



Fodder inclusive value chain analysis of milk in organized sector of Karnataka

Rajani M. Murgod¹, Nagaratna Biradar^{2*}, J. G. Angadi¹ and S. M. Mundinamani¹

¹College of Agriculture, University of Agricultural Sciences, Dharwad-580005, India

²Regional Research Station, ICAR-Indian Grassland and Fodder Research Institute, Dharwad-580005, India

*Corresponding author e-mail: nagaratna123@gmail.com

Received: 6th January, 2016

Accepted: 10th October, 2016

Abstract

In India, 80 per cent of the milk collection is handled through unorganized sector. But it is essential to shift the farmers towards organized sector to ensure fair practices. This is possible by improving the backward linkages through extension advisory services. So a study was taken up with the objectives of analyzing marketing efficiency of milk types of Karnataka milk federation and to map the present backward and forward services rendered to producers and processors. Value chain analysis method was used where in range of actors involved in the business were interviewed to collect data. Marketing efficiency was arrived at using secondary data. Among 4 types of milk, 'Shubham' milk expressed highest marketing efficiency due to its high fat percentage. AI services (100%), obtaining feed at discounted price (88.33%) and availing veterinary services (75.84%) were the backward services availed by majority of producers. More than half of the dealers (58.34%) received advisory services on storage of products and sweet preparation. Six predictors-total milk production, milk retained for family, annual income from livestock, backward services availed, herd size and price of the milk explained 99.8 per cent variation ($r^2=0.998$) in the amount of milk sent to cooperative societies by the producers.

Keywords: Backward services, Dealers, Karnataka milk federation, Marketing efficiency, Producers

Introduction

India ranks first in the world in milk production, which has risen from 17 million tons (Mt) in 1950-51 to about 127.9 million tons by 2012-13 (GOI, 2012). Karnataka ranks 11th in overall milk production in the country (Anonymous, 2014) and in 2013-14 the per capita availability of milk is 254 gm/day. Karnataka Milk Federation is a state's cooperative set up which has milk processing capacity of 2.1 lakh liters per day with a brand name 'Nandini'. Value

chain as a term was first suggested by Porter in 1985. Porter defined it as a 'set of activities that are performed to design, produce and market, deliver and support its product'. A value chain is the full range of activities which are required to bring a product or service from conception, through the different phases of production, transformations, and delivery to final consumers and final disposal after use (Bammann, 2000).

Though India stands 1st in milk production in the world, per capita livestock productivity is less. Besides, 80 per cent of the milk collection is handled through unorganized sector. But it is essential to shift the farmers towards organized sector by improving the backward linkages through extension advisory services. The most crucial and essential backward support needed for milk producers is ensuring fodder availability to them. Milk federations in the country have given more emphasis on upgradation of livestock through AI services. Among input services, fodder development though plays an important role but federations have included this service only recently. The fodder promotion activities taken up by them are however not to the scale to reach the milk producers but only to the milk societies where in elected representatives are called and given day training on fodder cultivation. The inclusion of this service in milk value chain is recent and no studies have been taken up to assess the performance of fodder development in backward services in the arena of analyzing milk value chain. This will help to understand how to make the backward, specially of fodder promotion and forward services more attractive and effective to loop in more number of livestock farmers to the organized sector as well as to improve the livestock productivity by better management practices. In view of this, a study was undertaken to determine the map of milk value chain from farmer to end consumer and analyze the role of different stakeholders in backward and forward linkages of dairy value chain.

Value chain analysis of milk

Materials and Methods

The study was conducted in Belgaum district of Karnataka. The district was selected for the study as it is the highest milk producing district and ranks 1st in livestock population in the state. It also stands first in quantity of milk procured by Belgaum Milk Union of Karnataka Milk Federation. Further, Gokak and Bailhongal blocks of Belgaum district were selected as the locale of the study, since they have highest functional milk co-operative societies and highest average milk collection. From each block, four villages having societies with highest milk procurement were selected. Study made use of the value chain analysis method. So producers (120), cooperative societies (8), a processor, dealers (36) and consumers (40) together formed the sample (204) of the study. Study made use of both secondary and primary data sources. One of the criteria for selection of producer was that they should be a member of co-operative society and should be a milk producer at the time of the study. Fifteen such producers from each village were randomly selected. Both close ended and open ended questions were included in set of interview schedules, pretested and standardised for the study to collect the data from chain actors. Personal interview technique was the method employed for the study.

Value chains of different types of milk: Milk in different forms like homogenized toned milk, homogenized cow milk, shubham having different SNF (solid not fat) and fat percentages which were sold in relatively good quantity by the Belgaum milk union as was found from the secondary data were considered for value chain analysis. To analyze value chains for this milk, secondary data collected from the Belgaum milk union was used. Costs towards raw material, procurement, processing and administration were included in production cost. Along with the production cost, cost of distribution and depreciation was also accounted for total cost per unit of production. Then it was compared with selling price and marketing margin to work out the marketing efficiency. The details were as below following the procedure of Babu and Verma (2010) .

Production cost: Costs towards raw material, procurement, processing and administration

Total cost: production cost + distribution cost + depreciation cost

Selling price: as it was fixed by the Belgaum milk union at the time of the study

Marketing margin: selling price - total cost

Total marketing cost: procurement cost of raw material + processing cost + distribution cost

Marketing efficiency = {(Marketing cost + margin)/Total marketing cost} - 1

Backward services to the producers: Backward service is operationally defined as the support/services rendered to the producers by the milk unions through the societies or any other agencies to facilitate not only higher milk production but also the production of quality milk. These services might be in the form of hardwares like feed at discounted price or in soft forms like improving skills through training programs. Different services being rendered to the producers were listed after discussing with the officials of milk union in the interview schedule. Producers were asked to mention the number of times they had availed these services in the previous one year. Producers having availed the services were expressed in frequency and percentages. Number of times services availed by each producer in one year were totaled, the total value of which was used for further statistical analysis. Backward services to the dealer from the milk union in the form of training and advisory services were also considered for the study. Information on these services received by the dealer was collected and expressed in frequency and percentages.

Statistical tools and techniques used for the analysis of data: The appropriate statistical procedures such as frequency, percentages, mean, standard deviation, standard error and step-wise regression were employed to analyze the data. Statistical package like excel and SPSS were used for analysis.

Results and Discussion

Value chains of different types of milk of Belgaum co-operative dairy plant: For all types of milk viz., toned milk, homogenized toned milk (HTM), homogenized cow milk (HCM) and shubham, raw material cost accounted for 73.0 per cent, procurement cost to the extent of 3.00 per cent, processing cost 7.0 per cent together add up to 83.0 per cent of production cost. Distribution cost slightly varied from 7.75 per cent of the total cost for toned milk, 7.85 per cent for HTM, 8.28 per cent for shubham and 8.31 per cent for HCM. The total cost remains all most same for toned (Rs. 29.52), HTM (Rs. 29.55), HCM (Rs. 29.64) and shubham (Rs. 29.69). The selling price for these three types of milk were fixed at Rs. 30, Rs. 31, Rs. 34 and Rs. 36, respectively and because of this the marketing margin was Rs. 6.31 for shubham, Rs. 4.36

for HCM, Rs. 1.45 for HTM and Rs. 0.48 for toned milk. Total marketing cost and margin was Rs. 11.77, Rs. 9.77, Rs. 6.77, Rs. 5.77 for shubham, HCM, HTM, toned milk respectively. The marketing efficiency thus obtained was highest for shubham (1.15) followed by HCM (0.81), HTM (0.27) and toned milk (0.09) (Table 1).

So marketing margin, marketing efficiency and selling price realized were higher in shubham as compared to toned milk, homogenized toned milk and homogenized cow milk. The apparent reason for this was as the fat percentage increased these factors showed higher values. Thus higher the fat per cent in milk, higher the marketing cost and efficiency, so it can be inferred that shubham milk production is more profitable for Belgaum milk co-operative dairy plant. Similar findings were reported by Babu and Verma (2010).

Backward services obtained by the producers from the co-operative society in a year: All the producers in previous year availed artificial insemination service to their livestock from the milk cooperative society. Mean herd size of producers was 2.71 ACUs and artificial insemination is widely used practice in recent years not

just for impregnation but for livestock improvement. Milk unions are providing this service very effectively to all the producers through their village level societies. Majority of the producers obtained feed at discounted price (88.33%) might be because of its quality along with its reasonable price and availed veterinary services (75.84%) even though they did not have good experience about it. More than half of the producers' took help from the cooperative society to get linked with the bank. Purchase of animals require loan from the bank and being a milk cooperative society member itself is a strong point and reason to get linked with the banks. Fodder seeds were taken from the society by half of the producers (51.67%) as in summer to feed green to the livestock, cultivation of fodder maize (African tall) is widely encouraged by the society. Besides, producers (34.10 %) availed advisory services on selection of breeds. Farmer must choose the breed that fits well into his management practices besides being good milk yielder. The state is source of some of the well known breeds of cattle, buffalo and sheep (Pushpa et al., 2009). Owing to prevalence of many breeds today, farmers might have preferred to go for expert advice. Some of the producers also availed advice on participation in

Table 1. Value chains of different types of milk of Belgaum co-operative dairy plant (unit not clear)

Sl. No.	Particulars	Toned milk (3.0/8.5)***	HTM* (3.1/8.5)	HCM** (3.5/8.5)	Shubham (4.6/8.5)
1	Raw material cost (Rs)	21.78 (73.78)	21.78 (73.70)	21.78 (73.48)	21.78 (73.35)
2	Procurement cost of raw material/ unit (Rs)	0.89 (3.01)	0.89 (3.01)	0.89 (3.00)	0.89 (2.99)
3	Processing cost/ unit (Rs)	2.11 (7.14)	2.11 (7.14)	2.11 (7.11)	2.11 (7.10)
4	Administrative cost/ unit (Rs)	2.28 (7.72)	2.28 (7.71)	2.28 (7.69)	2.28 (7.67)
5	Production cost / unit (1+2+3+4) (Rs)	24.78 (83.94)	24.78 (83.85)	24.78 (83.60)	24.78 (83.46)
6	Distribution cost / unit (Rs)	2.29 (7.75)	2.32 (7.85)	2.41 (8.31)	2.46 (8.28)
7	Depreciation cost (10% p.a) (Rs)	0.17	0.17	0.17	0.7
8	Total cost / unit (Rs) (5+6+7)	29.52	29.55	29.64	29.69
9	Selling price / unit (Rs)	30.00	31.00	34.00	36.00
10	Marketing margin (Rs) (9-8)	0.48	1.45	4.36	6.31
11	Total marketing cost (Rs) (2+3+6)	5.29	5.32	5.41	5.46
12	Marketing cost and margin (Rs) (10+11)	5.77	6.77	9.77	11.77
13	Marketing efficiency [(12/11) -1]	0.09	0.27	0.81	1.15

*Homogenized toned milk **Homogenized cow milk *** Toned milk, SNF/Fat; Figures in the parenthesis indicate percentage

Value chain analysis of milk

Table 2. Backward services obtained by the producers from the co-operative society in a year (n=120)

Services	Respondents	
	Frequency	Percentage
Availed artificial insemination services	120	100
Obtained feed at discounted price	106	88.33
Availed veterinary services	91	75.84
Helped to get linked with the bank	65	54.17
Procured fodder seeds	62	51.67
Availed advisory services on selection of breeds	41	34.10
Opportunity to participate in exposure visits	21	17.50
Opportunity to participate in training (dairying)	11	9.16

exposure visits (17.50%) and training programs (9.16%) as they might have felt that such programs would increase their skills and capacities on livestock management (Table 2). The similar results were reported by Prakash kumar (2012) and Girima and Marco (2014).

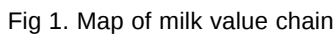
Backward support received by dealers from milk unions: Total six dealers attended trainings organized by milk union for dealers in previous year (Table 3). Of these, 13.89 per cent each dealers attended trainings on management and marketing topics, 11.12 per cent on cold storage and 8.34 on hygiene in handling milk to improve the keeping quality without spoilage. The percentage of dealers who attended meeting was very less. The reasons could be less number of training programs organized for dealer and the lack of importance and time among dealers to attend such trainings. More than half of the dealers (58.34%) received advisory

services in last one year on various aspects mainly on storage of products and sweet preparation (16.67%), marketing and management of shop (13.89%) and hygiene and pricing aspects (5.56%) owing to perishable nature of the product. The similar results were reported by Girima and Marco (2014).

Final mapping of milk value chain: The mapping of milk value chain to understand the backward and forward linkages/services is given in figure 1. In the map bolder the line, more strong the linkage is and vice versa. Regular payment at every stage was a strong forward support perceived from co-operative society to milk producers, on which whole business would run successfully. AI services, veterinary services to producers, and animal health care facilities were strong backward services received by the producers from milk co-operative society and the union. Livestock play vital role in

Table 3. Backward support received by dealers from milk unions (n=36)

Particular	Respondents	
	Frequency	Percentage
Training given by KMF	6	16.67
<i>Training issues</i>		
a. Management	5	13.89
b. Marketing	5	13.89
c. Cold storage	4	11.12
d. Hygiene	3	8.34
Advisory services	21	58.34
<i>Advisory aspects</i>		
a. Storage of products	6	16.67
b. Sweet preparation	6	16.67
c. Marketing aspects	5	13.89
d. Management of shop	5	13.89
e. Hygiene	2	5.56
f. Rating aspects	2	5.56



agriculture. They are viewed as ready source of cash to buy household needs and inputs for crop production. So livestock not only produce food directly, they also provide essential needs of a family and key inputs to agriculture. AI services, veterinary services, feeds and animal health care, all under one roof of cooperative society certainly makes rearing livestock much convenient as almost all the needs are met through these services. Employment generation by appointing required staff in each society and credit and cold storage facilities to dealers were also viewed as strong links. Moderate level of backward supports were providing extension services to dealers by the milk union, feedback from consumers to dealers and balanced cattle feed to producers from society. Some of the societies mentioned that required quantities of feeds were not supplied to them. Providing extension services and fodder seeds to producers and providing training to

Step wise regression analysis : Amount of milk sent to cooperative societies by the producer is an important factor that influences value chain at all levels. The causal variables which have been found generating critical influence on this are- total milk production, milk retained for family, annual income from livestock, backward services availed, herd size and price of the milk. These variables together have explained variation to the extent of 99.8 per cent (Table 4). Among all these variables, backward services availed sends a strong message that it should not be neglected if business has to be sustained profitably at different levels. Artificial insemination services, educating producers about

Table 4. Step wise regression analysis of amount of milk sent to cooperative societies versus with selected variables; predominating variables retained at the last step

Predictors	r	R ²	R ² adjusted	SE
Total milk production	0.999	0.998	0.998	0.400
Milk retained for family				
Annual income from livestock				
Backward services availed				
Herd size				
Price of the milk				

Value chain analysis of milk

scientific breeding and feeding aspects, supplying quality feeds, immunization etc., have influence on milk production. The milk productivity in the country could be considerably enhanced by timely extending the backward services to the producers. Since many small holders have looked at animal husbandry as subsidiary activity, the milk production has always remained low without actually realizing the genetic potential of livestock breeds. However the necessary skills and knowledge for scientific rearing of animals can be achieved through providing advisory services like balanced feeding, health management etc through village based trained local resource persons.

Conclusion

The milk value chain analysis indicated high marketing efficiency for high fat per cent milk. Value chain mapping indicated a weak service of providing extension/advisory services and fodder seeds between cooperative milk union and the milk producers. Capacity development programs in promotion of fodder cultivation hence need to be strengthened to improve the milk productivity by the producers and to attract more milk to the organized sector and more buyers to the milk dealers. Encouraging cultivation of high yielding perennial fodder grasses and legumes would help to reduce the cost of livestock rearing making it more profitable. So, Karnataka milk federation should further fine tune this activity so that every producer would get the desired quantity of fodder seeds for cultivation.

References

Anonymous. 2014. Karnataka 11th in milk production, *The Hindu Newsletter* 09: 22-26.

- Babu, D. and N. K. Verma. 2010. Value chains of milk and milk products in organized sector of Tamil Nadu -A comparative analysis. *Agricultural Economic Research Review* 23: 479-486.
- Bammann, H. 2000. The governance of global value chains. *Review of International Political Economy* 12: 78-104.
- Girima, D. and V. Marco. 2014. Assessment of factors and factors affecting milk value chain in small holder dairy farmers: A case study of Ada's district, East Shawa zone of Oromia regional state, Ethiopia. *African Journal of Agricultural Research* 9: 345-352.
- Gol (Government of India). 2012. *Economic Survey* (2012-13). Ministry of Finance, Economic Division, Government of India, New Delhi.
- Prakashkumar, R. 2012. Farmers perception towards livestock extension services: A case study in western Maharashtra. *Indian Journal of Extension Education* 2: 1-6.
- Pushpa, P., N. Biradar, S.N. Hanchinal and L.V. Hirevenkanagoudar. 2009. Fodder management systems of peri-urban and rural livestock owners of Belgaum district of Karnataka. *Range Management and Agroforestry* 30: 81-84.
- Porter, M. 1985. Review of guidelines and manuals for value chain analysis for agricultural and forest products, Nairobi, Kenya. *International Journal of Dairy research* 69:1-30.