



Production of Milk and Market Participation by Dairy Co-Operative Member and Non-Member Household in East Sikkim

Pranesh Pandey

PhD Scholar, Department of Economics,
Sikkim University, Gangtok, Sikkim, India

ABSTRACT

The study was conducted on the dairy co-operative member and non-member household in East District of Sikkim during the year 2013-14. The study covered 100 dairy farmers from 5 selected villages (Gram Panchayat Units). Dairy farmers were categorized in two groups; co-operative member and co-operative non-member. Co-operative societies are formed under the umbrella of Sikkim Milk Union which collect and process raw milk. The processed milk and milk products are marketed through its agents. The non-member producing surplus milk is subjected to sale in the local market and nearby household. The results of the study indicated that the member households holding of both cross and local breed was higher as compared with non-member household. The average milk production in litres per day was higher for co-operative member household which was 7.1 litres as compared with non-member which was only 5.1 litres. With regard to market participation, mean milk sold by member household in the study area was 5.5 litres milk a day while non-member household sold only 2.6 litres of milk a day. The result also showed that the per cent share of milk marketed by member household were found to be 77.5 per cent and 51 per cent by non-member household. For the analysis, the study has used descriptive statistics like mean, percentages, t-tests etc.

Keywords: Dairy, Co-operative member, Non-member, Sikkim Milk Union, Average milk production, Market

INTRODUCTION

A dairy is a business enterprise established for the harvesting of animal milk – mostly from cows or goats, but also from buffaloes, sheep, horses or camels – for human consumption. A dairy is typically located on a dedicated dairy farm or section of a multi-purpose farm that is concerned with the harvesting of milk. Dairy farming from being a traditional family run business today has grown hugely to an organized dairy industry with technological specializations in every part of the process. We have seen tremendous growth in dairy farming equipment that helps modern dairy farms to manage thousands of dairy cows and buffaloes. This huge boost in the industry has created a lot of farming jobs for the people. The world dairy market witnessed significant changes in the 1990s (Blasko, 2010), until late 2007 and early 2008, milk production expanded by almost 2.1 per cent in every year. Ghosh et.al (2001) said in their study that, “Dairy, fisheries and forestry are other components of agriculture with great unexplored potential. So there is a need to pay more attention to these agriculture activities. In this, dairy farming can be the viable alternative to enhance the economic conditions of the farmers.” Owing to the focus on dairying, the dairy farming and production trends in developing countries are increasing over the years (Gerosa and Skoet, 2012).

During the last four decades, our nation's milk producers have transformed Indian dairying from stagnation to world leadership. India became the world leader in milk production with a production

volume of 127 million tonnes (National dairy development board, 2011-12) and also India produces 17 per cent of the global milk (Indian Dairy Industry Analysis, RNCOS, Feb 2012). More than 40 per cent of Indian farming households, about two thirds of which own less than 1 ha of land, are engaged in milk production as this is a livestock enterprise in which they can engage with relative ease to improve their livelihoods. Regular milk sales allow them to move from subsistence to earning a market-based income. Agriculture plays an important role in Sikkim and its economy, especially rural population (about 75 percent) of people are engaged in agriculture, and two-third of the overall work force depends on agriculture and allied activities, about 17 percent of state GDP is being contributed from this sector (Kumar, 2010). The availability of land for cultivation is only 16 percent of the total geographical area. With regard to livestock farming, 80 percent household in Sikkim owns livestock which plays vital role in income earning. According to the 18th livestock census (2007), the total cattle population in Sikkim were 169829. The study has been conducted primarily with an objective to know the production and productivity of milk produced between dairy co-operative member and non-member household and also to analyze the market participation between the two groups in East District of Sikkim.

LITERATURE REVIEW

Dairy, a subsector in livestock plays an important role in the rural economy of India according to Sarker et al. (2010). They advocated dairy to be a very important productive activity in Indian agriculture, which generates a regular flow of income to the farmer's family throughout the year. Similarly Shinde (2011) revealed that dairy accounts 65 percent share in livestock sector GDP. He further added agriculture has got a prime role in Indian Economy. Small holder farmers can be benefited if they combine dairy with crop production. The above study has highlighted dairy to be the important sub-sector of agriculture in India.

The introduction of White Revolution has significant impact in the dairy industry of India. Shukla et al. (1995) examined the impact of Operation Flood Programme (launched in 1970) on production, consumption and marketed surplus of milk and on income and employment generation on different categories of milk producers by comparing the programme and non-programme areas in Kanpur –

Dehat district of Uttar Pradesh. Their findings suggested that the productivity of milch animals, production of milk and the marketed surplus were higher in the programme area compared to the non-programme area. On the whole, their assessment is that the programme had a positive effect on income and employment.

Similar study of operation flood and its positive impact has been studied by Cunningham (2009); found that Operation Flood was a key element in the transformation of India into a self-sufficient milk producer, and even into a milk exporter. By pointing the way to the use of production-enhancing technologies, establishing more effective and efficient supply chains, and orienting producers toward markets, Operation Flood helped promote a more productive Indian dairy industry. Milk is now big business in India. His study shows as of 2007 India was the largest milk producer in the world, and milk was a bigger contributor to the country's gross domestic product than rice. At least 20 percent of India's agricultural economy is composed of dairying, and about 70 percent of the rural population is somehow involved in milk production. Similarly 80 percent household in Sikkim owns livestock which plays vital role in income earning (Kumar, 2010).

Ghosh et al. (2002) in their study in Bangladesh mentioned that the co-operative farmers were producing more milk per cow compared to non-cooperative farmers. Similar is the point forwarded by Sarker et al. (2010). Their study has concluded that non-cooperative farms face major constraints and high severity compared with cooperative farms in expanding milk production and has suggested that for expanding milk production, the expansion of cooperative dairy farms other than non-cooperative dairy farms may overcome the situation.

Hemme et al. (2003) found that simulation of increased productivity, better farm financing and improved milk marketing, as they could result from pro-poor dairy development policies; show that landless rural dairy farmers do have the potential to reduce the cost of milk production to the level of the larger farms. They could thereby achieve an income from dairying that provides higher returns to labour than the prevailing minimum wage rate in the area and fully cover their production costs.

The study of Kumar et al. (2010) differs with the above studies as they have conducted their study in Assam, India, to see whether traditional milk marketing and processing is viable and efficient or not. They found that there is a continued dominance of traditional milk marketing and processing which are efficient too. The increased attention to quality by the growing middle class may work against these markets which are otherwise competitive and efficient. The quality gap can be bridged to a large extent by introducing training and certification programs for small scale milk and dairy product processors which in turn would be helpful in maintaining the efficiency and competitiveness of these milk market agents.

But it can be concluded from various studies that marketing channels of cooperative are more efficient than the other channels. The cooperative provides all modern marketing facilities to their members for marketing their milk. The milk supplied under cooperative system is hygienic and guaranteed with price and quality (Ghosh et al. 2002).

METHODOLOGY

Study Area

The study has been concentrated in East Sikkim because of greatest percentage mix of urban and rural population. The study has been conducted in five Gram Panchayat Units of East Sikkim, namely- Assam Lingzey, Dholepchen, Khamdong, Namcheybung and Rawte-Rumtek. The study areas have high potential for livestock production which is mainly undertaken by smallholder producers. Livestock production is an important economic activity in the agricultural development and has historically played various roles both in economic life and in socio-cultural traditions of the study areas. There is also an existence of milk co-operative societies under the Sikkim Co-operative Milk Producer's Union in the study areas. Despite the potential and huge demand in the urban and sub-urban areas, existing production and income generating capacity of dairying is not encouraging.

The primary data has been collected using the structured scheduled focusing on both dairy co-operative member as well as non-member households. The study has mainly emphasized on the production aspects as well as the marketing aspects of dairy. The data collected from the dairy households include herd size (both local and cross breed), milk production, consumption and marketed surplus, etc.

Sample Size and Method of Sampling Sampling procedure

The 100 households were selected who were engaged in dairy farming. Out of total sample 20 households (farmers) from each GPU has been selected, where 10 households from each GPU belong to co-operative member households and 10 belong to non-member households. Based on drawn sample, dairy household survey was carried out personally. In the course of data collection, there was an appropriate precaution to ensure collection of high quality information.

Method of Data Analysis

Descriptive Statistics

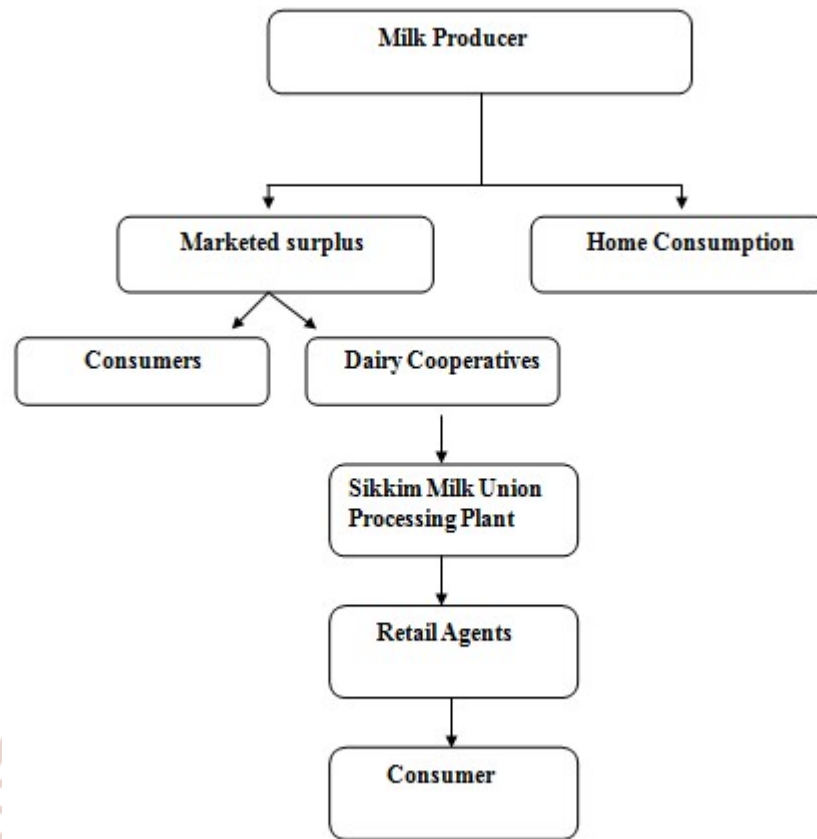
Descriptive statistics has been used in the data analysis which includes percentages, means and t-test.

Results and Discussion

Marketing of Dairy Products in East Sikkim

From the household level survey in East Sikkim, conducted in five different GPU's, it has been confirmed that livestock farming is heredity in nature in Sikkim. Dairy farmers are categories in two groups one is cooperative member and non-cooperative member. Cooperative societies are formed under the umbrella of Sikkim Milk Union. Dairy products produced by non member household in the study area are mainly used for household consumption. The non-member producing surplus dairy product is subjected to sale in the local market.

To understand the marketing of milk, the structure of milk supply chain has been examined in fig. 1

Figure-1: Structure of Milk Supply Chains

The marketing of milk and its product produced by cooperative member household is done by Sikkim Milk Union. In informal sector (non-member), most of the households produce milk for their own consumption or sale to the nearby households and restaurant and sweet shops in the local market. Role of middle man was found negligible in East Sikkim.

Description of the sampled herd size:

The total number of cattle in five different villages in East Sikkim was found to be 150 for co-operative members and 116 for non-members.

Table- 1: Total Herd Size Among members and Non-members

Village	Member	Non-member
Assam Lingzey	24 (2.4)	23 (2.3)
Dholepchen	24 (2.4)	19 (1.9)
Khamdong	41 (4.1)	25 (2.5)
Namcheybong	26 (2.6)	24 (2.4)
Rawte-Rumtek	35 (3.5)	25 (2.5)
Total	150 (3)	116 (2.3)

Source: Authors calculation based on Primary Survey

Note: Figures in the parenthesis in the above table represents the mean herd size of the sampled household

The result in table 2 clearly showed that cooperative member household have larger herd size as compared to non member household with 3 as compared to 2.3. Again we can classify the location wise, types of herds between member and non member in the sampled households.

Description of Herd Breeds in the sampled Location:

The result from the table 1 indicated that there are 266 dairy cattle in the sampled household from which 185 are local breed cattle and only 81 are cross breed cattle. In terms of local breed cattle, Khamdong is highest with 46 local cattle and lowest is in Assam Lingzey with 26 local breed cattle. But in case of cross breed cattle, Assam Lingzey is highest among others with 21 cross breed cattle and lowest is

Dholepchen with only 7 cross breed cattle, this has been presented in table 2. Co-operative membership wise, local breed and cross breed cattle are 107 and 78 (for co-operative members) and 43 and 38 (non-members) respectively. Figure in the parenthesis represents the average local and cross breed cattle in different location for both the member as well as non member household, where it has been observed that the average local breed and average cross breed for member and non member households were 2.14, 1.56 and 0.86, 0.76 respectively. The above result highlights that the local breed in the sampled household is more than a double then the cross breed cattle and also co-operative member household herd size is higher as compared to the other participant i.e. non-member household, in relation to both categories of breeds.

Table-2: Classifications of Herd Breeds by Location

Location	Local breed		Cross breed	
	Member	Non-member	Member	Non-member
Assam lingzey	18 (1.8)	8 (0.8)	6 (0.6)	15 (1.5)
Dholepchen	21 (2.1)	15 (1.5)	3 (0.3)	4 (0.4)
Khamdong	22 (2.2)	24 (2.4)	19 (1.9)	1 (0.1)
Namcheybong	16 (1.6)	17 (1.7)	10 (1.0)	7 (0.7)
Rawte-Rumtek	30 (3.0)	14 (1.4)	5 (0.5)	11 (1.1)
Total	107 (2.14)	78 (1.56)	43 (0.86)	38 (0.76)

Source: Authors calculation based on Primary Survey

Note: Figures in the parenthesis in the above table represents the mean value

Milk Production and Productivity:

The result for the average household milk production and productivity has been presented in table 3. With regard to milk production, the average milk production in litres per day for co-operative member household was 7.1 litres and for non cooperative member was 5.1 litres. The result is consistent with Ghosh et al. (2002) the study conducted in Bangladesh where they mentioned that the cooperative farmers were producing more milk per cow compared to non-cooperative farmers. Highest milk production in litre per day was observed in Assam Lingzey with an average of 8 litres per day and

lowest was in Dholepchen with an average of 4.05 litres a day. But if we observe member and non member separately, than we see that Khamdong member household produce 9.5 litres milk a day which is highest amongst all and lowest is Dholepchen with 4.5 litres a day. Again if we see non member household milk production, then we find that highest milk producing non member household are from Assam Lingzey with 7.7 litres milk a day. With Regard to milk productivity, the average milk productivity (litres/cow/day) for member household is 5.6 litres while for non member household is 4.4 litres. Milk productivity in litres per cow per day is

highest in Assam Lingzey with 6.9 litres, which belong to member household and lowest in Khamdong i.e. 2.9 litres, which belongs to non member household. To sum up the result, we can express that in terms of milk production or in terms of milk productivity, cooperative member are much more efficient than non member. The independent samples t-statistics in table 3 indicated that overall member and non member mean milk production per day is statistically significant confirming there is difference in the mean milk production. But if we compare village wise, member and non member mean

milk production, than t-statistics reveal that apart from Khamdong village, which is highly significant, there is no other village whose mean difference of milk production per day is there between member and non member. With regard to milk productivity per cow per day, the result is as similar as mean household milk production. The t-statistics suggests that member and non member mean milk productivity per cow per day is statistically significant indicating there is difference in the milk productivity and same as earlier result and only Khamdong milk productivity is statistically significant.

Table-3: Mean Household Milk Production and Productivity

Village	Mean Household milk production (litres/day)			Milk productivity (litres/cow/day)		
	Member	Non-Member	t-value	Member	Non-Member	t-value
Assam lingzey	8.3	7.7	0.20 (0.84)	6.9	5.9	1.05 (0.30)
Dholepchen	4.5	3.6	0.75 (0.46)	3.8	3.9	-0.15 (0.87)
Khamdong	9.5	3.5	3.09 (0.00)*	6.3	2.9	3.6 (0.00)*
Namcheybong	5.4	4.2	1.61 (0.12)	4.8	3.8	1.39 (0.17)
Rawte-Rumtek	8.1	6.5	0.54 (0.59)	6.2	5.4	0.33 (0.73)
All	7.1	5.1	2.05 (0.04)**	5.6	4.4	1.91 (0.05)**

Source: Authors calculation based on Primary Survey

Note: Figures in the parenthesis in the above table represents p-value

*significant at 0.01 per cent level, ** significant at 0.05 per cent level, *** significant at 0.10 per cent level

Market Participation by Dairy Household

In the study area, the most important marketable dairy product is milk, due to less quantity of milk production, milk products like butter, churpi, etc. are processed in a very small quantity, more over those processed products are directly consumed in the dairy household. The share of milk sold is high for member household as compared to non member. The reason behind this is, co-operative member are more market oriented than non member and their quantity of milk production is also much higher as compared to the other counterpart. The result from the survey indicated that mean milk sold by member household in the study area is 5.5 litres milk a day while non-member household sold only 2.6 litres of milk a day.

Table-4: Mean Yield and Sale of Milk by Membership

	Member	Non-member	t-value
Mean milk yield per day	7.1	5.1	2.05 (0.04)**
Mean milk sold/per day (litre)	5.5	2.6	3.24 (0.002)*
% share of milk marketed	77.5	51	

Source: Authors calculation based on Primary Survey

Note: Figures in the parenthesis in the above table represents p-value

*significant at 0.01 per cent level, ** significant at 0.05 per cent level, *** significant at 0.10 percent level

The independent sample t-statistics in table 4 shows that mean milk yield and milk sold per day between member and non member is statistically significant indicating there is difference between member and non member. The result also showed that the per cent share of milk marketed by member household were found to be 77.5 per cent and 51 per cent for non-member household.

CONCLUSION

- i. The study found that the average number of cattle between member and non-member household in five GPU was 3 and 2.3 respectively. Member household holding of both cross and local breed was higher as compared with non-member household. But the discouraging fact is there is on an average 0.86 cross breed cattle holding by member and 0.76 by non member household. The holding of local breed cattle was higher for both member as well as non-member household with an average of 2.14 and 1.56 respectively.
- ii. Dairy farmers are categories in two groups one is cooperative member and non-cooperative member. Cooperative societies are formed under the umbrella of Sikkim Milk Union. The raw milk are collected and processed by Sikkim Milk Union. The processed milk and milk products are marketed through its agents. Milk produced by non member household in the study area is mainly used for household consumption. The non-member producing surplus milk is subjected to sale in the local market and nearby household. The role of other middle man is negligible.
- iii. With regard to milk production, the average milk production in litres per day was higher for co-operative member household which was 7.1 litres as compared with non-member which was only 5.1 litres.
- iv. The result from the survey revealed that mean milk sold by member household in the study area is 5.5 litres milk a day while non-member household sold only 2.6 litres of milk a day. The result also showed that the per cent share of milk marketed by member household were found to be 77.5 per cent and 51 per cent for non- member household which showed co-operative member are more market oriented than non-member.

REFERENCES

1. Blasko, B. (2010). World Importance and Present Tendencies of Dairy Sector, University of Debrecen, Faculty of Applied Economics and Rural Development, Applied Studies in Agribusiness and Commerce – APSTRACT. Agroinform Publishing House, Budapest, Ph.D. Summaries.
2. Cunningham, Kenda. (2009). Rural and urban linkages: Operation Flood's role in India's dairy development, IFPRI Discussion Paper. Washington, D.C.: International Food Policy Research Institute.
3. Gerosa, S. and Skoet, J. (2012). Milk availability Trends in production and demand and medium-term outlook, ESA Working paper No. 12-10, Agriculture Development Economics Division, Food and Agriculture Organization of the United Nations.
4. Ghosh, Ashoke K., Maharjan, Keshav L. (2001). Impacts of Dairy Cooperative on Rural Income Generation in Bangladesh, *Journal of International Development and Cooperation*, Vol.8, No.1, pp. 91–10.
5. Ghosh, Ashoke K. and Maharjan, Keshav L. (2002). Milk Marketing Channels in Bangladesh: A Case Study of Three Villages from Three Districts, *Journal of International Development and Cooperation*, Vol.8, No.2, 2002, pp. 87–101
6. Government of Sikkim (2007), 18th Livestock Census
7. Hemme, T. et al., (2003). A Review of Milk Production in India with Particular Emphasis on Small-scale Producers, PPLPI Working Paper 2, accessed from <http://www.fao.org/ag/againfo/projects/en/pplpi/publications.html>.
8. Kumar, A. and Staal, Steven J. (2010). Is traditional milk marketing and processing viable and efficient? An empirical evidence from Assam, India. *Quarterly Journal of International Agriculture*.
9. Kumar, P.S. (2010) Impact of Climate Change and Adaption Measures in Dairy Sector of Sikkim, The Sikkim Cooperative Milk Producers Union Ltd, Animal Husbandry, Livestock Fisheries and Veterinary Services Department, Government of Sikkim, Gangtok, Sikkim – 737102.

10. National Dairy Development Board (2012).
Government of India.
11. Sarker, Debnarayan. and Ghosh, Bikash Kumar.
(2010) Milk Marketing under Cooperative and
Non-Cooperative Marketing Channels: Evidence
from West Bengal, Economic Annals, Volume
LV, No. 187 / October December 2010, UDC:
3.33 ISSN: 0013-3264, Scientific Papers, DO
I:10.2298/EKA1087087S.
12. Shinde, S. V. (2011). Socio - Economic Profile of
Dairy Farmers In Solapur District of Maharashtra
State, Research Paper – Economics, ISRJ Vol. 1,
Issue . 1 / February 2011, pp.86-100.
13. Shukla, D. Dass, S. Bhagwan. Singh, Babu. and
Yadav, S.R. (1995), Impact of Operation Flood
Programme on the Economy of Rural Milk
producers in District Kanpur- Dehat (Uttar
Pradesh), *Indian Journal of Agricultural
Economics*, Vol.50, No.3. July-September.

