

Impact of Dairy Cooperative societies on Production, Consumption and Marketed Surplus of Milk: A Case Study in Barpeta District of Assam, India

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Abstract

The study has analyzed the impact of dairy cooperatives on production, consumption and marketed surplus of milk. The study has been conducted in Barpeta district of Assam by collecting data from 150 member and 150 non-member milk producing households which are stratified into small (3 Milch SAU), medium (3.1 to 6 Milch SAU) and large (6.1 and above Milch SAU) herd size categories. All the economic parameters have been found to be more in case of dairy cooperative members than non-members. The impact of dairy cooperatives has also been found significant, indicating higher production, consumption and marketed surplus of milk for member compared to non-member group. The study has concluded that dairy cooperatives are associated with creating opportunities for attaining higher level of market integration having implications for significant improvement in production, consumption and marketing of milk of the dairy farmers.

Key Words: Dairy Cooperative Societies, Impact, Milk producers, India, Assam

Introduction

Together with the gradual development of agriculture, livestock rearing is now assuming the form of a gainful business occupation. Animal husbandry and dairying play an important role in national economy and socioeconomic development of the country. India ranks as the largest milk producer in the global sphere with 176.3 million tons of production during the year 2017-18 sharing 20% of the World's total milk production. After development of high yielding cow and buffalo breeds, improvement in management practices of dairy farming and marketing facilities through government, private organizations, NGOs and dairy cooperatives, milk production has increased very rapidly in the country. The large scale development of milk marketing under Cooperative framework paved the way for development of the dairy sector with the launch of Operation Flood programme in 1970. Dairy cooperatives in India have considerably influenced the marketing of milk along with its production to improve the socio-economic status of the producers in the country (Meena and Jain, 2010). Dairy cooperatives, apart from providing market opportunities for the milk produce to the members, also provide the technical inputs like provision of artificial insemination, health services and feed inputs (Meena and Jain, 2012). These have a tendency to fuel the uptake of membership in DCS on the one hand and increasing production, productivity and marketed surplus of milk of the farmers in the other. In India, more than 80 percent of the milk marketed in the country is handled by the traditional/unorganized sector (vendors, middlemen etc.) and less than 20 percent by the organized sector (government, private dairy and cooperatives) (Rajendran and Mohanty, 2004). Studies point out that dairy cooperatives provide opportunities for achieving higher level of market integration which could certify remunerative price to the producers and deliver high quality milk to the consumers. For greater availability of milk to the consumers, it is indispensable to increase marketed surplus of milk through increased production. The proportion of production that is marketed by producers is an important indicator for the development of dairy economy. In any developing country, like India, Pakistan, Sri Lanka, income of agricultural products (rice, vegetables, milk and so on) is mainly depending on marketed surplus (Liyanage and Sardika, 2009). It is necessary to identify the marketed surplus of milk which fully depends on production and provision of good marketing network. In this purpose, a precise study about the production, consumption and marketed surplus of milk is necessary with a view to generate economic information for projecting development activities in the dairy sector (Meena and Tiwari, 2015).

Dairying is an important element of mixed farming structure in Assam. Major hindrance of the efficient marketing system in the state is the presence of intermediaries which are taking advantage of the producers' weakness (Kakaty and Das, 2017). Paucity of facilities for organized dairy processing has led to the proliferation production clusters mainly in the peri-urban parts of the state (Sirohi et al., 2005). Smallholder farmers with indigenous cattle and buffalo, low productivity, lack of financial assistance, access to reliable markets may remain as critical constraints hindering the development of dairy sector in the state. Studies point out that only about 3% of the total locally produced milk is marketed in the organized sector (Saha, 2015). For cooperative network not being increased sufficiently even after several rounds of attempts at state level through funding from international agencies like World Bank and Govt. of India, producers had to sell their milk to the milk vendors/at milk market at a very low fixed price. As per data, there are 374 numbers of dairy cooperative societies with 20 thousand milk producers, whereas only about 51 thousand litres of liquid milk are marketed by these dairy cooperative societies (NDDDB, 2017-18). West Assam Milk Union Limited (WAMUL) is the progressive milk union of Assam to stimulate the all-round development of the milk producers by managing to procure 32,540 kg of milk per day from 12,365 dairy farmers through registered dairy cooperative societies and its own collection centres during the year 2018-19. In view of this, the present study is conducted in Barpeta district of Assam to evaluate the impact of dairy cooperatives on production, consumption and marketed surplus of milk.

Literature Review

Marketed surplus is important for farmers and also these are possessed great importance to the dairy farms which plan the milk procurement strategy on the basis of these information (Thakur 2010). Dairy cooperatives in India have considerably influenced the production and distribution of milk along with its marketing to benefit the greater number of producers in the country (Meena et al. 2010). Meena and Jain (2012) conducted a study in Alwar district of Rajasthan which indicates the promotion of dairy cooperative movement as a necessary course of action in the field of dairying in Rajasthan, dairy cooperatives prompts a positive impact on parameters viz. production, consumption and marketed surplus of milk. It is evidence from the results that milk production, consumption and marketed surplus are relatively higher in member farmers as compared to non-member group (Meena and Jain, 2012). According to Kumari (2012),

marketable surplus of milk not only depends on production, consumption and family size, but also on cooperative membership. The researcher is of the view that primary dairy cooperatives occupy a predominant position in case of milk marketing in Kanyakumari district where milk producers go for dairy cooperatives due to consistency in payment. The distance between the places of residents to the place of procurement is encountered as major problem in marketing of milk in the study area. Thakur (2011) in Samastipur district of Bihar revealed that dairy cooperatives realize the largest proportion of total milk marketed followed by milk vendor and consumers respectively. Ishaq et al. (2016) depicted the benefits of milk marketing cooperatives in the districts of Vehari and Muzaffargarh in Pakistan by taking 160 cooperative members and 160 non-members where majority of the milk producers sell their milk through informal milk collectors/dhodi. The researchers state that milk marketing cooperatives offer a reliable and consistent market with assured return to the beneficiary small scale dairy farmers which can be regarded as alternative milk marketing channel. In Raipur district of Chhatisgarh, largest share of surplus milk is disposed to dairy cooperative societies (58.71 percent), followed by consumer (23.57 percent) and the rest is sold to market constituting 17.71 percent of milk (Jaiswal et al. 2016). Milk production, consumption and marketed surplus of milk increase with the increase in the herd size category, ensuring largest percentage of marketed surplus of milk to total production by larger category farmers succeeded by rest of the categories.

Rajendran and Mohanty (2004) carried out their study to review the existing status of dairy cooperatives and milk marketing in India. According to them, even though dairy cooperatives provide remunerative prices of milk but their pricing policy is based on fat content of milk, this is the reason why unorganized sector plays a major role too where the price is given every day to the producers on a flat rate per litre of milk. As of 1995, milk marketing of the northern and eastern part of India remains unregulated compared to its western and southern counterparts. The presence of intermediaries is the major hindrance in case of an efficient milk marketing system. The study suggests a legitimate dairy cooperative laws and regulations of dairy to reduce the role of unorganized sector in marketing of milk. Sarkar and Ghosh (2010) have presented the empirical study of dairy marketing under co-operative and non-co-operative marketing channels in West Bengal, found that primary milk producers' cooperative societies serve as the most important marketing agent serving the majority of milk producer households. Efficient management of milk production and marketing of milk depends on dairy cooperatives (Singh et

al, 2012).Kakaty and Das (2017) in a survey in Assam, analyzed that dairy cooperative member farmers prefer to sell their surplus milk to dairy cooperatives where they get reasonable price of milk (Rs. 35.33/litre) while non-dairy cooperative farmers sell their produce to different informal channels at Rs. 33.17/litre relatively lower price of milk. Milk marketing system in Assam remains unorganized with dominance of traditional milk processors and raw milk traders besides a good number of development schemes. Most of the milk producers in Assam are smallholder farmers with indigenous cattle and poor market access. Low milk yield, low marketed production and lack of marketing infrastructure make marketing of milk insignificant. Dairy cooperatives without proper processing units are becoming non-functional, where the farmers have no other options besides the traditional market. Due to inefficient marketing facilities, the dairy farmers are compelled to sell their milk to the tea stalls at a cheaper rate (Debnath 2015).

Materials and Methods

An exhaustive list of all the districts with dairy cooperative societies in Assam has been prepared. Barpeta district is purposively selected considering several factors including that of Barpeta district has been considered to have significant dairy activities and a major source of liquid milk supply to the processors as well as to the urban consumers in the state (Jafor, 2019). The district has been selected based on the share of dairy cooperative societies among the districts in Assam (20.19% share of total DCS available in Assam). However, after making complete enumeration of the listed DCSs available in the district some of these dairy cooperatives are found to be functional. Six dairy cooperatives (30% share in active DCS) are randomly selected from the total active DCS operating in the Bajali Development Block. The selection of these DCS are such that they are non-contiguous to one another. In the last stage, farmer households are selected in two categories- member and non-member of dairy cooperative societies. The dairy farm households have been identified as the farmers who have at least one in-milk cattle during the survey. The list of farmers is prepared through discussion with key informants including the Secretary of Dairy Cooperative Societies, Veterinary Surgeon associated with the villages of farm households. 150 registered members have been chosen randomly from the active dairy cooperative societies. Similarly, another 150 non-members are selected from the same area to that of the members with consideration that they held at-least one in-milk cattle in the farm and carry almost similar socio-economic characteristics. Thus, the

members and non-members together constitute a total of 300 milk producers. Preferably the head of the household is interviewed using a structured interview schedule and in his absence next well-informed member is considered for eliciting the relevant information. All the households are categorized into three categories, viz. small (1-3 milch animals), medium (3.1-6 milch animals) and large (6.1 and above) based on SAU¹. The survey is carried out during the month of January 2019 to July 2019.

In order to measure the impact of dairy cooperatives on the economic parameters, appropriate statistical tools are used to test the difference between mean values of the parameters for member and non-member groups across different herd size categories.

Findings and Analysis

Milk production

The total amount of milk produced by all milch animals of member and non-member farmers is figured as the milk production per day per households for both member and non-member groups and the t-test results of difference in milk production between member and non-member farmers are presented in table 1.

Table 1. Average milk production by member and non-member group across herd size categories

(Litres/day/households)

Category	Member	Non-member	Difference
Small	12.5753 (0.8817)	6.9848 (0.5731)	5.5905*** (1.0090)
Medium	23.4902 (1.8912)	18.5833 (1.7776)	4.9069* (2.6358)
Large	46.6539 (4.3309)	45.6944 (8.3264)	0.9594 (8.8252)
Overall	22.1933	12.555	9.6383***

¹SAU (standard animal unit): 1 Crossbred= 1.40 SAU; 1 Indigenous= 1.00 SAU

	(1.4623)	(1.1213)	(1.8428)
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Source: Authors' estimation based on primary survey data

Per day average milk production increases with the increase in herd size group in both member and non-member households. It is also observed that milk production is higher in member group compared to non-member farmers across all herd size category associated with possession of high breed of animals and better management practices. The overall average milk production of member group (22.19) is significantly ($p < 0.01$) higher than non-member group (12.56) implying that member farmers produce 9.55 litres of more milk than the non-member group. Category wise milk production shows that average milk production per farm for small (3 Milch SAU) category member farmers (12.58) is significantly higher ($p < 0.01$) as compared to the small herd size farmers of non-member group (6.98). Also in case of medium (3.1 to 6 Milch SAU) herd size group, milk production of member farmers (23.49) is higher than their counterparts in non-member group (18.58) and this difference is significant at $p < 0.10$. Whereas no significant difference is witnessed in case of milk production of large (≥ 6.1 Milch SAU) category farmers between member and non-member group. In member group, milk production of large herd size category is 46.65 litres and it is 45.69 litres in large herd size group of non-member farmers.

It can be concluded that dairy cooperatives have positive impact in case of milk production of member dairy farmers which could be attributed to the study reported by Ravishankara (2014), Meena et al. (2010), Sangu (1995), Meena and Jain (2012) where they observe higher milk production in member/beneficiary households than non-member/non-beneficiary households. This is due to the facilities provided by dairy cooperatives which influence the production of member farmers.

Milk Consumption

Table 2 presents the amount of milk retained at home across all herd size categories of both member and non-member group.

Table 2. Average milk consumption by member and non-member group across herd size categories

(Litres/day/household)

Category	Member	Non-member	Difference
Small	1.1418 (0.0614)	0.6983 (0.0507)	0.4435*** (0.0792)
Medium	1.5049 (0.0971)	1.1629 (0.1402)	0.3420** (0.1662)
Large	1.8904 (0.1660)	0.9833 (0.2786)	0.9071*** (0.3264)
Overall	1.395 (0.0573)	0.8455 (0.0563)	0.5495*** (0.0804)

Source: Authors' estimation based on primary survey data

According to consumption of milk by overall category farmers of member group, member farmer consumes slightly more milk (1.40 litres) than the non-member farmers (0.85 litres) which shows that the difference is 0.55litres significant at $p < 0.01$. Sangu (1995), Meena and Jain (2010) also witnessed higher milk consumption for member households than non-member households which are in conformity with the present findings. Herd size category wise analysis reveal that there is highly significant difference ($p < 0.01$ and $p < 0.05$) in milk consumption for small, medium and large herd size category farmers between member and non-member group. The average milk consumption per day per household is 1.14, 1.50 and 1.89 litres for small, medium and large herd size category dairy farmers in member group against 0.70, 1.16 and 0.98 litres of milk is consumed by small, medium and large herd size dairy farmers of non-member group. Also the percentage of consumption of milk to production is slightly lower in member group (6.61 percent) than the non-member group (6.77 percent) as shown in table 4.

Marketed surplus

Proportion of marketed surplus of milk is followed by increase in milk production. Marketed Surplus of milk is estimated by subtracting the volume of milk consumption from total milk production. After the amount of milk retained at home from production, marketed surplus of milk for both member and non-member households can be shown in table 3. It is observed from the table that marketed surplus increases with increase in the herd size category across all farmer groups.

Table 3. Average marketed surplus of milk by member and non-member group across herd size categories

(Litres/day/household)

Category	Member	Non-member	Difference
Small	11.4336 (0.8477)	6.2866 (0.5570)	5.1470*** (0.9748)
Medium	21.9853 (1.8898)	17.4205 (1.7382)	4.5648* (2.6094)
Large	44.7635 (4.3382)	44.7111 (8.2596)	0.0524 (8.8153)
Overall	20.7983 (1.4428)	11.7095 (1.1033)	9.0888*** (1.8163)

Source: Authors' estimation based on primary survey data

The overall marketed surplus of member group farmers is 20.80litres/household/day which differ significantly from that of non-member group of farmers (11.71litres/household/day) at $p<0.01$ significant level, pointing out that member farmers have 9.09litres of more surplus milk to market than the non-member farmers. When compared across herd size categories, in case of small category, the marketed surplus per household per day for member group is significantly ($p<0.01$) higher (11.43 litres) than non-member group (6.29 litres). The average marketed surplus of milk for medium and large size farmer in member group is 21.99 and 44.76litres of milk per household per day respectively. In non-member group, the marketed surplus of milk per household per day of medium and large farmers are 17.42 and 44.71 litres respectively. The t-test results show significant difference ($p<0.10$) in marketed surplus for medium size farmers of member and non-member group. No significant differences in marketed surplus is revealed across large herd size category over the groups.

Percentage of Consumption and Marketed Surplus of milk to total Production

Table 4. Percentage of consumption and marketed surplus of milk to total production by member and non-member group

(Litres/day/household)

Category	Member					Non-member				
	Production	Consumption	MS	% of consumption	% of MS	Production	Consumption	MS	% of consumption	% of MS
Small	12.58	1.14	11.43	9.06	90.86	6.98	0.70	6.29	10.03	90.11

Medium	23.49	1.50	21.99	6.39	93.61	18.58	1.16	17.42	6.24	93.76
Large	46.65	1.89	44.76	4.05	95.95	45.69	0.98	44.71	2.14	97.86
Overall	21.19	1.40	20.80	6.61	98.16	12.56	0.85	11.71	6.77	93.23

Source: Authors' estimation based on primary survey data

A perusal of the table shows that production, consumption and sales increase with the increase in the size of the farm for both the farmer group. This indicates that production, consumption and sales are directly related to farm size category. Table 4 shows that among member farmers group, overall production of milk is found as 21.19 litres, out of which 1.40 litres is retained for consumption and the remaining 20.80 litres is sold by the household. Production of milk per farm for small farms (3 Milch SAU) of member group is 12.58 litres and found to increase to 23.49 litres and 46.65 litres for medium (3.1- 6 Milch SAU) and large (≥ 6.1 Milch SAU) farms respectively. Consumption and sales are also found in similar form with production of milk per farm for small, medium and large size member group. Overall production, consumption and sales of milk per farm across non-member group are 12.56, 0.85 and 11.71 litres respectively. When expressed in terms of percentage of production, for overall category, percentage of marketed surplus is higher for member farmers (98.16) than non-member group (93.23). The marketed surplus of milk is more with member group both in absolute and in percentage terms than non-member group. Percentage of marketed surplus of milk increases with herd size for both member (90.86 percent, 93.61 percent and 95.95 percent for small, medium and large categories) and non-member group (90.11 percent, 93.76 percent and 97.86 percent) respectively. The percentage of consumption to milk production per farm for small, medium and large size household of the member category are 9.06, 6.39 and 4.05 respectively. In non-member farmers, the percentage of consumption to milk production per farm is obtained as 10.03, 6.24 and 2.14 for small, medium and large group respectively. This summarization reveals that the percentage of consumption to production is higher for small farm of both member and non-member groups. This is attributed due to the higher percentage share of marketed surplus to the production of milk with the increase in farm size. The overall percentage of consumption of milk across all category farms of non-member group (6.77 percent) is higher than their counterparts of member group (6.61 percent). Relatively lower percentage of milk consumption in member group could be attributed to generating more marketed surplus and better marketing facilities being offered by dairy cooperative societies.

Recommendations

Establishment of milk processing plants would be attributed to augmenting long term procurement and marketing strategy through appropriate assessment of demand and supply and ascertainment of economic viability. The Government should organize SHG/DCSs for distributional purpose with necessary infrastructure to motivate farmers to supply milk to the organized sector, where collective pouring of milk at the producers' door steps will enhance milk production resulting higher marketed surplus. In this context, the study suggests that steps should be taken for greater inclusion of milk producers under dairy cooperative network assuring benefit of the dairy cooperative programme for their development in the study area. Overall, to increase farmer's membership the study recommends policies to take up more awareness programmes and trainings from time to time among the younger farmers on the beneficial effects of participating in cooperative system of dairying.

Conclusions

It can be concluded from the analysis that dairy cooperatives have a positive influence on the production, consumption and marketed surplus of milk for their member farmers. Milk producers under dairy cooperatives are found to be better off than their counterpart in non-member group as all economic parameters viz. production, consumption and marketed surplus are relatively higher in member group. Moreover dairy cooperatives have been able to provide technical inputs and services deriving economic gains for the all-round development of the farmers. Farmers can be the beneficiaries getting technical help and marketing of milk being members of the milk cooperatives. This indicates the need for emphasis on the diffusion of cooperative forms of dairying in Assam due to its livelihood and nutritional impact on the smallholder farmer's economy.

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