	1.22	
	Fuel	0.82	
	Water and electricity	0.25	
	Machine maintenance	0.14	
	Others	0.86	
	<b>Sub-total</b>	<b>4.01</b>	<b>8.17</b>
<b>4</b>	<b>Sales Cost:</b>		
	Staff salary and allowances	0.38	
	Transportation	0.46	
	Fuel	0.07	
	Others	0.26	
	<b>Sub-total</b>	<b>1.17</b>	<b>7.00</b>
	<b>Administrative Overheads:</b>		
	Depreciation	6.70	
	Staff salary and allowances	0.64	
	Insurance	0.25	
	Gratuity	0.24	
	Others	0.68	
	<b>Sub-total</b>	<b>8.51</b>	<b>(1.51)</b>
	<b>Total costs other than raw milk cost</b>	<b>15.61</b>	
	<b>Grand total with raw milk cost</b>	<b>39.51</b>	<b>(1.51)</b>

Source: Calculated by Consultant based on DDC data

The above analysis is based on processing cost of locally collected raw milk in which DDC incurs loss of NRs. 1.51/liter of processed milk. But, if cost NRs. 3.20/liter of processed milk of SMP and butter (NRs.3.01 for SMP and NRs. 0.19 for butter) used to

produce reconstituted milk is also added (which was the actual scenario in 2008/09) the negative margin of milk processing/liter goes up to NRs. 4.71.

The above analysis shows that the DDC's administrative overheads are much higher than other costs mainly due to depreciation, which is non-cash cost. Although the amount of depreciation is shown on the book of accounts, there is no separate depreciation fund. Similar is the case with gratuity which also is only the provision but not the actual payment to the employee. Thus, about NRs. 6.94/liter is the non-cash cost of the DDC; and the margin in the processed milk without these comes to be a surplus of NRs. 5.43/liter for processing locally collected milk (excluding SMP and butter cost) and NRs. 2.23 for processing milk including reconstituted milk. Actually, the DDC's operation is sustained by these non-cash costs.

Although the DDC has some margin on its other milk products (Table 11), their share in total revenue being only about 20 per cent this margin is not enough to compensate the loss in processed milk. According to the available information, DDC has incurred a loss of about NRs.10 million in 2008/09.

**Table: 11 Costs, Revenue and Margin of Dairy Products**

Particulars	Approximate Cost/kg (NRs.)	Consumer Price/kg (NRs.)	Gross Margin (NRs.)	Tax and Commission (NRs.)	Net Margin/kg (NRs.)
Yak Cheese (kg)	360	500	140	105	35
<i>Kanchan</i> Cheese (kg)	286	400	114	85	29
Mozzarella Cheese (kg)	199	300	101	80	21
Yoghurt (liter)	60	75	15	11	4
Ice-cream (liter)	70	150	80	64	16
Butter (kg)	250	400	150	100	50
Ghee (liter)	295	400	105	76	29
<i>Paneer</i> (kg)	200	300	100	80	20

Source: Calculated by Consultant based on 2008/09 DDC data

Note: (i) Tax includes 13 per cent Value-added tax (VAT) (ii) Yoghurt is exempted from VAT

### 5.3.3 Spatial and Seasonal Variation in Costs and Prices

Due to seasonal variation in milk collection, the milk plants get more milk in the flush season and less in the lean season. As revealed by milk collection quantity, flush and lean season ratio is 65:35. Due to lower price of raw milk as well as enough milk availability in the flush season, per unit cost of milk processing becomes lower during this season than in the lean season. However, in the absence of a system of seasonal variation in product pricing, seasonal costing of the product is also not exercised. It is, therefore, difficult to exactly assess the magnitude of per unit cost variation of processed milk and milk products during flush and lean season.

Although the milk purchasing price varies seasonally, there is no system of variation in selling price of milk and milk products depending on the seasonal variation in procurement price of milk in the formal sector. The price of milk and milk products of the formal sector remains the same throughout the country for all seasons. However, a very short run (one week) variation in price of products mainly of ghee and yoghurt may occur in the informal trading during major festival seasons when demand for these products is high. Consumers are compelled to pay higher price due to the necessity arising out of the religious as well as cultural value of these products. As DDC ghee is popular among the consumers, its black marketing occurs when it is short supplied particularly during the festival seasons. But this is an occasional and very short-run phenomenon.

Seasonal variation in consumption of ice-cream and yoghurt is common being these products highly consumed during summer season and less in winter season. About  $\frac{3}{4}$ <sup>th</sup> of total ice-cream production and  $\frac{2}{3}$ <sup>rd</sup> of yoghurt production is consumed during summer season. Even so, price of these products remains the same in both the seasons. But, there is no such variation in consumption of other products viz. cheese, butter, ghee, *paneer* etc.

### 5.3.4 Market Shares and Growth Potential of Various Products

**Market Shares:** Among the dairy products, market share of standardized processed milk, yoghurt and *paneer* is dominated by local production. Processed milk with 3 per cent fat and 8 per cent SNF filled in 500 ml plastic pouches dominate the market. Full cream milk containing 5 per cent fat and 8 per cent SNF is also sold by the dairies. DDC brand processed milk is most popular.

Yoghurt, a traditional fermented milk product, is produced by almost all dairies of varied sizes. Mainly two types of yoghurt are available in the market viz. ordinary with less

sugar content and special with higher sugar and solid content. DDC packs it in single use 1.5 and 5-liter traditional clay containers. DDC also packs yoghurt in 1 liter and 200 ml plastic cups mainly for smaller single serve pack. The private dairies also follow this practice. Moreover, DDC also packs yoghurt in sealed plastic bags. Like Ghee, yoghurt market is also seasonal with sharp increase during festivals and religious ceremonies. DDC has started a new variety of yoghurt named Probiotic Yoghurt. Prices of yoghurt range from Rs. 55 to Rs. 70 per liter and Rs. 20 to Rs. 30 per cup.

*Paneer* is produced by almost all kind of dairies. Except for the DDC, the private dairies do not practice branding of *paneer*. DDC *paneer* is vacuum packed whereas *paneer* of the private dairies is usually packed in plastic bags with manual sealing. For larger supplies, loose wrapping with plastic sheets is done. The price of *paneer* ranges from Rs. 200 to 250 per kg. The quality and shelf life of *paneer* also varies from source to source.

Apart from the above market dominating local products, other local as well as imported milk products from various countries from Asia, Europe, Australia and North America compete in the Nepalese market. Different varieties with various sizes and from ordinary to advanced packaging are available for most of the products (Annex 7).

The market leader of ghee is DDC followed by the private dairies and imported brands from India and Belgium. DDC ghee has a well-established goodwill in the market. Most of the ghee (except a few) marketed by the private dairies is not branded. Packaging is in a variety of packs. Domestically produced ghee is packed in plastic containers; plastic pouches and laminated flexible packaging. The Indian ghee is packed in convenient packaging of hard paper pack with inner lining. Belgian ghee is packed in tins. Ghee market is somewhat seasonal with sharp increase during festivals and religious ceremonies. Besides the household consumers, the major buyers of the ghee are traditional sweet manufacturers.

The SMP is mostly used for industrial purposes such as in the dairy industry, biscuit and confectioneries, and bakery factories. In most cases, the users in bulk package of 25 kg directly import it. Although the DDC also produces the SMP in the country, its production (around 600 mt/year) is not sold in the market and is entirely used by itself. In the retail market, the market share is more or less equally shared by different brands from India and other countries. The difference between the products is that SMP from India is not the instant powder whereas from other countries it is. Price of SMP from India is cheaper than from other countries.

Indian brands of full cream milk or WMP command about 10 per cent market share and the remaining is from other countries. The market share of the brands is uncertain because at times, some of the brands disappear in the market. Price of the product depend on the type of packaging, unit size and product source.

Almost all market (over 90 per cent) of infant milk formula dominated by the Nestle's Lactogen brand with two sub brands viz. Lactogen 1 and Lactogen 2 from India and the Netherlands. The price varies with the type of packaging and product source since the same brand from the Netherlands has higher price. Amulspray is another brand from India, which caters the smaller markets and has the lowest price.

The major brands of dairy whitener are from India. Everyday brand manufactured by Nestle India is the most popular brand with a market share of over 50 per cent. The price varies with the packaging size and packaging type. Smaller unit size is more expensive and so are the tin-packed products. Recently, Sujal Dairy of Nepal has also started production of this product but its market share very less.

Cheese is the product of which the largest varieties are available in the markets particularly in Katmandu. Few of the cheese types, namely Yak Cheese, Kanchan (cow) Cheese, and some quantity of processed cheese, cheese spread and mozzarella cheese is produced in the country both by the DDC and private sector, and most of the cheese available in the country is imported. A NDDDB study on the Establishment of Cheese Storage (2000) has shown that highest market share of over 70 per cent is of locally produced cheese. As such, most of the specific varieties of imported cheese are targeted for foreign customers with lower consumption rate. The locally produced Yak and Kanchan Cheese are generally sold by cutting the block. However, smaller units vacuum-packed Yak and Kanchan cheese are sold by DDC. Other cheese varieties viz. processed, cheese spread, and mozzarella are sold in vacuum pack. Price of imported cheese other than from India is comparatively expensive. Many varieties of imported cheese are also available in the market. The major difference between the locally produced and imported cheese is that the imported cheese are very attractively packed in various size packs.

Butter available in the market comprises of the locally produced DDC butter and private dairies' butter; and imported butter mainly from India and a little from European countries. There is no single highest market share by any of the brands. However, DDC and Amul of India enjoy the major market share followed by butter of the private dairies. Except for DDC, concept of branding is not so strong in locally produced butter. Their presentation to consumer is also not so appealing, as the packaging is ordinary parchment paper with or without cardboard box. As a result, the products are not very

convenient to handle. The shelf life of the locally produced butter is much lower even compared to Amul, which has much better and attractive packaging. Nepali products have comparable prices with Amul. Some of the private dairies market their butter at comparatively lower prices. The European butter is available for niche market in specialized stores. Their packaging is of high quality and shelf life is high.

Both the locally produced and imported ice cream is available in the market. Nepalese producers have also been able to establish their brand image. The Nepalese brands are DDC, ND's, and Snow Fun. Many other smaller ice cream manufacturers also supply ice cream in the market, but the amount is not big and there is no branding. Three imported brands of ice cream are also available in the market. They are: Move n pick from Switzerland, Vadilal and Baskin and Robbins (an American brand) from India. As many as 30 varieties (flavors) of ice cream are marketed in different sizes and packaging includes plastic cups, cones and bars for smaller sizes and plastic containers and cartons for bigger sizes (family pack). DDC supplies its ice cream through its own sales centers, franchise shops, dealers and the other brands are marketed through supermarkets and other retail stores. Local ice cream enjoys the major market share.

Only imported sweetened condensed milk is available in tin packaging. The label is attractive and informative to the consumers. The prices vary from brand to brand. Milk Maid by Nestle (made in India and Singapore) is the most popular brand.

**Growth Potential:** Consumer needs vary from person to person, and also from time to time. Dairy processors have accommodated this trend by providing not only basic dairy products, but special products for special needs as well. Because of its perishable nature and high water content, most milk in the world is not consumed in its original liquid form, but in some processed state: cheese, butter, yogurt, powder etc. The number of value-added dairy products available to consumers has increased considerably in recent years as Nepali dairy processors are introducing more new products in hopes of increasing dairy product consumption. The food market in general and the dairy market in particular, are increasingly being presented in a wide variety of forms. While some demand low-priced products, others are ready to pay a premium for quality. It is, therefore, the challenges for the dairy industry is to identify what the consumer needs are and focus on these areas.

In Nepal, population is increasingly becoming urbanized. The rural people who used to be the milk producers some years ago have now become the urban consumers. Urbanization has brought increased disposable income and consumption of higher cost foods, such as milk and milk products. Here, the fact that urbanization is also characterized by the general provision of electricity, and hence the potential for

developing an extended cool chain, is of particular importance for a highly perishable product such as milk. Although the shortage of electricity has resulted in extended time of load shedding during summer season, big restaurants and supermarkets have managed their own alternatives such as generators, high capacity inverters etc. for operating the cool chain. In such a situation, household expenditure shifts from unrefrigerated raw and fermented milk, and products such as tinned and dried milk products which do not require refrigeration, to the wide range of dairy products which can be found in any of today's supermarkets. Thus, along with population concentration, urbanization has also resulted in concentrations in food marketing. This is manifested in supermarkets, which are fast growing in the urban centers. Supermarkets are offering dairy products with both refrigeration capacity and space to display products, which acts as a stimulus to increased consumption of value-added products.

The growth in consumption of food outside the home has brought enormous potentiality to the dairy industry. The growth of the fast food has considerably improved the position of value added dairy products. Restaurants, mainly those specializing in pizza are major users of value added dairy products.

The moment of truth for any food product is its arrival at its final destination: the consumer's mouth. While eating and drinking are, of course, fundamental activities, the way in which food is eaten, the place where it is eaten and the company with whom it is eaten are all changing. These changes have important implications for the market for dairy products. Like in many other countries, in Nepal also the main growth in food expenditure is in the area of food eaten outside the home. As more meals are eaten outside the home, so food is more often consumed with friends and associates, rather than family members. In such cases, the use and values associated with food changes.

Therefore, as incomes rise and economic conditions improve, demand for more varied foodstuffs increases. Food market in general, and the dairy market in particular, is noteworthy for its dynamism and inventiveness. Consequently, each year, a number of new products are being brought to the market. As income level increases, demand for more varied food products will follow suit. Consumers are many and varied.

Thus, in the dairy market of the future, some will demand low-priced products, while others will pay a premium for quality and uniqueness. The challenge for the dairy industry is to identify which markets it can profitably supply and to focus its efforts on meeting the needs of consumers in these markets.

### 5.3.5 Investment, Profitability and Risk at Various Level of Value Chain

As mentioned above, the value chain includes MPCS, MCC, milk tankers, milk processing plants and sales shops. Separate investment and operational costs, and revenue of each of these items of value chain are estimated.

#### 5.3.5.1 Investment Costs

**MCPS:** The cost of MPCs includes the investment required for land and building, milk cans, centrifuge, chemicals and glassware and other items, which includes simple furniture and pipes for provision of water in the MPCS. Although the MPCS will receive varying quantity of milk with some receiving more milk and some less, investment cost of MPCS is based for the average quantity of 200 liters of milk (Table 12).

**Table 12: Investment Cost of MPCS**

S. No.	Item	Amount (NRs.)
1.	Milk cans	18,000
2.	Centrifuge (manual)	5,000
3.	Chemicals and glassware	2,000
4.	Others	5,000
	<b>Total</b>	<b>30,000</b>

Source: Consultant's estimation

**MCC:** The estimated cost of MCCs includes the investment required for land and building, chilling vats/instant chilling system, milk pump to transfer chilled milk to the road milk tanker, and diesel generator for electricity supply. Apart from these major items, cost for other smaller items such as milk cans, chemical and glassware, electric fittings, furniture water supply and other miscellaneous is also included (Table 13).

**Table 13: Investment Cost of MCCs**

S. No.	Item	Capacity/ Amount (NRs.)		
		1000 liters	2000 liters	5,000 liters
1.	Land and building	500,000	600,000	1,000,000
2.	Milk cans	12,000	30,000	36,000
3.	Chilling Vat/Instant chilling System	350,000	600,000	3,500,000
4.	Milk Pump	35,000	45,000	60,000
5.	Centrifuge (electric)	12,000	12,000	12,000
6.	Automation	150,000	150,000	150,000
7.	Diesel Generator	250,000	250,000	800,000
8.	Chemicals and glassware	3,000	5,000	5,000
9.	Electric fittings	5,000	5,000	5,000
10.	Furniture	5,000	5,000	5,000
11.	Water Supply	10,000	10,000	10,000
12.	Others	10,000	10,000	10,000
	<b>Total</b>	<b>1,342,000</b>	<b>1,722,000</b>	<b>5,593,000</b>

Source: Consultant's estimation

**Road Milk Tanker:** The road mil tankers will be double-jacketed insulated milk tank of 6,000-liter capacity divided in two compartments mounted on the 10-ton capacity single cabin truck with the facility of milk pump. The cost of such complete road milk tanker is estimated to be NRs. 2,000,000.

**Milk Processing Plants:** Estimation of investment is based on composite milk processing plant producing processed milk and other dairy products such as yoghurt, ghee, ice-cream, butter etc. The investment cost of milk processing plants includes land, building and other civil works, plant equipment and machinery, furniture, fixtures and office equipments, milk and milk products distribution vehicles, and other pre-operating expenses (Table 14).

**Table 14: Investment Cost of Milk Processing Plants**

S. No.	Item	Capacity/ Amount (NRs.'000)		
		Small (10,000 liters)	Medium (30,000 liters)	Large (100,000 liters)
1.	Land	4,000	9,000	10,000
2.	Building, and other civil works	7,500	10,500	40,000
3.	Complete plant (machinery, equipment and accessories)	15,000	30,000	100,000
4.	Furniture and fixtures and office equipment	1,000	1,500	2,500
5.	Distribution vehicles	2,400	3,600	7,200
6.	Pre-operating expenses	300	500	1,000
7.	Working capital	9,900	30,000	99,000
	<b>Total</b>	<b>40,100</b>	<b>85,100</b>	<b>259,700</b>

Source: Consultant's estimation

### 5.3.5.2 Operational Costs

**MPCS:** The regular operation cost of the MPCS include cost of milk purchase from the farmers; salary of the MPCS manager who will be responsible for collecting and testing of milk along with keeping the records of milk transaction; and other consumables such as chemicals and glassware for milk testing, milk transportation and other smaller items (Table 15).

**Table 15: Annual Operating Costs of the MPCS**

S. N.	Particulars	Amount (NRs.)
1.	Milk purchase	18,90,000
2.	House rent	12,000
3.	Salary of MPCS manager	50,000
4.	Chemicals and glassware	15,000
5.	Milk Transportation to MCCs	91,000
	<b>Total</b>	<b>2,058,000</b>
	<b>Cost/liter (NRs.)</b>	<b>28.19</b>

Source: Consultant's estimation

**MCCs:** The regular operational cost of the MCC includes salary of the MCC manager, dairy boys and operators; cost of electricity; glassware, chemicals and detergents; and repair and maintenance of machinery. The manager is responsible for collecting and testing of milk along with keeping the records of milk transaction. One dairy boy/operator in 2,000-liter capacity MCC and each one of dairy boy and operator in 5,000-liter capacity MCC will work to assist the manager (Table 16).

**Table 16: Annual Operating Costs of MCCs**

S. N.	Item	Capacity/ Amount (NRs.)		
		1,000 liters	2,000 liters	5,000 liters
1.	Salary of MCC manager	72,000	84,000	108,000
2.	Salary of dairy boy	-	60,000	60,000
3.	Salary of operator	-	-	60,000
4.	Electricity	60,000	110,000	250,000
5.	Fuel	20,000	36,000	115,000
6.	Water supply	12,000	15,000	24,000
7.	Chemicals, detergents and others	12,000	15,000	18,000
8.	Repair and maintenance	25,000	35,000	50,000
9.	Depreciation	81,000	109,000	456,000
	<b>Total</b>	<b>282,000</b>	<b>464,000</b>	<b>1,141,000</b>
	<b>Cost/liter (NRs.)</b>	<b>0.77</b>	<b>0.64</b>	<b>0.63</b>

**Source:** Consultant's estimation

**Road Milk Tanker:** The operational cost of road milk tanker includes the cost of diesel and lubricants, spare tyres and tyre resoling, salary of driver and helper and repair and maintenance. The cost estimation is based on the assumption that a tanker runs 250 km/day for carrying 6,000 liters of milk (Table 17).

**Table 17: Annual Operating Costs of Road Milk Tanker**

<b>S. N.</b>	<b>Particulars</b>	<b>Amount (NRs.)</b>
1.	Diesel	1,368,780
2.	Lubricants	136,878
3.	Spare Tyre	52,000
4.	Tyre Resoling	21,000
5.	Driver	9,000
6.	Helper	6,000
7.	Repair and Maintenance	136,878
	<b>Total</b>	<b>1,730,536</b>
	<b>Cost/liter</b>	<b>0.79</b>

**Source:** Consultant's estimation

**Milk Plants:** Operational costs have been categorized into fixed operational costs and variable operational costs. Operational costs have been estimated for full capacity utilization of the milk plant. Operational costs are categorized into fixed costs which remain constant over the life of the project, irrespective of the product output, and variable costs which are directly related to the value of product output (Table 18).

**Table 18: Annual Operating Costs of Milk Processing Plants**

Cost Particulars:	Capacity/Amount (NRs. '000)		
	Small (10,000 liters)	Medium (30,000 liters)	Large (100,000 liters)
<b>A Fixed Costs:</b>			
Depreciation	2,055	3,570	10,185
Insurance	259	456	1,497
Office overheads	400	865	1,800
Indirect labor	1,000	1,500	6,000
<b>Sub-total</b>	<b>3,714</b>	<b>6,391</b>	<b>20,112</b>
<b>B. Variable Costs:</b>			
Material Inputs:			
a. Raw milk,	111,690	335,090	1,116,900
b. Auxiliary materials (Sugar, SMP, lactic acid, essence, ice-cream flavor etc)	5,585	16,754	55,845
c. Packing material	9,000	30,113	30,113
d. Chemicals and glassware	35	50	125
e. Miscellaneous	50	75	200
Utilities:			
a. Diesel	256	767	2,555
b. Lubricants(10% of Diesel expenses)	26	77	256
c. Water and electricity	960	3,212	10,707
Repair and maintenance	443	807	2,594
Direct labor	1,825	5,475	5,475
<b>Sub-total</b>	<b>129,869</b>	<b>392,398</b>	<b>1,307,806</b>
<b>Annual Operating Cost</b>	<b>133,583</b>	<b>398,789</b>	<b>1,327,918</b>

Source: Consultant's estimation

### 5.3.5.3 Estimated Revenue and Margins

**MPCS and MCC:** As above, the MPCS's cost of milk collection and transportation including raw milk price is estimated to be NRs. 28.19/liter; and it receives NRs.

28.50/liter from the milk processing plants. This allows a margin of NRs.0.31/liter to the MPCS. Similarly, estimated margin of cooperative/private operated MCCs of varying capacity without and with milk delivery to the DDC's MCC/milk processing plants (Table 19) depicts that a MCC may generate margin at a range between NRs. 0.12 - 0.26/ liter in case of delivery of milk at its own place. Contrary to this, the MCC will lose at a range between NRs. 0.07 – 0.21/liter if it delivers milk to the DDCs' MCC/milk processing plant. This means, it will not be profitable to a MCC to operate milk tanker for milk transportation.

**Table 19: Revenue and Margin of MCCs**

(NRs./liter)

Capacity of MCC	Delivery at Own Place			Delivery at DDC's MCC/ Milk Processing Plants		
	Cost	Revenue	Margin	Cost	Revenue	Margin
1,000 liters	28.96	29.08	0.12	29.75	29.54	-0.21
2,000 liters	28.83	29.08	0.25	29.62	29.54	-0.08
5,000 liters	28.82	29.08	0.26	29.61	29.54	-0.07

Source: Consultant's estimation

**Milk Plants:** The product mix of a milk processing plant is composed of processed milk, butter, ghee, yoghurt, ice-cream and *paneer* because of high market potentiality of these products in the urban areas. Depending upon capacity, the milk processing plants are estimated to generate a margin of NRs. 12.52 million, Rs. 39.52 million and NRs. 133.11 million (Table 20) for small, medium and large milk processing plants, respectively. The financial rate of return (FIRR) for small, medium and large plants is 23.90 per cent, 41.80 per cent and 51.72 per cent, respectively; and break-even point (BEP) for these plants is 23 per cent, 14 per cent and 13 per cent, respectively.

**Table 20: Estimated Revenue and Margins of Milk Plants**

Products	Product Quantity (kg./day)			Price	Annual Revenue (NRs. '000)		
	10000 liter capacity	30000 liter capacity	100000 liter capacity		10000 liter capacity	30000 liter capacity	100000 liter capacity
Processed milk	9,050	27,150	90,500	38	125,524	376,571	1,255,235
Butter	110	330	1,100	330	13,250	39,749	132,495
Ghee	113	339	1,130	440	18,148	54,443	181,478
Yoghurt	200	600	2,000	75	5,475	16,425	54,750
Ice-cream	70	210	700	200	5,110	15,330	51,100
Paneer	40	120	400	300	4,380	13,140	43,800
<b>Total</b>					<b>171,886</b>	<b>515,657</b>	<b>1,718,858</b>
Less tax, commission and losses @15%					25,783	77,349	257,829
<b>Net revenue</b>					<b>146,103</b>	<b>438,309</b>	<b>1,461,029</b>
Estimated Operating cost					<b>133,583</b>	<b>398,789</b>	<b>1,327,918</b>
Margin					12,520	39,520	133,111
FIRR (%)					23.90	41.80	51.72
BEP %					23	14	13

Source: Consultant's estimation

Note: Price of products as of DDC's prevailing prices.

#### 5.3.5.4 Risks

The above analysis illustrate that investment in milk processing plants is neither financially risky nor risky in terms of product marketing as explained earlier in the demand analysis. However, shortage of raw milk may be the most critical factor for operating the milk processing plant. Milk collection by DDC's MSS in 1998 was 61,840,000 liters which has gone down to 51,264,000 liters in 2009 even by expanding its milk collection networks. Similarly, the private dairy people are also very anxious over the shortage of milk and requesting the government to give priority to increase milk production. Local raw milk collection has become a very competitive mainly due to the expensive imported SMP. On the other hand, there is lucrative market with ever increasing demand for processed milk and milk products. By this, it can be deduced that investment in milk processing plants is financially viable but only with the assurance of raw milk availability.

### **5.3.6 Nature and Mechanism of Coordination**

The nature and mechanism of coordination including information and knowledge sharing across various sectors in the chain is primarily vertical among the concerned units. DDC has its own mechanism for information flow from MPCCS to milk processing plants and then to the central level. Private dairies have also their own vertical mechanism. Regular information required to pass up-ward from the field level goes through the MPCCS to MCC to milk processing plants; and back from milk processing plants to MPCCS through MCC. But in some exceptional cases such as disputes about the price of milk, the farmers/MPCCS come directly to the milk processing plants or even at the central level. There is no horizontal relationship between the DDC and NDA. Similar is the case with the CDCAN, which has no formal linkage with either DDC or NDA. As such, there is absence of formal information flow between these three major actors and their lower level units. However, informal information sharing at the field level among these actors is generally common which has enabled the DDC and private dairies to be informed about each others field level happenings.

NDDDB is mandated by its Act to coordinate the dairy development activities and actors involved in it, but its role in this regard has not been effective so far. Although the EC of NDDDB is comprised of members from NDA, CDCAN and DDC, it meets rarely and that also for taking decisions needed for its daily operation. When some serious differences occurs among the DDC, CDCAN and NDA regarding price and quality of milk, NDDDB organizes meetings (mostly as directed by MoAC) of the related stakeholders to settle down the differences, such meetings are occasional and only for some specific issues. Otherwise, NDDDB has not been able to establish a formal coordination mechanism at the operational level so as to regularly discuss and develop common strategies for dairy development by involving the major actors in the dairy value chain.

### **5.3.7 Regulatory Facilitators and Impediments**

There exists various Acts and regulations to regulate the dairy sector. These are Food Act 2023 (1967) Food Regulation 2027 (1971); Cooperative Act 2048 (1992) and Cooperative Regulation 2049 (1993); National Cooperative Development Board Act 2049 (1993), and Industrial Enterprises Act, 1992.

The Food Act prohibits the production and sales of adulterated and sub-standard food and misinterpretation of food quality. The Act covers minimum standard of raw cow and buffalo milk, pasteurized milk and some other milk products such as ghee, butter, cream, yoghurt, evaporated milk and skim milk, sweetened and skim sweetened condensed milk and infant milk food. Although the dairy industries also produce other

major products such as cheese, ice-cream, *paneer*, and traditional type sweets, these are out of scope of the Act. The Act fails to provide substantial penalizing measures for adulteration, misbranding and mislabeling of food commodities including dairy products. The Act does not adequately address the imported food items.

DFTQC is the main implementing agency of the Act. The Act requires that the dairy industries should get license from the DFTQC to operate, and need annual renewal of the license. Since the Act has very large scope, its implementation needs very institutionally strong and capable DFTQC. But due to lack of enough resources, weak institutional capability, lack of well equipped food laboratories etc., the DFTQC has not been able to effectively administer the Act. The implementation part of food Act is thus so-so resulting in uncertain quality of milk and milk products. Moreover, due to the lack of strong penalizing system, the miscreants are encouraged to be involved dishonest trading of milk and milk products. This has created an unfavorable situation to the genuine and honest dairy entrepreneurs.

The Cooperative Act has provisions of the formation and operation of various level (primary, association, and federation level) cooperative institutions. The cooperatives formed under the Act are needed to register in DoC which is mandated for regulatory activities of the cooperatives and the Registrar of DoC is the main authority to implement the Act. The Act provides that the cooperatives are not needed to pay any local taxes on their transactions; full or partial exemption of taxes and duties on imported machinery and equipment, raw materials and transportation vehicles; full or partial exemption of excise duty on the products produced by the cooperatives; and other facilities for the cooperative industries as provided by related prevailing Acts.

The Act anticipates regular monitoring and strengthening of the cooperatives. However, implementation of the Act is very weak in monitoring the MPCs, and therefore not all MPCs are working as cooperatives institution in real sense. Some of them are even operating as contractors running under informal contract. More of it is also because many farmers are not aware of cooperative principles and operation mainly either due to lack of awareness programs by the related dairy industries or due to indifference of farmers towards cooperative. This has retarded the MPCs from being financially and managerially strengthened institutions.

The NCDB Act is promulgated with the objective of formulating the national policy and planning for the promotion and development of cooperatives. The act has also the provision of Cooperative Development Fund for which the resources are provided by the Board.

There is absence of coordination between the NCDB that has promotional functions and DoC that has regulatory functions. Since these two roles are not essentially different and needs to be done by separate institutions, there are ambiguities in works of DoC and NCDB.

Industrial Enterprises Act has categorized dairy industries as agro and forest based industry. The Act emphasizes for fostering industrial enterprises in a competitive manner. Prior to establishing an industry, the act requires an application for the registration of proposed industry at Department of Industries or Department of Small and Cottage Industries depending on the category of the industry. For dairy industries, the Act provides no income tax in excess of 20 per cent on the derived income. Industries using 80 per cent or more of local raw materials can also claim for a rebate of 10 per cent in income tax. This is mostly applicable to the dairy industries as many of them fully use local raw milk to produce their products. In addition, the Act has also a provision of 50 per cent rebate on income tax for dairy industry for 10 years from its date of commencement by being categorized as national priority industry. Similarly, dairy industry located on specific location as classified by the Act also receive some additional rebate in income tax and excise duty for the same period.

### **5.3.8 Socio-Cultural and Political Dynamics**

Nepal is a multi-ethnic nation with diverse languages, religious and cultural traditions. More than 100 ethnical/caste groups are prevailing with their distinct languages and cultures in Nepal. Agriculture is the main stay of more than 65 per cent people of the country. Dairy livestock being a subsidiary of crop farming, it is commonly raised in the farms of people regardless of ethnicity. Additionally, milk and its products particularly yoghurt and ghee has both religious and cultural value in the Nepalese society.

However, the social exclusion of some of the so called scheduled and untouchable castes in the dairy cooperatives in rural areas has been still found as one of the constraints in value creation. Milk produced by the scheduled and untouchable castes in the rural areas has not yet been bought by some of the dairy cooperatives of the country. A study<sup>11</sup> has revealed that traditional thinking of untouchable castes concept was still prevailing in the society, untouchable and scheduled castes were kept aside from the cooperative members, milk and milk products from the scheduled castes were not allowed to bring in the dairy cooperatives and local markets, default thinking of higher castes as non-sanitary and unhygienic milk and milk products production by the

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<sup>11</sup> Social Inclusion: A Driving Force for Dairy Sector Development in Nepal: Soma Kumari, Lok Nath Poudel and Matthias Gauzy,

scheduled and so-called untouchable castes of the society, and lack of proper care on the personal hygiene of the marginalized people of the society. This problem is mostly common in particularly in the hilly areas of mid and far western development regions.

Nepalese society mostly being the patriarchal, role of women is given less importance in decision making and pecuniary matters. In the livestock sector, another study<sup>12</sup> has found that men's participation is higher in larger animals, which are perceived as the prestigious animals in the society; women are involved in most of the difficult but non-cashable farm activities like forage collection and transportation, cleaning the gutter and sheds and feeding animals whereas men are involved in relatively easier and attractive tasks of the livestock activities such as milking animals and selling of milk; women have less chances for trainings, seminars and observation tours; and participation of women in livestock programs launched by public organisations is still very low in Nepal.

Thus, the socio-cultural power relationship is still elite and higher-caste dominated in terms of ethnic consideration and male dominated in terms of gender consideration with ultimate repercussion of limited influence of these sections of society in the value creation in the chain.

From the political perspective, although the power relationship has no direct effect in the creation of the value chain, it has immense effect in influencing the dairy cooperatives. Since the farmers are also the voters, each and every political party wants as much farmers as possible to follow their political ideology and support the party line. Many of the officials of dairy cooperatives are active workers or even post holders of one or another political party. There are evidences of splitting of MPCs members based on the political lines and formation of another MPCs in the vicinity. Elections of the dairy cooperatives are mostly contested on the political basis. Let us just say "milk is not only the commercial commodity but has also become the political commodity."

## **VI. ASSESSMENT OF THE ROLE OF SMALL FARMERS, MIDDLEMAN AND PROCESSORS RELATED TO DIFFERENT MARKETING CHANNELS**

### **6.1 Role of Small Farmers**

The small farmers involved in milk production are engaged both in the formal and informal milk marketing channels. In the formal sector they have either organized

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<sup>12</sup> Gender Aspects in Livestock Farming: Pertinent Issues for Sustainable Livestock Development in Nepal: Lok Nath Paudel, U ter Meulen, C Wollny, H Dahal and M Gauly.

MPCS and carry out their milk marketing activities through it, or deliver their milk production through the middleman acting as contractor between them and the milk processing plants. By organizing the MPCS, the farmers aim to reduce high transaction costs for individual smallholder producers through collective action.

In the informal sector also either the farmers themselves market their milk directly to the consumers, tea shops, and restaurants, or channel their milk through the middleman who ultimately deliver it to the consumers, tea shops, and restaurants. In all the cases, the farmers' marketing activity is restricted to liquid milk marketing. Even though some of the MPCS are also involved in producing milk products and sell them in the local markets through their own production points, this practice is very limited. This is so because of the financial as well as technical constraints. The role of small farmers is thus to produce milk and market it through either MPCS or middlemen or by themselves.

## **6.2 Middlemen**

The middlemen are informal and they could be milk traders or contractors or farmers themselves. They are active in collecting raw milk from the farmers and transport it particularly to the MCCs or processing plants of the private dairies. They are also involved in collecting and transporting milk to the sweet shops, restaurants and tea shops. The middlemen are mostly active in the surrounding rural areas of the major urban centers because of easy transportation facility but not in the distant rural where there is lack of transportation facility or transportation is difficult. The transaction by middlemen is based on the price negotiation. The role of middlemen is thus limited to milk collection and transportation to the milk MCCs/processing plants.

## **6.3 Processors**

The milk processors are the main actors to mobilize various channels of milk and milk products marketing. They act as a bridge between the producers and consumers. They create different channels for milk collection from the farmers in the rural areas and for selling milk and milk products in the urban areas. In the rural areas, they form MPCS or channelize middlemen/farmers for milk collection and transportation. In the urban areas they manage milk booths to sell processed milk. They either set-up own sales centers or create franchise shops to market milk products to the urban consumers. Moreover, they also channelize the products to the retail shops through arranging dealers. Due to increasing popularity of supermarkets/department stores, the processors have also started to market their products through these sales outlets. Thus the processors

mobilize both the formal and informal sales outlet to channelize the milk and milk products to the urban consumers.

Accordingly, milk processing plants are the focal and play the crucial role in relation to different marketing channels for milk and milk products. They put a lot of efforts in creating and managing these marketing channels. Due to fierce competition for milk collection, the big milk processors have now started to adopt various measures to attract farmers towards them. These include arrangement of credit facility for purchasing dairy animals through financial institutions, veterinary health care and breeding services; support for fodder production through seed distribution and technical services; distribution of smaller milk chilling units with automatic milk analyzing system; trainings and exposure visits to the farmers. Through providing these services, the processors are making efforts to tie-up the farmers with them for assured milk supply.

Similarly, in the sales and distribution front also the processors have been involved in motivating the operators of sales outlets to increase the sale of their products. The motivating measures include higher sales commissions on the products, and provision of other hardware support such as refrigerators, freezers and counter coolers. However, such measures are adopted only by the big processors mainly due to the requirement of enough financial resources.

But, unfortunately, the processors have not been much serious in motivating the general consumers who are the ultimate destination of their products. Except for occasional advertisements in the print media and audio-visuals through radio and televisions by some, most of the processors are indifferent towards implementing such customer-oriented programs as awareness campaign, product promotion, product presentation (packaging, selling methods etc.) to attract the customers.

## **VII. ASSESSMENT OF THE CONTRIBUTION OF DAIRY DEVELOPMENT TOWARDS FOOD SECURITY**

The International Fund for Agricultural Development concisely defines household food security as “the capacity of a household to procure a stable and sustainable basket of adequate food.” The World Food Summit in 1996 has defined food security as “the situation when all people at all times have access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.” Since then several definitions have been put forward by different organizations but common to most definitions of food security are the elements of availability, access, stability, and utilization.

In Nepal, majority of the population resides in the rural areas with about 65 per cent still dependent on agriculture for their livelihood. However, the current status of the crop productivity of large sectors of the rural population is exceedingly poor. Agriculture being subsistent in nature, crop yield is low and family labor is not fully employed. No major improvement in crop productivity has been achieved though it has been in priority in all-national budget due to constraints in infrastructural support and capacities to make appropriate investment. In addition, the distribution of land is such that the number of small and/or marginal farmers and landless dominate the scene and the resources of this class of people are very meager and much of the household is heavily indebted.

At this backdrop, the dairy sector has been playing a major role in order to ensure social justice amongst the rural poor by providing off farm opportunities for increased employment and income generation. Dairy sector is directly contributing food security to the large number of population as part of their milk production is consumed within the farm households in the form of milk and milk products which encompass both elements of availability and access to food. The dairy sector is also contributing to the stability of food security of rural households because dairy animals form an integral part of crop-livestock integrated form of agriculture systems, in which they provide a steady stream of food and revenues for households, they can be used as collateral for credit, sold for emergency cash needs arising due to an injury or illness of productive family members, they also provide draught power, fertilizer and pest control, contributing to total farm productivity and hence to food security. The final element of utilization is materialized through production and consumption of milk-based foods which is a common practice in the Nepalese farm households.

Apart from the above direct contribution to food security, the dairy sector has been the major source of income generation contributing indirectly to food security in the rural areas. According to the available information, in fiscal year 2008/09 there were about 100,000 farmers of the rural areas directly involved in supplying milk to DDC and they were paid about NRs. 1,296 million (around 57 percent of the total DDC expenditure) for their milk. In this manner, the DDC has paid about NRs. 3.55 million per day on average to the rural areas of the country. Although the exact figures about the farmers involved in supplying milk to the private sector dairies as well as the amount paid by these dairies is not available, based on their share in milk collection, it is estimated that about NRs. 3,200 million is paid to the farmers by them to the rural milk producers in the same fiscal year.

Accordingly, the dairy development activities have been one of the major means to regularly channeling a large amount of urban money to the rural areas significantly

contributing to total farm productivity and hence to food security and improve the living standards of the rural poor.

## VIII. SUGGESTIONS

### 8.1 Strategic Measures for Reducing Dependence on Import of Milk

The key medium/long term strategic measures/priorities to reduce dependence on imported milk are to: increase milk production and productivity of the dairy animals, and expansion of milk collection networks.

#### 8.1.1 Increase Milk Production and Productivity

Presently, the main problem faced by the dairy processors is the shortage of local raw milk. Increase in milk production and productivity has become urgent. For this, more concerted efforts are required in the areas of fodder development, and animal health and breeding services.

**Feed and Fodder:** Fodder scarcity resulting in malnutrition or even starvation is the biggest hurdle for increasing milk production in Nepal. The shortage of fodder is the most critical aspect of livestock production which also has a serious effect on the country's entire agricultural and eco-system as well. The hill areas, which contain major milk shed areas due to larger concentration of animals, have the most pronounced fodder deficit. On the other hand, the two main areas of off- farm fodder supply – the forest and rangeland – are both declining in area and productivity. Poor nutrition makes animals much more susceptible to diseases and causes considerable wastages through sickness and even death. Consequently, excess dependency of farmers on the grain based expensive concentrate feed rather than fodder grasses for maintaining dairy animals has become a compulsion resulting in higher cost of milk production. Fodder based milk production could considerably decrease the cost of milk production. Therefore, intensive programs for improving fodder resource base should be launched to increase fodder resources to levels that are sufficient for the nutritional needs of the animal population without adversely affecting the environment. For this, the followings are the potential means:

- Investigate and assess fodder situation in different agro-ecological zones to better understand fodder production, management and utilization practices to identify constraints and opportunities facing fodder development;

- Promotion of community fodder development programs to plant fodder trees in village waste lands, and at individual level on fruit-orchards, and around farmsteads to be used on a “cut-and-carry” basis;
- Emphasize promoting the use of native fodder trees and expand farmer operated nurseries to propagate locally preferred fodder species for distribution to other farmers;
- Integration of the planting of fodder trees in the community forests managed by forest user groups;
- Encourage private sector in fodder research activities and foster collaboration with international research organizations;
- Upgrade the skills of fodder extension workers through regular in-service trainings; and
- Use crop residues from more intensive crop production to decrease the pressure on fodder resource bases.

***Animal Health:*** Good animal health is an essential prerequisite to any improvement in livestock production. The overriding problem is the limited capacity of the DLS to fund them at a level sufficient to achieve any meaningful results. DLS’s limited financial resource is thinly spread over the entire country. At present, the animal health services are inadequate to meet the requirements of the country’s massive livestock population. DLS provide nationwide general livestock services and its limited resources are diluted to the total livestock development programs. There is an urgent need to extend dairy animal health services to the village level through means that do not totally rely on the GoN budget for continued operation. As such, the potential measures to improve animal health are as follows:

- Encourage private veterinarian/para-veterinarians to provide animal health services in the rural areas by providing easy-term credit facility (without collateral and low rate of interest) to procure the initial stocks of drugs, vaccines and other essential equipment;
- Strengthen quarantine services to protect animals from the risk of imported diseases,
- Adopt preventive animal health treatment programs to protect animals from epidemic diseases;
- Implement quality assurance system for locally produced biological products used for animal health protection and treatment;
- Strengthen disease diagnostic capability of the laboratories through making them well-equipped; and

- Upgrade skills of the animal health workers through providing commercial veterinary training under fellowship programs.

**Breeding Services:** In Nepal, rural milk producers have adapted indigenous breeds of livestock over the centuries to the limitations of environmental and feeding regimes which exist in the country. The cross-breeding of local animals with higher producing species has been beneficial only to the lesser extent because of the shortage of adequate feeding and lack of improved feeding practices. Breed improvement through cross-breeding has frequently been regarded as a means of increasing animal productivity, but it does not provide a quick solution to animal production problems when delivered in isolation and without supporting animal health and feeding. The artificial insemination (AI) services through using locally produced as well as imported semen is though successful in some locality, this service has been limited to accessible areas and is constrained by trained operators and unreliable liquid nitrogen supplies. At this backdrop, the followings are some potential measures to improve breeding services:

- Preservation of the genetic characteristics of local breeds where these have particular attributes of value, and development of their special characteristics through within-breed selection program;
- Encourage cross-breeding as a means of improving productivity but only in conjunction with supporting adequate feeding arrangement and animal health services;
- Ensure availability of improved breeding stock and extend availability of AI services particularly in high milk production areas along with other support services;
- Extend breeding services in the potential milk production areas;
- Implement contract breeding services wherever practical by entering into contract with farmers, breeders and private entrepreneurs;
- Upgrade skills of AI service providers, and
- Make farmers aware about the effects of in-breeding and breeding with bulls of unknown genetic quality which results in degenerated genetic quality of dairy animals.

Some people including the private dairy entrepreneurs argue that export restriction of dairy animals by India to Nepal has halted the growth of milk production in the milk shed areas and lifting the restriction would result in free flow of animals contributing to increased milk production. But, as reported by Economic Times, India itself is facing the shortage of dairy animals as the farmers increasingly preferring to rear livestock for meat, lured by lucrative prices and a friendly government policy. It has further reported

that farmers selling milk have gained little due to the surge in fodder prices (Annex 8). Similarly, in another issue Economic Times has reported that India is in the verge of importing SMP and BO to address the rising shortage of milk and milk products (Annex 9). This indicates the difficulties to bring dairy animals from India. As such, Nepal has to make its own efforts for increasing milk production from the existing stocks with better animal health services, feeding and breeding.

### **8.1.2 Expansion of Milk Collection Networks**

Presently, formal milk collection networks covers only about 10 per cent of milk produced in the country. Milk collection is mostly concentrated in the Central region followed by Eastern region and then by Western region. Of the total DDC's milk collection, about 70 per cent is collected from the Central region. Similar is the case with the private dairies. DDC and private dairies intensely compete for milk collection in this region. This is mainly because most of the dairies are operating in Kathmandu valley which is the major market for milk and milk products. Very small portion of milk produced in the Mid-western region is collected by DDC and some private dairies. Major parts of the Mid-western the entire Far-western region do not have access to the formal milk marketing.

Presently, apart from the milk production, availability of transportation is another driving force to milk collection. The road network in the country is increasing at the rate of 200 Km per year and the analysis of the relation between the added road length and milk offered by the farmers has shown that every addition of one km of road can be expected to add nearly 39 mt of milk offered by the farmers for the reason that once a road is linked to a new area, surplus milk at the household levels will try to find its way in the formal channel (C. Pokherel *et al*). Addition of one km road length will connect about 30 farmers in the milk supply system with an average supply of 3.4 liters/day by a farmer (NDDDB). The road network during 10<sup>th</sup> plan period (2002-2007) has increased by an average of 400 km annually.

Moreover, presently almost entire milk is collected only in the morning. Evening milk is not collected because the farmers do not have the habit of milking early in the evening as well as absence of milk chilling facility at the MPCS.

In view of the above, there is big potentiality of expansion of milk collection networks in the new areas. Both the DDC and private dairies should therefore expand their milk collection networks in the accessible areas instead of competing in the same areas. This will not only enable them to collect more milk but will also create income and employment opportunities in larger scale to the people, particularly the small and

marginal ones, through improved livestock keeping for milk production. Further, milk collection in the evening should also be introduced which could increase milk intake in the processing plants. Since there is transportation accessibility in many MPCSSs now and the MPCSSs have also started to install smaller chilling units, milk collection in the evening could be started by providing some additional incentives to the farmers/MPCSS.

## **8.2 Price and Non-price Measures**

The major price and non-price immediate measures for improving the dairy sector are: implementation of DDP and CoP, implementation of appropriate milk pricing mechanism, quality improvement, product diversification, manpower development, improving cheese production, domestic market promotion, and institutional capacity building.

### **8.2.1 Implementation of DDP and CoP**

First of all, the DDP and CoP should be effectively implemented. As mentioned above, the DDP covers all aspects of dairy development and it has also defined the role of various agencies. Similarly, the CoP has various provisions for improvement of quality of milk and milk products from farm level to the sales and distribution level. DDP has not come into effect due to the absence of its working procedures prepared and submitted by NDDDB for approval by MoAC. It is stuck in MoAC since a long time. NDDDB has not taken any initiation to get it approved nor has MoAC taken any action towards this. Similarly, CoP is not implemented mainly because of the inactiveness of NDDDB, which is the coordinator of the committee responsible for implementing and monitoring the CoP. Effective implementation of these policies and practices is expected to considerably improve the overall dairy sector. NDDDB needs to be more active in this regard.

### **8.2.2 Implementation of Appropriate Pricing Mechanism**

Pricing policy is one of the major determinants of the development of dairy industry. The major drawback of the present pricing of raw milk is that it does not have provisions of price differentiation by quality of raw milk, consideration of cost of milk production, and price inflation. The raw milk pricing is based only on fat and SNF content which has created chances of adulteration in milk. Similarly, pricing of pasteurized milk is based on the DDC's cost of milk processing and the same price is applied throughout the country.

Therefore, payment of raw milk should be related to quality, cost of milk production and price index of other associated materials. Quality based premium and penalty pricing system for raw milk should be effectively implemented. Similarly, pricing of processed milk should be based on the milk processing cost of the dairy industry as a whole. DDC, CDCAN and NDA should take initiation for adopting the quality based raw milk price. NDDDB should be regularly involved in monitoring the price of milk and milk products in different parts of the country and disseminate the price information to the farmers as well as general consumers.

### **8.2.3 Quality Improvement**

In this new millennium, quality philosophy is considered as password to the market. Quality, as in other products, is considered as an indispensable attributes of the milk and milk products too. Various reports have concluded that the quality of milk and milk products in Nepal is very poor. There is lack of standards, lack of quality focused pricing system for raw milk and lack of quality monitoring at all levels. Very high priority for quality improvement with the implementation of necessary tools and mechanism is imperative to secure a sustainable development of dairy industry. Without quality improvements, chances of growth of dairy industry are slim and the possibility of developing export-oriented dairy products will be nil.

During the past years, very little improvement has occurred in the quality of raw milk and milk products. On the other hand, after entering into World Trade Organization (WTO) and South Asian Free Trade Agreement (SAFTA), the Nepalese dairy industry will be more exposed to the international market and the likely scenario is that other countries can produce high quality milk with lower costs. Thus, after entering into the WTO, Nepal has to face a strong challenge by the imported dairy products and the Nepalese dairy industry will be impacted enormously. Because, WTO will reduce non-tariff trade barriers, producer support programs and export subsidies, all of which distort the world market for dairy products. As the barriers are removed, countries with cost advantage together with high quality milk production will gain the market share while high cost and low milk quality countries will lose their market share. As such, Nepal needs to make great efforts to enhance the quality of its raw milk as well as milk products along with being price competitive. Otherwise, the dumping of cheaper dairy products will be a very likely scenario.

In order to improve the quality of raw milk also, premium and penalty pricing system should be introduced, and possibility should be explored to introduce protein and fat based milk pricing system instead of present fat and SNF based system so as to discourage adulteration. Evening milk collection would also improve the quality of raw

milk. The standard of the dairy products presently covered by the Food Act should be revised and standard for other dairy products which are out of scope of the present Food Act should be fixed with a goal of reaching the international standards as quickly as possible. Milk products should be graded based on the quality standards. Strict quality control measures should be applied in raw milk production and collection, processing, production and distribution of market milk and milk products. The CoP should be effectively implemented. The standards should be legalized and continuously monitored. Legal actions should be taken against those not meeting the standards. DFTQC should be more active for overall quality improvement. However, the role of NDDB, DDC, CDCAN and NDA are much important in implementing and monitoring the quality improvement programs.

#### **8.2.4 Product Diversification**

Even though product diversification is one of the major options for increasing the quantity of milk going through the formal sector, product diversification of dairy products in Nepal is not well developed. About 80 per cent of the processed milk in Nepal is sold as pasteurized milk leaving only a marginal quantity for being converted into other milk products. Nepalese dairy industry can be very much benefited through product diversification in terms of improving the overall operational profit by utilizing additional milk, and substituting imported dairy products, opening export possibility in longer term, and improving the overall sustainability of the sector.

However, production diversification in the dairy sector is limited mainly due to low quality raw milk, lack of qualified technical staff for product development, lack of assessment of market potentiality of different products, and reluctant private sector to introduce new products owing to risk.

So as to achieve the objective of product diversification the measures to be adopted include improvement of raw milk quality, training for fulfilling the need of skilled manpower, market assessment of the potential products, transfer of technology from the developed countries, encouragement to the private sector for carrying out research and product development projects with technical collaboration, and dissemination of information on product demand, supply and prices. For this, joint efforts of NDDB, DDC and private dairy entrepreneurs are sought.

#### **8.2.5 Manpower Development**

The Nepalese dairy industry severely lacks skilled manpower as well as organized and recognized education for the sector. Dairy processing is a complex task and it needs

specialized manpower like dairy technologists, and dairy industry operators with medium level education in milk handling, processing, hygiene, equipment operation, product manufacturing, quality control and equipment maintenance. In addition, professionals in management, finance and marketing are also equally required. But very few existing dairies in Nepal have trained manpower for running these operations. Most of the qualified and trained manpower is with the DDC but in decreasing number. Because of the lack of qualified manpower for the dairy industry, the obvious effects have been observed in low quality of products and lack of product diversification.

The middle and lower level technicians should be provided with adequate training within the national institutes. Similarly, staff in management, finance and marketing should be trained in the national institutes, and qualified manpower in these faculties should be hired through competition from among the fresh graduates. Scholarship in India or abroad should be arranged for the higher-level manpower like B.Sc. and M. Sc. in Dairy Technology. NDDB could make arrangement with NDDB India/National Dairy Research Institute, India for short term tailor-made training courses and degree programs. Income tax of the dairy industries should be exempted on the amount incurred for training of manpower.

### **8.2.6 Improving Cheese Production**

Presently, cheese production, particularly Yak cheese, has remained the most neglected area of the dairy sector in terms of promotional activities and incentives to the farmers. The *nak/chaury* milk producers, by being located in the difficult terrains of high mountain regions far away from the service delivery points, are neglected in almost all aspects of clean milk production, livestock management, animal health, feeding, breeding and pasture production. The cheese making is also hampered due to its lesser attraction to the local youths than being trekking and mountaineering porters. Similarly, production and marketing of cheese also face difficulty in terms of quality, storing, transportation and sales.

Since the Yak cheese is a specialty product of Nepal, it should be preserved and promoted by every means. More emphasis should be placed for providing services in such aspects as clean milk production, better livestock management, nutritional feeding, improved breeding, and high quality pasture production and management. Moreover, the cheese producers should be thoroughly imparted with the technical know-how of cheese production. Due to the robust demand for Yak cheese, the market can probably support a considerable increasing in cheese price, especially if more attractive product packaging is developed. This would allow paying the higher prices of milk to the *Yak/nak/chaury* herders, which may be contributing to retain them in the business. DLS

is needed to provide the support services whereas NDDDB is required to support for the technical aspects of cheese production.

### **8.2.7 Domestic Market Promotion**

Overall milk and modern dairy product consumption in the urban areas of Nepal is low mainly because milk being primarily used for tea and traditional food habit does not include modern dairy products. Per capita milk consumption is estimated at 139 gm/day which is lower than in India with 229 gm/day and much lower than the world average with 285 gm/day (Vaisya). Moreover, high prices of milk and milk products have also restricted common Nepali people to consume these products.

The measures to promote domestic market should include launching of a massive generic advertisement program regarding advantages of milk and milk products so as to increase awareness on the usage of good quality milk and milk products, targeting milk consumption for schoolchildren, campaigning to vulnerable groups through health programs, quality improvement, emphasizing product development including packaging. Efforts should be made for keeping the price of milk and milk products within the reach of general consumers. NDDDB, DDC, CDCAN and NDA should contribute for the advertisement funds.

### **8.2.8 Establishment and Management of Database**

Reliable updated data and information are vital for the development of the dairy sector. Reliable past and present data and information are crucial to make better prediction about the future because only such dependable forecast enhances future decisions about requirement of resources for area expansion, investment, manpower and marketing. Presently, a big data gap exists in almost all aspects of dairy activities.

Although different activities in wider scale are executed by different agencies, none of them have so far been found serious about the importance of information. Establishment of a database along with mechanism of regular data supply, data analysis and dissemination to the related agencies/persons is felt urgent. NMTPF may help to establish the database at NDDDB. DDC, CDCAN, NDA and other relevant institutions such as DLS, DFTQC, DoC should collaborate to furnish required data, and NDDDB should collect and analyze the data and disseminate the results of analyses.

### **8.2.9 Institutional Capacity Building**

Many of the institutions directly involved in the dairy sector are institutionally weak. The prominent institution NDDB is weak both in terms of financial resources and technical capability. Dairy cooperatives as well as NDA are no exception to this. They are both resource constrained and technically very weak. Despite of the significant importance of the dairy cooperatives and NDA in the dairy development, efforts have not been made to strengthen them financially, technically and managerially. Over politicization is another problem with the dairy cooperatives as they are more politically-oriented rather than being developed as professional institutions. Establishment of a sound resource base for these institutions is very much essential. Similarly, these are also needed to be technically strengthened. NMTPF may help them to establish a sustainable resource base by exploring the possibilities and suggesting appropriate one.

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# **Annexes**

### Details about Milk Cooperatives

District	Zone	Milk Production (mt)	Coops. (No.)	Members (No)	
				Male	Female
Arghakhanchi	Lumbini	18,630	1	48	4
Baglung	Dhaulagiri	25,210	14	706	176
Baitadi	Mahakali	18,323	2	33	20
Banke	Bheri	18,841	7	746	89
Bara	Narayani	17,350	13	856	176
Bardia	Bheri	26,746	17	668	219
Bhaktapur	Bagmati	9,296	37	770	204
Chitawan	Narayani	34,362	122	8,533	3,584
Dadeldhura	Mahakali	16,111	10	246	227
Dailekh	Bheri	12,304	2	33	20
Dang	Rapti	26,825	17	819	223
Dhading	Bagmati	28,302	24	915	140
Dhankuta	Kosi	10,371	32	311	1,113
Dhanusha	Janakpur	17,205	2	49	10
Dolakha	Janakpur	13,134	7	125	72
Gorkha	Gandaki	17,905	19	388	742
Ilam	Mechi	27,637	108	5,849	4,127
Jhapa	Mechi	53,978	23	1,017	416
Jumla	Karnali	1,592	1	24	5
Kanchanpur	Mahakali	29,528	3	57	9
Kapilvastu	Lumbini	23,700	18	609	205
Kaski	Gandaki	37,378	28	1,735	367
Kathmandu	Bagmati	13,556	35	1,146	62
Kavre	Bagmati	72,100	267	7,218	1,223
Lalitpur	Bagmati	10,540	52	1,470	1,298
Lamjung	Gandaki	12,862	7	287	224
Mahottari	Janakpur	20,365	5	205	346
Makawanpur	Narayani	30,562	56	4,322	783
Morang	Kosi	39,818	28	2,507	598
Myagdi	Dhaulagiri	10,057	1	38	57

Nawalparasi	Lumbini	28,853	28	2,084	402
Nuwakot	Bagmati	26,102	15	385	66
Palpa	Lumbini	23,287	19	1,101	422
Panchthar	Mechi	16,312	10	333	233
Parbat	Dhaulagiri	13,656	14	419	43
Parsa	Narayani	22,586	2	49	12
Pyuthan	Rapti	12,607	2	56	48
Ramechhap	Janakpur	16,382	1	22	10
Rasuwa	Bagmati	4,619	2	27	23
Rautahat	Narayani	17,228	51	1,864	279
Rukum	Rapti	9,101	2	58	1
Rupandehi	Lumbini	25,986	69	3,850	1,636
Saptari	Sagarmatha	27,181	14	319	113
Sarlahi	Janakpur	20,953	146	4,817	428
Sayngja	Gandaki	45,705	40	1,832	425
Sindhuli	Janakpur	16,749	6	405	221
Sindhupalchok	Bagmati	16,036	136	4,530	677
Siraha	Sagarmatha	24,010	4	56	25
Sunsari	Kosi	29,985	12	1,212	563
Surkhet	Bheri	13,996	22	680	329
Tanahu	Gandaki	28,784	26	2,294	3,610
Terathum	Kosi	18,180	16	288	383
Udaypur	Sagarmatha	18,443	8	152	47
<b>Total</b>		<b>1,171,329</b>	<b>1,603</b>	<b>68,563</b>	<b>26,735</b>

Source: deoc.gov.np (April 2009) for cooperative data and MoAC (2008) for milk production data.

## DDC's MSS

MSS	Milk products
Kathmandu MSS	Pasteurized standard and whole milk, butter, ghee and flavored milk.
Biratnagar MSS	Pasteurized standard and whole milk, skim milk powder (SMP), butter, ghee, yoghurt, ice cream, <i>paneer</i> .
Hetauda MSS	Pasteurized standard and whole milk, flavored milk, butter, ghee, yoghurt, ice cream, <i>paneer</i> , <i>lal mohan</i> and <i>peda</i> .
Lumbini MSS	Pasteurized standard and whole milk, ghee, yoghurt, <i>rasbari</i> .
Janakpur MSS	Pasteurized standard and whole milk and yoghurt.
Mid-western MSS	The Mid-western MSS is currently running as a chilling center with the arrangements being made to convert it to a processing plant.

Source: Central Office, DDC

## Cheese Factories under MPPSS and their Products

District	Production Center	Milk Products
Dolakha	Chordung	Yak cheese and butter
Dolakha	Chankhu	Yak cheese and butter
Ilam	Pasupatinagar	Cow cheese and butter
Ilam	Rakse	Cow cheese and butter
Ilam	Maipokhari	Cow cheese and butter
Ilam	Naya Bazar	Cow cheese and butter
Kathmandu	Lainchour	Yoghurt and Ice cream
Kavrepalanchok	Nagarkot	Mozzarella cheese, <i>paneer</i> and <i>rasbari</i>
Kavrepalanchok	Bhimkhori Pauwa	Mozzarella cheese
Nuwakot	Chipa Bhanjyang	Mozzarella cheese and <i>paneer</i>
Nuwakot	Trishuli	Mozzarella cheese and <i>paneer</i>
Panchthar	Ranke	Cow cheese and butter
Ramechhap	Thodung	Yak cheese and butter
Rasuwa	Gosainkunda	Yak cheese and butter
Rasuwa	Langtang	Yak cheese and butter
Rasuwa	Gatlang	Yak cheese and butter
Solukhumbu	Pike	Yak cheese and butter

Source: MPPSS, DDC

### Category of Private Dairies in Nepal

<b>S. N.</b>	<b>Type of Industry</b>	<b>Daily Processing Capacity</b>	<b>Number</b>
1.	Large	Above 30,000 liters/day	3
2.	Medium	10,000 liters – 30,000 liters/day	6
3.	Small	1,000 liters- 10,000 liters/day	26
4.	Cottage	Below 1,000 liters/day	215
	<b>Total</b>		<b>250</b>

Source: Expansion of KMSS, EMESS Consultancy Services, Kolkata, 2009.

## **Code of Practice for Dairy Industries**

The “Code of Practice (CoP) for Dairy Industry” was approved by the GoN in 2061 (2005). The Code was prepared by NDDB in participation with the related government institutions and private institutions/associations/individuals involved in dairy enterprise/business. The main objectives of the Code are to improve quality of processed milk and milk products, monitor/supervise the quality of milk and milk products by considering consumers’ health, and secure sustaining long future of the dairy industry.

The key actors as per the CoP are milk producer farmers, milk collectors (cooperatives)/chillers, milk processors (dairy industries) and distributors. The CoP has elaborated the functions these actors.

The prescribed procedures for milk producer farmers to produce clean/fresh milk include:

- The milking cow/buffaloes as well as the milking individual should be healthy and the milking individual should be more attentive in his/her sanitation prior to milking the animals;
- The cow/buffalo sheds should be clean with appropriate arrangement of animal waste management and surroundings of the sheds should be free from fly, mosquitoes and other insects;
- Milking place should be clean;
- Prior to milking, cow/buffaloes should be properly cleaned and their udder and teats should be washed by clean water and wiped by a clean cloth;
- The milking vessel should be made of stainless steel or aluminum;
- Prior to and after milking the milking vessel should be washed by hot water and detergent and kept upside down in dust free place;
- Adulterated, quality deteriorated, spoiled tasted and coagulated milk should not be delivered in collection center/MCC/milk processing plant;
- After milking, milk should be transported to collection center/MCC/milk processing plant as quickly as possible; and
- Milk from the animal being treated by anti-biotic should not be sold.

Similarly, for the milk cooperatives/MCCs, the CoP has prescribed the following practices:

- Stainless steel/aluminum milk cans should be used for collecting milk;
- Milk brought in narrow neck vessels (which can not be cleaned inside by hand) should not be accepted;
- Milk from sick animals or animals being treated by anti-biotic should not be accepted;
- Nothing should be mixed in milk and milk contaminated with any foreign materials should not be accepted;
- Milk collection should be done at fixed time in the morning and evening;
- Milk collection center should be in such place which is convenient to all the milk producer farmers and has sufficient water to clean milk cans; and if possible has electricity facility;
- After collection, milk should be transported to the MCC/processing plant as quickly as possible, otherwise milk should be boiled and kept cool;
- At MCC milk should be cooled at 4<sup>0</sup> C; and Milk should be transported from collection center/MCC to processing plant by insulated milk tanker or aluminum/stainless steel milk cans by quick transportation and these cans should be covered to prevent sunlight.

Prescribed practices for the milk processing plants are:

- Milk processing plants should be established in unpolluted places having facilities of transportation, electricity, water and sewerage;
- Roof of the building of the processing plant should be made of RCC slab and its floors should be strong and easy to clean;
- The building should be well ventilated with provisions of sufficient light, and it should have separate provisions of processing room, store room, boiler room, laboratory, dressing room and toilets and wash basins;
- The building should be built in such a manner that entry of insects is prevented
- The building should have facility of sufficient water for drinking as well as processing purposes with provisions of hot and cold water for cleaning;
- The water quality should be checked in each trimester and recorded;
- Cleanliness and personal hygiene of the workers should be maintained;
- Smoking, tobacco chewing and eating foods in the processing plant should be prohibited;
- Quality of raw milk should be daily tested and pass such tests as organoleptic test (for taste, smell and color), COB and alcohol test (for checking coagulation),

fat and SNF test (to know fat and SNF per cent in milk), and adulteration test (for checking any foreign materials in milk), and records of these tests should be properly maintained;

- Raw milk should not have any unnatural taste, odor and color, it must not coagulate while boiling, it must pass 60 per cent alcohol test, it must have 3.5 per cent fat and 8.1 per cent SNF for cow milk and 5.1 per cent fat and 8.3 per cent SNF for buffalo milk, and it must be free from any foreign materials;
- The processed milk also should be daily tested for each lot, and pass the organoleptic test, fat (minimum 3 per cent) and SNF (minimum 8 per cent) test, adulteration test, coliform test (zilch coliform), and microbial test (maximum 50,000 microbes/ml);
- If any milk processing plant is unable to carry out any of these tests in its own laboratory, it should make arrangement of such tests in an accredited laboratory, and the test results should be safely kept;
- The batch type milk processors should heat the milk to 65<sup>0</sup> C for 30 minutes and cooled down to 4<sup>0</sup> C;
- The modern high temperature short time (HTST) type processors should heat the milk at least at 72<sup>0</sup> C, hold it for 15 seconds, and immediately cooled down to 4<sup>0</sup> C;
- The pipes, valves, milk cans, storage tanks etc should be made of stainless steel 304;
- Processing plant including milk filling machines should be properly cleaned with commercial food grade proper strength alkali/acid;
- The packet of milk should contain information about type of milk, fat and SNF per cent, production date and batch number, valid date for consumption, and full address of the processor;
- The batch pasteurization type processing plants (below 1,000 liter capacity) and small dairy plants (1,000 – 10,000 liter capacity) should employ such individuals who are imparted at least 2-weeks and one year training, respectively by related institution;
- The medium (10,000 – 30,000 liter capacity) and large (above 30,000 liter capacity) milk processing plants should employ skilled dairy graduates (B.Sc. level).

The prescribed practices for store, sales and distribution of milk and milk products are:

- Processed milk packets should be kept in clean crates and stored at 4<sup>0</sup> C;
- Milk packets should be checked for leaking;

- Delivery van used for distribution of processed milk and milk products should be clean and closed;
- Milk and milk products should be sold in clean shops with shades to avoid direct sunlight and cold chain system should be maintained to keep the temperature of milk below 10<sup>0</sup> C;
- Returned milk from the market should not be mixed with the fresh milk to be processed;
- All related records should be kept.

To monitor the implementation of Code (establish the value system), a committee is constituted as follows:

NDDB	Coordinator
DFTQC	Special Advisor
National Bureau of Standard and Metrology	Special Advisor
Agro-enterprise Center/Federation of Chamber of Commerce and Industries	Member
DLS	Member
DDC	Member
Municipality Association of Nepal	Member
NDA	Member-secretary

The Committee should meet at least bi-monthly. The Committee is responsible to supervise and monitor all the dairy industries and give them necessary suggestions for improvement within a stipulated time, which the dairy industries should comply. If the dairy industries failed to comply, the Committee may recommend to the related authority to take action against such industries.

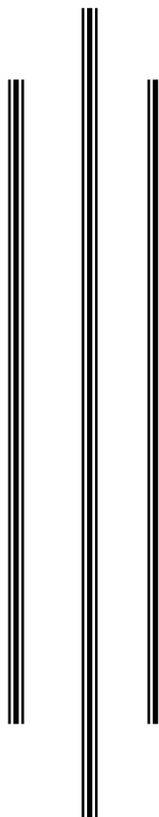
## Imports of Dairy Products, 2007/08

S. N.	Product	Country	Amount (NRs.)
1	Milk and cream of fat content, by weight not exceeding 1 %	Denmark	757,990
2	Milk and cream in powder, granules or other solid form , of fat content, by weight, not exceeding 1.5 %	France	135,362
3	Milk and cream in solid form not containing sugar or sweetening matter of a fat content by weight exceeding 1.5%	Australia	396,000
4	Milk and cream in powdered and granules of a fat content by weight exceeding 1.5 % containing sugar or added sweetening matter	Malaysia	833,676
		Singapore	974,559
		Thailand	316,714
		USA	3,728
		Germany	638,870
		Netherlands	948,758
		Australia	3,182,626
5	Milk and cream in liquid form not containing sugar or sweetening matter of a fat content by weight exceeding 1.5%	New Zealand	2,640,663
		Singapore	632,014
		Thailand	858,795
		France	64,776
6	Milk and cream in liquid form containing added sugar or sweetening matter of a fat content by weight exceeding 1.5 %	Netherlands	822,600
		China P.R.	1,643,545
		Korea R	48,130
		Singapore	2,659,929
		Thailand	81,479
		USA	1,749,753
7	Buttermilk, curdled milk and cream	France	132,040
		Singapore	698,884
		Thailand	1,102,824
		USA	185,592
		UK	101,802

8	Products consisting of natural milk constituents whether or not containing added sugar or sweetening matter	Hong Kong	930,305
		Malaysia	1,166,967
		UAE	7,265
		USA	49,193
		France	2,250,402
9	Fats and oils derived from milk	USA	25,275
10	Fresh cheese including whey cheese and curd	Singapore	599,642
		Thailand	103,339
11	Grated or powdered cheese	Singapore	6,477,480
		New Zealand	2,360,354
12	Processed cheese	Australia	597,369
13	Cheese	China P.R.	20,630
		Hong Kong	1,912,946
		Singapore	6,226,397
		UAE	162,628
		USA	57,011
		Denmark	3,999,067
		France	1,043,996
		Netherlands	520,272
		Hungary	599,644
		Australia	748,173
14	Ice cream and other edible ice whether or not containing cocoa	USA	134,986
		Belgium	112,205
		Italy	41,173
		UK	6,375
		Malta	39,743
	<b>Sub-total from overseas countries</b>		<b>51,803,946</b>
15	Milk products from India		445,300,000
	<b>Total imports</b>		<b>497,103,946</b>

Source: Nepal Overseas Trade Statistics, Trade and Export Promotion Center

**Dairy Development Policy, 2064**



**Government of Nepal  
Ministry of Agriculture and Cooperatives  
Singh Durbar, Kathamndu  
Marg 2064**

## **Dairy Development Policy, 2064**

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### **1. Background**

Cow and buffalo keeping is a traditional occupation in Nepal. There is an ample potentiality of reducing poverty through sustainable development of the dairy sector due to the country's geographical settings, livestock farming based agricultural system, traditional involvement and experience of the farmers in livestock raising, high potentiality of increasing present productivity of the cows/buffaloes, development of dairy processing industries etc.

So as to transform the traditional subsistent livestock occupation to income oriented, competitive and commercial system, lack of awareness about the importance of fresh and good quality milk production among the farmers, lack of necessary livestock services, problem of milk holiday due to seasonal fluctuation in milk production, problem of milk transportation due to geographical remoteness, weak economic and managerial capacity of the milk producers' cooperative societies involved in milk production and collection, lack of physical infrastructure, technology and skilled manpower for producing modern dairy products, lack of awareness about the consumption of good quality milk and milk products among the consumers etc. are remained as the hindrances of appropriate dairy development.

For assisting poverty reduction by developing income and employment oriented dairy business,<sup>13</sup> formulation and implementation of Dairy Development Policy, 2064 is felt essential to make dairy development successful and realizable by putting forward the works with clearly specified targets through investing in improved breed animal rearing, producing and processing within the country, and substituting the imported milk and milk products from abroad.

Accordingly, Government of Nepal has approved the Dairy Development Policy, 2064 for overall development of the dairy sector in accordance to the spirit of Twenty Year Agriculture Perspective Plan; National Agriculture Policy, 2061; National Milk Marketing and Strategy, 2001; and Agriculture Business Promotion Policy, 2063.

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<sup>13</sup> Note: Dairy business signifies all the works related to milk production, collection, processing, production and distribution of the dairy products.

## **2. Vision**

The long-term vision of this policy is to qualitatively contribute national economic development by commercially, qualitatively and competitively developing the dairy sector for contributing employment generation and poverty reduction with the participation of government, cooperative and private sector and extending the efforts and programs of making good quality milk and dairy products easily available to the consumers as a complementary to each other.

## **3. Objectives: This policy has the following objectives -**

- (a) To increase production and productivity of milk in the rural areas,
- (b) To extend milk collection, transportation arrangement and processing industries by making production of milk and dairy products commercial and competitive,
- (c) To substitute import of the dairy products through product diversification based on the potentiality of internal market and develop milk and dairy products as exportable commodities, and
- (d) To make milk and dairy products easily available to the consumers through quality improvement and regulation.

## **4. Policy: The following policies will be adopted for achieving the above objectives -**

### **4.1 Policy guidelines to be adopted to increase production and productivity of milk in the rural areas**

- (a) Dairy business will be gradually developed as the main basis of reducing poverty in the rural areas by routing the milk produced in the rural areas to the urban areas.
- (b) Resource centers will be developed in appropriate locations by mobilizing cooperatives, groups and private entrepreneurs for increasing the production of improved breed animals through breed improvement, and preservation, conservation and promotion of the improved as well as productive local breed animals.
- (c) Services of animal health care and disease control will be extended and made effective.
- (d) Pasture and feed for livestock keeping will be arranged for round the year.
- (e) Cooperatives/groups will be mobilized for providing and extending livestock insurance services and Government of Nepal may exempt the insurance premium of the animals that are insured by the farmers through these Cooperatives/groups.
- (f) Banks will be motivated to provide easy and convenient credit to the farmers for purchasing milking animals.

- (g) Appropriate animal feed, breeding and grass harvesting technology will be developed for increasing milk production also in the lean season.
- (h) Making group-based collateral-free low-interest loan and technical services available particularly to the women, *dalit* and other disadvantaged groups will be encouraged for income generation through livestock keeping.
- (i) Districts that are highly potential for milk production will be prioritized and the farmers of these districts will be encouraged to produce more milk.
- (j) Milk chilling centers will be extended in the areas having transportation facility for effectively expanding the collection areas of milk produced in the rural areas.

**4.2 Policy guidelines to be adopted to extend milk collection, transportation arrangement and processing industries by making production of milk and dairy products commercial and competitive.**

- (a) Arrangements will be made for providing concession in the tariff of electricity used by the milk chilling centers and dairy industries established in the cooperative sector.
- (b) Arrangements will be made for providing concession in the custom duty for the National Dairy Development Board sanctioned machines and equipment that are used for production, collection, processing and distribution of milk and milk products by the government, cooperative and private sector dairies.
- (c) Movement of the vehicles used for the transportation of milk and milk products will be prioritized as essential service.
- (d) Establishment of internal/external joint venture dairy industries that substitute import and promote export of dairy products by producing value-added dairy products including powder milk and baby food will be encouraged.
- (e) Convenient credit facility and technical support will be provided to the dairy industries for enhancing their capacity of producing good quality modern as well as traditional dairy products.
- (f) Convenient credit facility and technical support will be provided for developing Nepalese identity product Yak cheese as specialized product for improving the living standard of the farmers residing in the high mountain area because *chauri* keeping being their main occupation and cooperative/private sector will be supported for capacity development for producing cow milk cheese.
- (g) Dairy Institute/Training Center will be established for developing necessary technical manpower for the dairy industries and arrangements will be made for study and trainings on dairy related subjects.
- (h) Capacity of the technical as well as management employees involved in the dairy sector will be enhanced.

- (i) Research and development of appropriate technology will be carried out for milk production, processing and product diversification.
- (j) Tax on the expenses made for the research and development of dairy technology by the cooperative and private sector will be exempted and arrangements will also be made for other appropriate incentives.
- (k) Arrangements will be made for implementing necessary programs of goat milk production and producing cheese and other dairy products from goat milk.

#### **4.3 Policy guidelines to be adopted to substitute import of the dairy products through product diversification based on the potentiality of internal and external markets and develop milk and dairy products as exportable commodities**

- (a) Free market policy will be adopted for pricing of milk and milk products.
- (b) Information on price, demand and supply of milk and dairy products will be collected, analyzed and disseminated through regular monitoring and study.
- (c) Dairy industries of the specified locations that fully use local milk for producing milk and dairy products will be exempted from the income tax for a certain period.
- (d) Custom duty may be made convenient to the import of printed packaging materials that are not produced in the country but are used for packing milk and dairy products
- (e) Efforts will be made to remove bi-lateral and regional tariff and non-tariff barriers for making export of milk comfortable.

#### **4.4 Policy guidelines to be adopted to make milk and dairy products easily available to the consumers through quality improvement and regulation.**

- (a) Consumer targeted public awareness programs will be launched for promoting consumption habit of more milk and dairy products.
- (b) Considering the welfare of the consumers, regular quality monitoring of the market milk and dairy products will be carried out. The consumers will also be made aware about the keeping methods, consumption duration, consumption methods etc. of these products.
- (c) Quality control of milk and dairy products will be reviewed and updated.
- (d) Appropriate packing standard of milk and dairy products will be prepared and implemented.
- (e) Milk collection and processing code of practice will be implemented at the milk chilling centers and dairy processing factories.
- (f) Laboratories at different levels will be arranged and strengthened for ensuring quality of milk and dairy products.

## 5. Institutional Arrangements

- (a) National Dairy Development Board will be developed as a strong organization having institutional representation of farmers and dairy entrepreneurs to formulate policy for the development of dairy sector and prepare related development plan, monitoring and regulation.
- (b) Capacity of the National Dairy Development Board will be enhanced for planning, investment, monitoring, regulation, study and development of the dairy sector.
- (c) Government, cooperative and private dairies will be registered at the Dairy Development Board and a **Dairy Fund** will be established through service charge on milk per liter sold by the dairy industries. The amount thus generated will be disbursed for overall development and expansion of dairy sector.
- (d) Statistics and information management system for national dairy information will be developed and updated national and international statistics and information relating to milk production, collection, processing, price, demand, supply and quality will be gathered and disseminated.
- (e) Support will be provided for enhancing technical and managerial capacity of milk producer cooperatives.

## 6. Implementation and Monitoring Arrangements

- (a) Implementation and monitoring arrangement of this policy will be carried out by National Dairy development Board itself or in support of other related institutions.
- (b) National Dairy Development Board will prepare necessary working procedure for implementing the provisions of this policy.
- (c) National Dairy Development Board will take initiative for making necessary amendment on the existing legal provision for implementing the provisions of this policy.

## Various Agencies related with the Implementation of Dairy Development Policy

Ministry/Agencies and Institutions/Board/Department/Corporation	Responsibility	Remarks
Ministry of Agriculture and Cooperatives	Policy formulation, monitoring and evaluation and facilitation.	
Ministry of Finance	Arrangements for exemption of tax, custom duty and other concessions.	
National Dairy Development Board	Study, policy formulation and amendment, monitoring and evaluation of policy implementation.	
Nepal Agriculture Research Council	Dairy product diversification, research and extension of on low cost milk production technology, study and research on reducing fluctuation in milk production during flush and lean season.	
Department of Livestock Services	Necessary technical services for quality milk production, animal feed, animal disease control, training and management and programs for reducing milk production cost.	
Department of Food Technology and Quality Control	Quality amendment, fixation, quality monitoring and direction.	
Department of Cooperatives	Development and extension of dairy cooperatives, monitoring and evaluation.	
Ministry of Industry, Commerce and Supplies	Facilitation on establishing dairy industries, and import and export of milk and dairy products and machine and equipment.	
Agriculture Development Bank	Arrangements of credit facility for milk producer farmers and dairy industries.	
Dairy Development Corporation	Extension of dairy business and quality dairy product diversification.	
Central Dairy Cooperative Association	Development, expansion and strengthening of dairy cooperatives, training, and establishment and operation of cooperative dairy processing factories.	
Nepal Dairy Association	Problem identification, expansion of dairy business and quality dairy product diversification, implementation and monitoring of code of practice in the dairy industries.	
Cooperative Development Board	Amendment of cooperative policy, strengthening of dairy cooperatives, and establishment and operation of cooperative dairy processing factories.	

### Milk Products Available in the Markets

#### SMP

<b>Brands</b>	<b>Countries</b>	<b>Available Sizes</b>	<b>Available Packaging</b>	<b>Price Range (Rs/kg.)</b>
Amul, Carnation, Fabulous, Gold Milk, Kream Kountry, Nova and Anik Spray	India, Canada and Australia.	1/2 Kg, 1 kg and 25 kg.	Tin, refill pack of aluminum lined pouches covered with paper cartons and refill packs of aluminum, polythene laminate, and plastic jar, filled in plastic bags covered by Hessian sacks.	200-5000

#### Full Cream Milk or WMP

<b>Brands</b>	<b>Countries</b>	<b>Available Sizes</b>	<b>Available Packaging</b>	<b>Price Range (Rs/kg.)</b>
Alban, Amul, Amulya, Coast, Farm Trust, Kanny, Milk Maid, Nespray, Nestle, NIDO, Nova, Red Cow and Smart Milk.	India, Indonesia, Thailand, Singapore, The Netherlands, Switzerland, and Australia.	400gm, 500 gm, 800 gm, 900 gm, 1 kg, 1.8 kg., 2.5 kg.	Tin, refill pack of aluminum lined pouches covered with paper cartons and refill packs of aluminum, polythene laminate.	250 – 500

### Infant Milk Formula

<b>Brands</b>	<b>Countries</b>	<b>Available Sizes</b>	<b>Available Packaging</b>	<b>Price Range (Rs/kg.)</b>
Lactogen 1, Lactogen 2 and Amulspray	The Netherlands and India.	400 gm, 500 gm, 1 kg	Tin, refill pack of aluminum lined pouches covered with paper cartons.	300 – 600

### Dairy Whitener

<b>Brands</b>	<b>Countries</b>	<b>Available Sizes</b>	<b>Available Packaging</b>	<b>Price Range (Rs/kg.)</b>
Amulya, Everyday, Sweta, Alpine	India Nepal	200 gm, 500 gm, 1 kg., and 2 kg.	Tin, refill pack of aluminum lined pouches covered with paper cartons and refill packs of aluminum, polythene laminate.	200– 500

### Cheese

<b>Brands</b>	<b>Countries</b>	<b>Available Sizes</b>	<b>Available Packaging</b>	<b>Price Range (Rs/kg.)</b>
DDC Yak and Kanchan Cheese Private dairies Yak and cow cheese DDC and private dairies Mozzarella cheese	Nepal	Open, 200 gm, 500 gm.	Open, sold by cutting the block and in case of DDC vacuum-packed unit packs.	500 (Yak Cheese) 400 (Kanchan Cheese) 300 (Mozzarella)
Cream Cheese	France, USA, Australia, Austria.	120 gm, 200 gm, 240 gm, 350 gm.	Tin, Plastic Cups, Glass Bottle, Hard Paper Back.	1000 – 1800

Processed Cheese (assorted, plain, cheddar, spiced)	Nepal, India, Australia, Switzerland, Austria, Philippines, USA, France.	50 gm, 113 gm, 120 gm, 125 gm, 150 gm, 170 gm, 200 gm, 226 gm, 340 gm, 350 gm, 400 gm, 500 gm.	Tin, Hard Paper packs with lining, Polythene packaging with liner.	350 for DDC, 400- 500 for Indian brands, and 600 – 1200 other countries.
Processed Cheese Cube and Triangle (plain, gruyere, emmental, blue cheese with flavors)	India, Austria, USA, France, Switzerland.	50 gm, 120 gm, 125 gm, 140 gm, 170 gm, 200 gm, 250 gm, 500 gm.	Hard paper box.	304 – 500 for Indian brands, 571 – 1421 for other brands.
Processed Slice Cheese	India, Australia, Switzerland, Holland, France, Germany.	100 gm, 150 gm, 200 gm, 227 gm, 250 gm, 500 gm.	Double plastic packaging	400 – 560 for Indian brands, 550 – 1184 for other brands.
Processed Cheese Spread	Nepal, India, France, Austria, USA, Australia, Philippines.	50 gm, 100 gm, 120 gm, 125 gm, 140 gm, 150 gm, 160 gm, 200 gm, 227 gm, 240 gm, 250 gm, 500 gm.	Plastic cup, Double Hard Paper pack with liner, Glass Bottle, Plastic Packaging.	400 for DDC, 350 – 700 for Indian brands and 450 – 2000 for other brands.
Processed Cheese Spread Cube	India, France, Holland.	20 gm, 100 gm, 200 gm.	Double plastic packaging, Hard paper pack with lining.	750 – 1800
Processed Cheese Spread Slice.	India.	200 gm.	Double plastic packaging.	600
Slice Cream Cheese	Switzerland	150 gm, 227 gm	Double plastic packaging.	900 – 947

## Butter

Brands	Countries	Available Sizes	Available Packaging	Price Range (Rs/kg.)
DDC, Amul, Schadinger, Tea Butter, Private Dairies	Nepal, India, Austria, Germany	100 gm, 125 gm, 200 gm, 250 gm, 300 gm, 500 gm.	Parchment paper, parchment paper lined with cardboard, plastic pack, Aluminum lined foil.	360 – 700 for Nepali and Amul butter and 1500 – 2000 for European.

## Ice Cream

Brands	Countries	Available Sizes	Available Packaging	Price Range (Rs/liter.)
DDC, Kwality, ND's, Neerala's, Snow Fun, Move n pick, Vadilal, and Baskin and Robbins	Nepal, India, Switzerland	50 ml, 60 ml, 100 ml, 120 ml, 125 ml, 150 ml, and family packs of 500 ml and 1 liter.	Plastic cups, cones, bars and paper cartons.	130 – 250 for Nepali brands, 300 – 800 for imported brands.

## Sweetened Condensed Milk

Brands	Countries	Available Sizes	Available Packaging	Price Range (Rs/kg.)
Cow Bell, Milk Maid	Indonesia, Malaysia, Singapore, India	250 gm, 379 gm, 397 gm, 400 gm.	Tin	250 – 500

Source: National Milk Marketing Strategy Study, 2001.

## Ghee

<b>Brands</b>	<b>Countries</b>	<b>Available Sizes</b>	<b>Available Packaging</b>	<b>Price Range (Rs/kg.)</b>
DDC, Private dairies, Amul, Green Mountain, Kream Kountry, Madan, Milk Man, Nova	Nepal, India, Belgium	500 gm, 900 gm, 1 kg, 2 kg.	Plastic containers, plastic pouch, hard paper pack, laminated flexible packaging, tin	400 – 600

Source: Market survey by Consultant.

## Dairy Animal Situation in India

# For farmers, this biz is full of meat

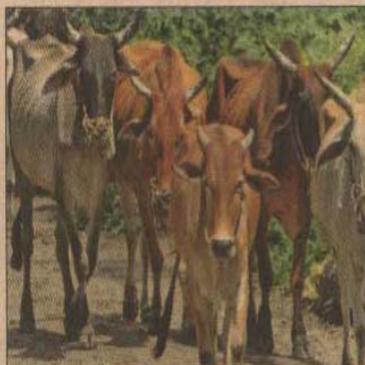
Our Bureau  
NEW DELHI

INDIA'S almost-indelible perch atop global milk-producing nations is showing the first signs of cracks with farmers increasingly preferring to rear livestock for meat, lured by lucrative prices and a friendly government policy.

The country's average milk yield of 917 kg per annum is now ranked a lowly 35th among 44 select countries, though India continues to be the world's largest milk producer, a position it has clung to for many years. Still, there are clear signs of worry as farmers in north India, the country's top milk-producing region, are up against squeezed margins after a 90% rise in fodder prices between 2006 and 2009. The sharp increase in fodder prices is driving farmers to send animals to abattoirs.

In contrast, the value of meat exports has doubled in four years to Rs 5,000 crore in 2008-09, according to industry estimates. India shipped around 20,000 animals in 2008-09. Indeed, the two segments present a picture of contrasting fortunes. According to state-run Agricultural and Processed Food Products Export Development Authority, the per-kg realisation of meat (meat extracted for processing) rose 57% to Rs 115 in 2008-09 from a year ago. Meat realisation for a buffalo weighing around 500 kg is about 275 kg.

Farmers selling milk, in comparison, have



Where is the milk?

gained little due to the surge in fodder prices, though the wholesale price index for milk has shot up by 14% from a year ago. The change in farmers' practices is palpable.

A recent report of the advisory committee on animal husbandry and dairying said there were chances of a drop in the annual growth target of milk production to 5% from the 6-7% projected in the current Five Year Plan (2007-12). National Dairy Development Board chairperson Amrita Patel said if milk production persistently flagged, imports would become the order of the day. The culprit, says the Indian Dairy Association (IDA), the apex body comprising members from cooperatives, MNCs, corporates & PSUs, among others, is a government policy lopsided towards meat exporters. Farm animals producing 10 litres of milk a day require at least 675 kg of crude

protein a year. But raw cattle feed exports have more than doubled between 2006 and 2009, mounting pressure on fodder prices. Fodder ingredients sufficient to feed 3,300,826 animals, which could have translated into 10% of India's annual milk production, were also exported.

"The abnormal rise in the cost of feed and maintenance has made it highly uneconomical for farmers to keep a dry buffalo (which ceases to produce milk). So when a buffalo becomes dry, it is sent to a slaughterhouse," said a New Delhi-based dairy sector executive. "This has become the trend in all peri-urban areas."

Buffalo meat exports between April 2008 and January 2009 leapt 45% from a year ago, boosted by government incentives such as Vishesh Krishi Aur Gram Udyog Yojana and duty entitlement passbook scheme, which give refunds and duty exemptions to exporters. The Centre's meat export incentives in 2008-09 alone were an estimated Rs 484 crore. Ironically, the BJP's stringent opposition to animal slaughter forced the Planning Commission in 2002 to backpedal proposals such as withdrawal of the beef export ban and a hike in meat and leather exports. The incentives have not gone down well with the dairy sector, which allege that the government's skewed policy is likely to accentuate a severe milk shortage. The IDA says these incentives mean more and more high producer animals are heading to slaughterhouses.

Source: Economics Times, February 5, 2010, New Delhi.

## Shortage of Milk and Milk Products in India

# India may've to import skimmed milk powder

Deepshikha Sikarwar

NEW DELHI

INDIA, the world's largest producer of milk, is looking to allow import of skimmed milk powder and butter oil to address the rising shortage of milk and milk products, which has led to a sharp increase in prices.

A committee of secretaries on prices is expected to take up the proposal shortly, a government official told ET. As per the proposal, the National Dairy Development Board may be asked to import 30,000 mt of skimmed milk powder and 15,000 mt of anhydrous butter oil on an urgent basis.

India produces about 105 million tonne of milk every year, roughly of the same order as the domestic demand. The tightly balanced demand-supply equation has caused demand to exceed supply following the drought-related drop in production of milk.

There is also apprehension that government policies have made cattle rearing for meat more lucrative, causing growth in production of milk to drop in recent years.

Prices of milk have already gone up in the range of Rs 4 a litre and ghee or butter oil by about 5% in the last six months due to shortage of the commodity. Milk cooperatives all over the country are expected to further raise prices in wake of shortfall and higher procurement prices.

Gujarat Cooperative Milk Marketing Federation, the retailer of the popular Amul brand of milk and milk products, recently raised the price of its full cream milk by Rs 2 a litre. Some states such as Maharashtra have already increased procurement price of milk following a sharp rise in price of fodder. Union food and agriculture minister Sharad Pawar had recently highlighted the issue of milk procurement by states in view of the shortage of commodity. He had said that states looking to procure milk will have to increase the procurement price of milk.

Of the total milk produced, about 50% is consumed by the village households, while the remaining 50% is considered marketable surplus. The organised sector accounts for about 30% of the marketable surplus.

Most of the dairy cooperatives build their quota of milk powder in winter months when supply of milk is good. This is then used as a buffer in summer months to deal with any shortfall. But, this year, cooperatives have been unable to build this buffer due to the drought forcing the government to resort to imports.