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Economics of Milk Production in Alwar District (Rajasthan): A Comparative Analysis

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Abstract- This study covered 75 cooperative member milk producers and 75 non-member milk producers which were post-stratified into small, medium and large herd size categories. Per day net maintenance cost was found to be higher for member group than that of non-member group. It was found to be higher in case of buffalo than that of cow and also observed more in the summer season. Per litre cost of buffalo and cow milk production was observed to be higher for the non-member as compared to member group. Per litre cost of buffalo milk production decreased with increase in herd size categories across different seasons while same trend was not observed in case of cow milk production. Further, it was found higher in summer season. Daily net return was found relatively higher in member group as compared to non-member group and also found higher in winter season. Overall average daily milk production, consumption and marketed surplus of milk were found higher on the member group as compared to non-member group. The corresponding figures were recorded highest in the winter season in both the member and non-member group.

Index Terms- Buffalo, Cow, Dairy cooperatives, Marketed surplus, Per litre cost.

I. INTRODUCTION

Dairy cooperatives have played an important role to improve the economy of small milk producers' households in different regions of India. Rajasthan is one amongst them, which is predominantly an agricultural state with an excellent potential for milk production. Dairy cooperatives have not only provided organized network of milk marketing to the rural households, but also provided the crucial technical inputs like provision of artificial insemination, health services and feed inputs. Cost plays an important role in portraying economic viability of a dairy enterprise. It is a critical economic indicator for milk producers, consumers and policy makers in order to provide an effective linkage between the milk producers and consumers for fixing the price of milk rationally. Generally, a milk producer can increase his dairy income in two ways either by increasing the milk production or by reducing cost of milk production. Cost of milk production often becomes a policy issue, when milk producers complain that the price of milk they are getting does not the cover cost of milk production. Keeping the above background in mind, it is necessary to study the comparative analysis of milk production with the following specific objectives.

1. To compare the cost and return of milk production among different herd size categories of households across member and non-member in different seasons.
2. To compare the production, consumption and marketed surplus of milk among different herd size categories of households across member and non-member in different seasons.

II. REVIEW OF LITERATURE

Attempts have been made to review briefly the specific and relevant literature, which has direct or indirect bearing on the objectives of the present study. Accordingly, relevant literature has been reviewed and presented in chronological order as follows.

Rao and Singh (1995) while studying the impact of operation flood programme on the economics of the buffalo milk production in Guntur district of Andhra Pradesh found that the gross cost of milk production was Rs.2,982.05, Rs.3,274.05, Rs.2,744.80, Rs.2,682.75 per annum on landless, small, medium and large categories in the case of the beneficiary households as against Rs.2,544.05, Rs.2,252.05, Rs.2,113.35 and Rs.2,314.10 per annum on landless, small, medium and large categories for the non-member households. The average cost of milk production was Rs. 2.80 per litre on the beneficiary households as compared to Rs.3.75 per litre on the non-beneficiary households.

Sangu (1995) conducted a study on the impact of dairy cooperative societies on production, consumption and marketed surplus of milk in Meerut district of UP among member and non-member households. Average milk production per member and non-member household respectively were found to be 7.74 and 6.91 kg per day of which 26.72 and 25.78 per cent was retained for home consumption and the rest was sold. The milk production increased with size of land holding.

Shiyani and Singh (1995) conducted a study on economics of milk production for the member and non-member milk producers in the Saurashtra region of Gujarat and observed that the net cost of maintaining a buffalo was Rs.36.30, Rs.40.15, Rs.24.35 per day in rainy, winter and summer seasons in the case of the member respondents as against Rs.32.49, Rs.37.97 and Rs.26.10 per day for the non-member respondents. The corresponding figures for the milch cow were Rs.17.52, Rs.19.27and Rs.16.93 in the case of the member respondents as against Rs.16.13, Rs.20.14 and Rs.16.46 per day in the case of non-member respondents. The season wise analysis indicated that the highest cost of milk production per day was found in

winter season both in the case of members and non-members. The main reasons for the higher cost during winter season were better feeding and management practices adopted by the milk producers to obtain more milk yield. Further, it was observed that feeds and fodder constituted about 70 per cent of the total maintenance cost of a milch buffalo and nearly two-thirds of the total cost of cow milk production. On an average, per litre cost of buffalo milk production was Rs.5.56 and Rs.6.47 for members and non-members, respectively. Corresponding figures for milch cows were Rs.4.12 and Rs.4.63.

Shukla *et al.* (1995) studied the impact of Operation Flood Programme on the economy of rural milk producers in Kanpur district – Dehat (UP) and found that the overall average cost per milch animal and per household per annum was found to be Rs.7,588 and Rs.18,286, respectively in the programme area as compared to Rs.6,854 and Rs.11,584 in the non-programme area. The average cost of milk production per litre was found to be Rs.3.59 and Rs.3.67 in programme and non-programme areas, respectively. The overall average milk production per day per household was higher at 8.78 litres in the programme area as compared to 6.04 litres in the non-programme area. The average milk consumption per day per household was 2.23 litres and 1.92 litres in the programme area and non-programme area, respectively.

Shah *et al.* (1996) conducted a study on milk production, marketed surplus and marketing of milk in organized and unorganized milk marketing sector of Bullandshahar district. The results of the study revealed that the level of milk production was higher in villages covered by DUSS than those not covered under it NDUSS. On an average, the annual milk production per household was 4504 litres in DUSS and 3964 litres in NDUSS area. The milk production increased with the increase in herd size category in both areas. Milk production in DUSS area was 2378, 5225 and 8301 litres for small, medium and large herd size categories, respectively, whereas it was 2045, 4079 and 8094 litres for small, medium and large herd size categories in NDUSS area, respectively.

III. RESEARCH METHODOLOGY

Alwar district milk producers' cooperative union was purposively selected from Rajasthan state. Exhaustive lists of all the milk producers' cooperative societies in Alwar district milk producer's cooperative union were prepared. From amongst these societies, six milk procurement societies were randomly selected. A complete enumeration of all milk producing households of six selected societies as well as villages covered under these societies was carried out. All the milk producing households were classified into three categories, viz., Small (1-2 milch animals), Medium (3-4 milch animals) and Large (more than 4 milch animals) on the basis of number of milch animals. From six selected societies, 75 member households[1] were randomly selected based on probability proportional to number of households in each category. Thereafter, an equal number of non-member households[2] (75) of almost similar resource situation were selected from each category of households in the same society villages to serve as valid basis of comparison. Thus in all, 150 households were interviewed during the year 2005-06.

The primary data were collected with help of well structured pre-tested schedule by personal enquiry method. The data collected were subjected to tabular analysis in order to study the comparative economics of milk production. The net maintenance cost per milch animal per day was divided by the respective average milk yield per milch animal per day to arrive at per litre cost of milk production. Net return was computed by deducting gross cost from gross return. The total milk produced by the all milch animals in the household was reckoned as total milk production. The quantity of milk retained at home for consumption or conversion into milk products was taken as the per day milk consumption of household. The marketed surplus of milk was worked out by subtracting total milk consumption from total milk production.

IV. RESEARCH FINDINGS AND INTERPRETATION

Maintenance Cost: A comparative analysis of season wise per day maintenance cost for buffaloes and cows are presented in Table 1. A perusal of the table revealed that the overall average per day net maintenance cost per milch animal was found to be higher for member group than that of non-member group. Shiyani and Singh (1995) also observed similar findings. The relatively higher net maintenance cost observed for member group could be due to better feeding and management practices adopted by this group to achieve the higher milk yield. Average net maintenance cost per milch animal per day was found to be higher in case of buffalo than that of cow. Average per day net maintenance cost per buffalo increased with increase in herd size categories across different seasons in both the member and non-member group while same trend was not observed in case of cow. Further, the average net maintenance cost per day per milch buffalo and cow was found to be relatively more in the summer season followed by rainy and winter seasons across various herd size categories in member and non-member groups which may be attributed to higher price of feed and fodders in this season.

Table 1: Average maintenance net cost across herd size categories in different seasons
(Rs. / milch animal/day)

	Member		Non-member	
Category	Buffalo	cow	Buffalo	cow
Winter season				
Small	48.45	38.12	43.44	36.29
Medium	46.20	38.21	42.40	35.32
Large	44.57	34.88	38.69	--
Overall	**46.42**	**37.55**	**41.18**	**35.98**
Summer season				
Small	50.51	40.17	46.18	37.84
Medium	49.92	41.10	45.46	37.26
Large	49.28	36.12	44.82	--

[1] Member who have atleast one milch animal and supplying milk to cooperative societies for a period of 180 days in a year.

[2] Non-member who have atleast one milch animal and supplying the milk to any agency except milk cooperative societies for a period of 180 days in a year.

Overall	**49.90**	**39.92**	**45.64**	**37.63**
Rainy season				
Small	49.13	38.25	46.96	36.36
Medium	47.90	38.71	44.01	35.57
Large	45.52	34.42	41.68	--
Overall	**47.67**	**37.79**	**44.85**	**36.10**

Cost of milk production: Cost of milk production per unit is an important indicator of efficiency of milk production. The average per litre cost of milk production across different herd size categories of member and non-member groups has been given in Table 2. A close perusal of the table revealed that per litre cost of milk production of buffalo and cow was observed to be higher for the non-member as compared to member group except in the case of rainy season in buffalo and summer season in cow. Thus, it can be concluded that the per litre cost of milk production was slightly lower in the case of member of dairy cooperatives than the non-member group, which can be attributed to the higher milk yield per milch animal in member group. These findings were in conformity with study of Shukla *et al.* (1995), Shiyani and Singh (1995), Rao and Singh (1995). Average per litre cost of buffalo milk production decreased with increase in herd size categories across different seasons in both the member and non-member group while same trend was not observed in case of cow milk production. Further, the average per litre cost of buffalo and cow milk production was found to higher in summer season followed by rainy and winter seasons across various herd size categories in member and non-member groups. This was mainly due to lower milk production in summer season.

Table 2: Average per litre cost of milk production across herd size categories in different seasons (Rs. / litre/day)

	Member		Non-member	
Category	Buffalo	cow	Buffalo	cow
Winter season				
Small	9.30	8.80	9.44	9.35
Medium	8.85	8.49	9.42	9.32
Large	8.39	8.72	8.99	--
Overall	**8.85**	**8.67**	**9.28**	**9.33**
Summer season				
Small	13.84	12.67	13.99	12.09
Medium	13.53	12.09	13.98	11.32
Large	13.25	11.11	13.92	--
Overall	**13.54**	**11.96**	**13.96**	**11.70**
Rainy season				
Small	12.22	10.42	12.04	10.69
Medium	12.01	10.32	11.74	10.31
Large	11.18	10.59	11.33	--
Overall	**11.80**	**10.44**	**11.70**	**10.50**

Net return from milk production: Per day net return from milk production obtained from buffalo and cow across herd size categories in different seasons for both member and non-member group have been presented in Table 3. The net return per milch animal per day in the case of buffalo and cow were relatively higher in member group as compared to non-member group. Relatively higher net return observed for member group could be due to the relatively higher milk yield and higher price of milk realized by member group as compared to non-member group. This was mainly due to higher milk production in winter season. Further, the net return per milch buffalo and cow were found to be higher in winter season followed by rainy across various herd size categories in member and non-member groups. Net return per milch buffalo and cow were found to be positive in summer season for member households while it was observed negative for non member households across various herd size categories in different seasons.

Table 3: Net return from milk production across herd size categories in different seasons (Rs. / milch animal/day)

	Member		Non-member	
Category	Buffalo	cow	Buffalo	cow
Winter season				
Small	15.01	10.59	8.82	3.48
Medium	17.90	12.19	8.86	4.48
Large	20.58	10.32	10.33	-
Overall	**17.83**	**11.03**	**9.34**	**3.98**
Summer season				
Small	0.30	1.04	-3.78	-1.85
Medium	1.37	3.95	-3.83	-0.25
Large	2.39	6.13	-3.86	-
Overall	**1.35**	**3.71**	**-3.82**	**-1.05**
Rainy season				
Small	1.40	6.71	0.42	1.89
Medium	2.37	6.29	1.48	2.38
Large	5.36	4.58	2.48	-
Overall	**3.04**	**5.86**	**1.46**	**2.13**

Milk production: Milk production was analyzed across different seasons in both the member and non-member groups and the results of the same are presented in Table 4. It may also be observed that overall average milk production was higher on the member group as compared to non-member group could be attributed to the keeping of superior quality of animals and other management practices. The study of Shukla *et. al.* (1995), Sangu (1995), Shah *et al.* (1996), and Ashalatha *et al.* (2004) were also reported similar observations. The average milk production across different seasons indicated that the highest milk production was recorded in the winter season (15.06 litres) followed by rainy season (11.32 litres) and summer season (10.52 litres) in the member group, while for non-member group highest milk production was observed in the winter season (12.71 litres) followed by summer (9.35 litres) and rainy season (8.86 litres). Highest milk production in the winter season might be due to more availability of feed and fodders. Further, the average milk production per day per household increased with increase in herd size categories across different seasons in both the member and non-member groups.

Table 4: Average milk production across herd size categories in different seasons (Litres/day/household)

Category	Member			Non-member		
	Winter	Summer	Rainy	Winter	Summer	Rainy
Small	9.15	6.16	6.75	7.33	5.08	6.04
Medium	17.54	12.51	13.24	14.12	10.52	12.71
Large	27.67	19.22	21.00	21.50	15.80	20.40
Overall	**15.06**	**10.52**	**11.32**	**12.71**	**9.35**	**8.86**

Milk consumption: Milk consumption was also ascertained across different seasons in both the member and non-member groups and the results of the same are presented in Table 5. Average milk consumption per day per household was slightly higher on the member group than that of the non-member group. The average daily milk consumption was observed to be highest in winter season followed by rainy season and summer seasons across various herd size categories in the member and non-member groups. Highest milk consumption in the winter season might be due to conversion of larger quantities of milk into milk products. Further, the average daily milk consumption increased with increase in herd size categories across different seasons in both the member and non-member groups.

Table 5: Average milk consumption across herd size categories in different seasons (Litres/day/household)

Category	Member			Non-member		
	Winter	Summer	Rainy	Winter	Summer	Rainy
Small	3.20	1.59	2.21	3.29	1.92	2.55
Medium	5.84	3.45	4.27	5.38	3.38	4.35
Large	8.44	4.67	5.89	7.10	4.60	6.40
Overall	**4.99**	**2.78**	**3.56**	**4.13**	**2.52**	**3.31**

Marketed surplus of milk: In order to assess marketed surplus of milk, data were analyzed for different seasons on the member and non-member groups and are brought out in Table.6. It may be observed that average marketed surplus of milk per day per household was more on the member group compared to the non-member group. The average daily marketed surplus of milk across different seasons indicated that the highest quantity of marketed surplus of milk was recorded in the winter season followed by rainy season and summer seasons in the member and non-member groups. Highest marketed surplus of milk in the winter season might be due to more production of milk.

Table 6: Average marketed surplus of milk across herd size categories in different seasons (Litres/day/household)

Category	Member			Non-member		
	Winter	Summer	Rainy	Winter	Summer	Rainy
Small	5.95	4.57	4.54	4.04	3.16	3.49
Medium	11.70	9.06	8.97	8.74	7.14	8.36
Large	19.22	14.55	15.11	14.40	11.20	14.00
Overall	**10.07**	**7.74**	**7.76**	**6.05**	**4.81**	**5.55**

V. CONCLUSION

The cost and return measures of milk production obtained in the present study suggested that buffalo milk production is relatively more profitable than cow in the study area. Thus, sound economic logic exists for persuading both the member and non-member households to continue buffalo rearing to enhance their income. Hence, adequate attention should be paid to promote buffalo upgradation programme. The study in nutshell indicated a positive impact of dairy cooperatives on several economic parameters such as average cost and return, production, consumption and marketed surplus of milk in dairy enterprise as evidenced from the results of the investigation. The findings of present study would be of practical significance for the researchers, extension workers, policy makers, planners, administrators and dairy farmers so as to take rational decisions for the benefit of members of dairy co-operative societies as well as promote co-operative movement in the field of dairying in Rajasthan in general and for the cooperative milk union in Alwar district.

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