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# Dairy Products Marketing in Bharatpur Metropolitan City, Nepal

**S. Acharya, T. Bhandari**

[1, 2]Department of Agri-Economics, Agri-Extension and Rural Sociology
Institute of Agriculture and Animal Science, Tribhuvan University, Lamjung Campus, Lamjung, Nepal

**Abstract:** ***Efficient marketing system is essential to operate dairy industry in its full potential but past studies were inadequate to visualize milk marketing system in Bharatpur Metropolitan city. This survey was conducted during January to March of 2018 with the aims of analyzing socioeconomic characteristics of milk producers, determining marketing channels and margins receiving by the chain actors. Study collected primary information from 50 households and 16 key informants. Farmers, MPCs, chilling centers, processors, traders and consumers were major identified actors in four marketing channels. Out of 50 sampled households, 14% were illiterate, 36% earned from salary, 18% and 16% from remittance and business respectively. 78 % of 5047 tons produced milk was marketed surplus, out of which 89% entered formal marketing channel supplying 3% milk to local consumers through hot chain and 97% to large processors through cold chain. Although Producers' share was 100% in direct selling to final consumer it was not sufficient to handle all the produced milk. Processors not only added highest value on raw milk but also received highest margin. Unit investment in raw milk gave highest net profit from ice-cream (2.963 rupees) and lowest from packet milk (0.37 rupees) after adding 6.05 and 0.245 rupees, respectively. Low price on SNF and fat content of milk had increased threat of dissatisfied farmers' retreat from dairying. NDDB is suggested to give high attention in policy formation regarding aggressive competition of multinational products and local dairies with formal milk processing and distribution function.***

**Keywords:** Chain actors, marketed surplus, marketing channel, product diversification, value addition

## 1. Introduction

Dairy is an important agricultural subsector in Nepal, whose contribution to GDP is 7% (NEPC 2014). Total number of cattle and buffaloes in Nepal are 7,302,808 and 5,168,809 respectively with total milk production of 643,806 and 1,210,441 tons per year (MoAD 2017). Though cattle population is larger, contribution of buffalo to annual milk production is around 71% and only rest 29% by cattle. This is mainly due to extremely low productivity of indigenous cattle as compared to the productivity of buffaloes (NDDB 2012). Everyday 10,000 liters milk is importing from India to fulfill (Poudel 2016). Ministry of Livestock Development is focusing in making self-sufficiency in milk within 3 years (MoLD 2016).

Effective marketing channel is essential in every firm. To operate a firm in its full potential it should have chosen the best way of marketing. Due to the presence of the intermediaries in the milk marketing channel not only the managerial skills of milk producers gets affected but also the marketing efficiency is decreased (Sankar and Yoganandham 2016). Every consumer wants quality product for his paid price and every producer wants reasonable price for his product (FAO 2010) but due to lack of proper marketing channel, large amount of money is going inside the pocket of numerous middle man as market margin. In Nepal, only 12% of milk is marketed through formal channel (Poudel 2017). According to Timsina and Regmi (2009) low milk price is the major constraint followed by strikes, unavailability of appropriate government milk policy, unavailability of milk processing industries; milk holidays etc. There is still a poor and un-organized vertical linkage between producers and traders in terms of price transparency and sometimes in milk collection, not really punctual (KUBK-ISFP 2015).

Researcher didn't find sufficient data related to the milk production and marketing situation regarding either farmers in the study area are following proper marketing channel or not. What are the socio-economic conditions of dairy farmers?, what are prevalent channel followed by farmers in study area?. Either they are obtaining reasonable price or not. What are the major problems prevalent in milk marketing? Either producers are satisfied to price obtained or not. To define above mentioned questions, following specific objectives were set. i. To study socio-economic characteristics of milk producers in study area ii. To identify marketing channels and market outlets chain actors. iii. Quantify economics behind value addition of diversified milk products of micro-actors.

## 2. Materials and Methodology

**Data source and collection methods:** To identify value addition and product diversification in milk marketing channels, researcher purposively selected two wards of Bharatpur Metropolitan City for the reason of being one of the major exporters of milk. Potential stakeholders to be visited were identified with the help of the advisor. Then questionnaire and checklists were prepared for household survey and KII. After doing content validation, questionnaire was pretested with five non respondents of the research site. Total 50 respondents, 16 Key informants were visited to collect primary information during January to march of 2018. Secondary information was collected from published reports, journals, web browsing and publications of different stakeholders.

**Data analysis**

The gross market margin and net margin of different chain actors were estimated by the following formulae as used by Aslam (2018)

GMi = PRi – Ppi
Where, GMi = Gross margin for ith intermediaries
PRi = Price received by ith intermediaries
Ppi = Price paid by ith intermediaries
NMi = GMi – Mci
where, Mci = Cost incurred by ith intermediaries
Value addition in each actors were estimated by the following formulae as used by Aslam (2018)
Value addition (%) = (sales price-purchase price) / (Purchase price) × 100
Producer's share was calculated by the formula used by (Bankar 2010),
Producer's share = Price received by producers) / (Price paid by consumers) × 100%.

## 3. Result and Discussion

**Socio-economic characteristics:** Out of sampled household head, 14% were illiterate, 10% had college and above degree and rest were secondary level or below educated. Brahmin and Chhetri composed 84% of the sampled population where Janajati and Dalits contributed 14% and 2% respectively. Average age of household head was 53 years with minimum and maximum being 38 and 78 years respectively. Study showed average 5 members in a family. Dependency ratio of 4.26 showed high number of working group compared to dependent population in study area. Researcher noticed average land holding of respondents to be 0.595 ha which was non-significantly lower than national gold average value (0.68 ha).

**Table 1:** Showing socio-demographic status of the respondents

| Variables | Indicators | Milk producers (N=50) | |
|---|---|---|---|
| | | Frequency | Percentage (%) |
| Age of HHH | Mean 53 | | |
| Education level of HHH | Illiterate | 7 | 14 |
| | Literate | 12 | 24 |
| | Primary education | 9 | 18 |
| | Secondary education | 17 | 34 |
| | College and above | 5 | 10 |
| Ethnicity | Bhramin | 38 | 76 |
| | Chhetri | 4 | 8 |
| | Janajati | 7 | 14 |
| | Dalit | 1 | 2 |
| Family size | Median 5 | | |
| Source of income | Agriculture | 50 | 100 |
| | Remittance | 9 | 18 |
| | Business | 8 | 16 |
| | Salary | 18 | 36 |
| | Pension | 2 | 4 |
| | Wage | 1 | 2 |

Source: Field survey (2018)

**Chain actors and their roles in milk marketing:**
Following key actors acting in four types of marketing channels were identified during field survey.

**Raw milk producers:** 5047 tons milk was produced per year by 1346 milk producing farmers in study area. Most of the farmers were subsistence type rearing 1 to 2 cattle. Researcher found only 2 large farms producing more than 100 liters milk per day.

**Milk collectors:** Researcher found 6 cooperatives, 1 non – registered farmers' group and 1 private dairy functioning as collection center with the facility of chilling vat. These collection centers collected milk from both members and non-members. All collection centers fixed prices based on SNF, fat and TS content. On average, total milk collected in collection center in fiscal year 2076/17 was 3942 tons.

**Chilling centers:** There were individual chilling center in each collection centers. Cost of which was paid by processors themselves. 3390 tons of milk was marketed through cold chain where milk was chilled in such chilling centers.

**Processors:** Chilled milk was directed to 4 private processors located in Kathmandu and Pokhara and 1 DDC located in Kathmandu. Here, various short and long term processed products were processed.

**Distributors:** Either processor itself involved in distribution of the products through milk booths or external agents were involved in distribution of multi-dairies products.

**Wholesaler:** Wholesaler either collects milk directly from processing center or from distribution centers located in different places of major cities and sold it to retailers.

**Retailers:** Collection centers, groceries, teashops and hotels were major outlets for dairy products. Dairy products were being sold from both collection centers and groceries, locally processed milk products from teashop and hotels. Timilsina and Regmi (2009) also reported that, some collection centers were involved in retailing of dairy products in Chitwan district. On an average, collection centers were found to sell 39 tons of milk to local consumers and 79 tons of milk to local teashops and hotels.

**Consumers:** They were ultimate destination of products. DDC distributed dairy products to consumers of 23 major city area of Nepal.

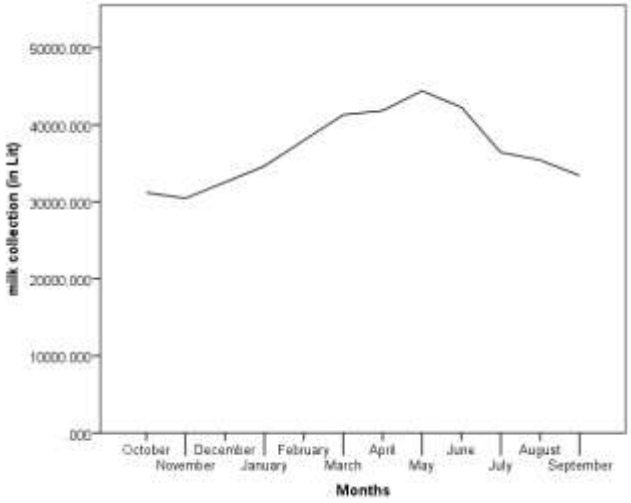


**Figure 1:** Seasonal fluctuation in milk collection
(Source: Household Survey, 2018)

Figure 1 depicts trend of milk collected in collection centers over a year based on secondary data of the collectors. Period of March to June was flush period of milk collection and

period of October to January was lean period of milk collected in collection center.

Table 2 depicts share of price received by producers on price paid by consumers when marketed milk followed various marketing channel. Producers' share on consumers paid price was 100% in I channel. Due to absence of any intermediaries all the price paid by consumers were directed towards producers. Producers' share was found lowest in Channel III, where, collected milk in collection centers was sold to hotels and teashops. Here, after adding value of Rs. 4.3, milk was sold to consumers at Rs. 125 per liter. Producer's share in channel II was about 64%, price spread in this channel is mainly due to margin taken by collection center which is around 36%. While looking at channel III, it was observed that producer's share was only 30 %, this indicated that involvement more number of intermediaries in marketing channel leads to decrease in marketing efficiency which is in the line with Sankar and Yoganandham (2016), where they reported, presence of the intermediaries not only works against the managerial skill of milk producers but also decreases the marketing efficiency.

**Table 2:** Price spread and producers' share on consumers paid price of milk

| | Channel I (producers – consumer) | Channel II (producers – collectors – consumers) | Channel III (producers – collectors – processors – consumer) | Channel IV (producers – collectors – teaashops – consumers) |
|---|---|---|---|---|
| Price paid by Consumer (Rs) | 70 | 70 | 150 | 90 |
| Price received by producers (Rs) | 70 | 45 | 45 | 45 |
| Price spread | 0 | 25 | 105 | 45 |
| Intermediaries' share (%) | 0 | 35.72 | 70 | 50 |
| Producers share (%) | 100 | 64.28 | 30 | 50 |

**Table 3:** Value addition (Rs. Per lit) of cold chain

| S.N. | Parameters | Producer | Collector | Processor | Wholesaler | Retailer | Total |
|---|---|---|---|---|---|---|---|
| 1. | Production/Buying cost | 30 | 45 | 47 | 75 | 82 | |
| 2. | Transportation cost | 2.0 | | 3.09 | 1 | 0 | |
| 3. | Rent and labor | | 0.371 | | 1.5 | 1 | |
| 4. | Testing and/or electricity | | 0.5 | | | 0.5 | |
| 5. | Depreciation and repairing | | 0.114 | 2.08 | 0.75 | 1 | |
| 6. | Chilling charge | | | 0.8474 | | | |
| 7. | Processing | | | 4.379 | | | |
| 8. | Packaging | | | 0.6 | | | |
| 9. | Total cost | 32 | 45.985 | 57.99 | 78.25 | 84.50 | |
| 10. | Added cost (NRs) | 32 | 0.985 | 10.99 | 3.25 | 2.5 | 19.725 |
| 11. | Sale price (NRs) | 45 | 47 | 75 | 82 | 90 | |
| 12. | Value addition % | 40.635 | 4.44 | 59.57 | 9.33 | 9.75 | |
| 13. | Sale byproduct (1%Cream) | | | 5.69 | | | |
| 14. | Gross margin | 15 | 2.0 | 28.79 | 7 | 8 | 60.79 |
| 15. | Net margin (NM) | 13 | 1.015 | 17.01 | 3.75 | 5.5 | 40.275 |
| 16. | Net margin % | 32.27 | 2.52 | 42.2 | 9.31 | 13.65 | 100% |

Source: Own estimation from field survey (2018)

Table 3 depicts value addition and market margin in milk marketing channel. Producer invested 30 rupees in producing 1 liter of milk and additional 2 rupees was spent in bringing milk to collection center. Thus, Net Margin (NM) for producers was 13 rupees after selling to collection center at 45 rupees/lit. Subsequently collector spent 0.885 rupees/lit and sold it to processor at NRs 47. Processors after adding NRs 10.99 and removing 1% cream from milk, sold to wholesaler at NRs 70 and made NRs 17.01 as NM. After adding NRs 3.25, wholesaler sold to retailer at 82 rupees and retailer on adding NRs 2.5 on top of buying cost ultimately sold processed milk to final consumers at 90 rupee making NRs 5.5 NM. Here, price spread along the chain was Rs. 45. Highest value addition percentage was found in processor (59.57%) followed by producer (40.635%) and retailer (9.75%). From above table it was clear that the one who shared high value addition to goods also shared high profit from it. Net margin shared along the chain followed same trend of value addition, highest NM being shared by processor (42.2%) followed by producer (32.27%) but NM shared by retailer was higher than that shared by wholesaler. Since there is no any product diversification, both value addition (4.44%) and NM (2.52%) by collection centers were lowest in case of collection center. Also low NM shared by collectors was assumed to be due to high competition among large number of collectors with in small area. Timsina and Regmi (2009) also revealed that among all marketing agents, processing plants were getting higher amount of margin. Processor received some extra amount of Fat and SNF on milk from chilling center, from which it could separate cream and sold as separate products (standard milk containing 3% Fat and 8% SNF).

Table 4 shows value addition and profit in production of some important dairy products being produced in local as well as in large processor level. Tea and hot milk were locally produced value added products while packet milk, ice-cream and yoghurt were produced by large processors. 1 liter of raw milk produced 0.99 lit packet milk, 0.89 lit yoghurt, 0.2 kg Paneer, 1.67 liter ice-cream, 8 cups tea and 5 cups boiled milk. While calculating profit on the basis of consumers' paid price, 30.67 rupees of net profit was obtained by adding 10.61 rupee on cost of raw milk. Similarly, Net profit from Yoghurt was 33.52 rupees after

adding 23.121 rupees on cost of raw milk. Ice-cream had highest return per unit input in raw milk i.e., 2.963 rupees net profit from 1 rupee investment in raw milk. Value addition was also highest in ice-cream i.e., 7.05 rupee per unit investment in milk. This finding is similar with NSSO (2000-01), which also reported highest value addition in ice-cream (5.95 per rupee in milk). While observing total cost incurred in production process, paneer had low value addition but due to need of large amount of raw milk, total cost of production was highest with highest amount of net profit i.e, per rupee investment in paneer production gave 1.13 rupee net profit. Similary higher net profit from tea and boiled milk from unit investment was found as 1.37 and 1.01 rupees respectively. Reason for high profit from tea and coffee was due to locally processed products without much investment in administration and omitting necessity of tax payment.

**Table 4:** Product diversification and value addition on milk

| Cost categories | Packet milk | Yoghurt | Paneer | Ice-cream | Tea | Boiled milk |
|---|---|---|---|---|---|---|
| One litre equals | 1.1 lit. | 0.89 lit. | 0.2 kg | 1.67 lit | 12 cups | 6 cups |
| Market price of processed product | 90 | 120 | 650 | 320 | 180 | 150 |
| Cost of milk | 47 | 56 | 250 | 30 | 70 | 70 |
| Labor charge | 0.5 | 0.5 | 2.0 | 2.8 | 1.5 | 1.5 |
| Boiling and/or preservation | 1.2 | 1.3 | 6.0 | 1.2 | 1.52 | 1.05 |
| Additives and preservatives | 0 | 11.4 | 2.0 | 166.5 | 1.03 | 0 |
| Packing | 0.6 | 0.6 | 0.6 | 0.6 | | |
| Repair and maintenance | 1.5 | 2.25 | 4.5 | 2.14 | 0.5 | 0.5 |
| Rent/depreciation and interest | 1.03 | 1.289 | 1.339 | 2.57 | 1.27 | 1.25 |
| Administrative cost | 5.782 | 5.782 | 5.782 | 5.782 | | |
| added value | 10.61 | 23.121 | 22.221 | 181.592 | 5.82 | 4.3 |
| Total cost | 57.611 | 79.121 | 272.221 | 211.592 | 75.82 | 74.3 |
| Extraction of fat from collected milk | 5.69 | | | | | |
| Gross profit | 38.08 | 40.879 | 377.779 | 108.41 | 104.18 | 75.7 |
| Tax payment (13%) | 6.85 | 7.35 | 68 | 19.51 | 0 | 0 |
| Net profit | 31.23 | 33.52 | 309.779 | 88.89 | 104.18 | 75.7 |
| Profit: investment ratio | 0.542 | 0.423 | 1.137 | 0.42 | 1.37 | 1.01 |

(Note: Cost and benefit estimation at retailing price)

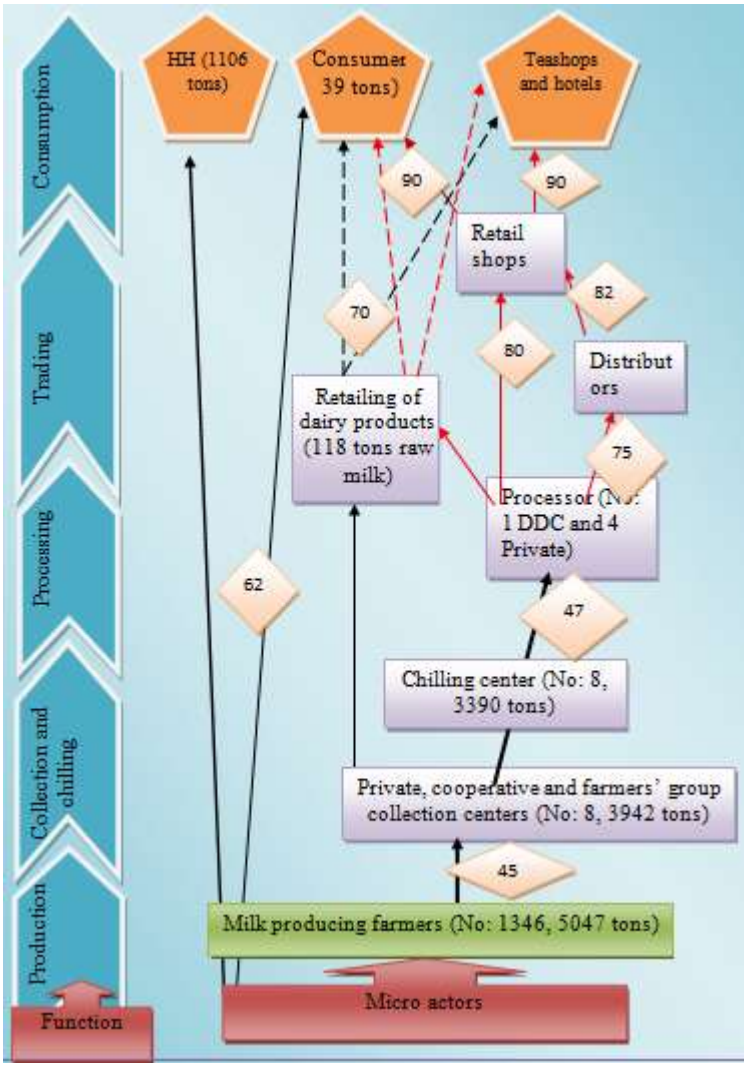


**Figure 2:** Market map
Source: Field survey (2018)
Index: ⟶ Strong linkage - - ▶ Weak linkage
Rs/lt price of whole milk
Note: Pink line represents flow of processed products while black line represents flow of raw milk

Figure 2 overviews picture of marketing channels, actors, price and volume of dairy products along the chain. Figures inside the quadrant show rate of milk along the chain. The figure in parenthesis represents volume of milk being transferred. Vertical linkage between two actors is indicated by line drawn between them. Bold and continuous line represents strong linkage while dotted line represents weak linkage i.e., small quantity of milk and milk products is being transacted. Weak linkage represents prospects for developmental intervention. Pink line shows flow of processed products. From above figure it was clear that price varied along the chain. Farmers got 62 rupee on selling 1 liter whole milk to consumers directly but its only 45 rupees when sold to milk collection centers. Collection centers sent raw milk to chilling unit at the rate of 47 per liter. Chilled milk in chilling center was carried by processors for final processing. Figure represents weak linkage between producers and informal trading. Local processing dairies were not found in the study area. Some of the retailer shops and collection center itself were involved in retailing of the dairy products. Collection centers were provided with processed products from where either final consumers or local retailer bought the products. Around 3 rupees was provided as bonus to the collection centers which varied according to volume of the products being sold. After processing of raw milk, processor sold packet milk to either distributor at 75 rupees/lit or retailer at 80 rupees/lit. And finally processed milk was sold to consumer at 90 rupees/lit. But variation in price of milk was seen according to types of milk based on fat content.

**Table 5:** SWOT analysis of milk marketing in Bharatpur metropolitan city, Chitwan

| | |
|---|---|
| **Strength**<br>• Well distributed sufficient number of collection and chilling centers<br>• Large volume of milk being marketed through formal marketing<br>• Scientific pricing system based on SNF and Fat content<br>• Involvement of cooperative collection centers<br>• Provision of bonus in the name of TS content and support from livestock directorate<br>• Availability of good infrastructure | **Opportunity**<br>• High capacitate chilling vat operating at low volume<br>• Shift in consumption pattern in favor of diversified products<br>• High demand of dairy products<br>• Prioritized sector of ADS<br>• Availability of calf starter and milk replacer<br>• Increasing number of commercial farmers |
| **Weakness**<br>• Under utilization of chilling vat leading to increase procurement cost<br>• Insufficient large processors<br>• Insufficient milk quality analyzer for day to day testing of milk quality<br>• Problems of hiring technicians for repair and maintenance of sophisticated equipments<br>• Collection of milk from distant rural areas increased cost of production<br>• Blockage in milk collection during major festivals and long duration strikes | **Threat**<br>• Involvement of local dairies (dacha dairy) in urban areas leading to unhealthy composition with formal processing<br>• Threats from aggressive competition with multinational products of India.<br>• Retreating of unsatisfied farmers to more productive income generating sector<br>• Change in governmental prioritized sector |

Table 5 represents SWOT matrix of milk marketing channel. Strength and weakness were internal factors governing milk marketing system, where Opportunity and threats were external factors influencing milk marketing system in identified marketing channels.

## 4. Conclusion

Dairy farming was major source of income of large number of people in research area. Seasonal variability of milk production was found with increased production during summer and reduced production in winter season. 4 different types of channels were identified with large portion of milk being transferred to formal channel through cold chain and small portion to informal channel through hot chain. Producers' share was highest in direct selling to final consumers but it was not sufficient to handle all produced milk. Share of consumers' paid price was highest in processors followed by retailers. Total price spread was highest in selling milk to consumers through processors. Processor incurred highest value addition to the milk and shared highest profit from it. Ice-cream gave highest net profit from unit investment in milk but while observing total cost of production, highest benefit from investment was found in paneer production. High proportions of milk producers were found to be unsatisfied with prevalent pricing system. Competition from multinational products and local dairies creates potential threats for enabling environment for formal marketing channels. Such situation in all actors of marketing channel demands due attention from NDDB and other concern agencies.

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