

IMPACT OF DAIRY CO-OPERATIVES MEMBERSHIP ON INCOME AND EMPLOYMENT OF DAIRY FARMERS IN KARNATAKA STATE

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ABSTRACT

The present study was carried out in three different regions of Karnataka state to assess the impact of dairy co-operatives membership on income and employment of dairy farmers. For the study, primary data was collected from the 180 members and non-members of the dairy co-operatives. The results revealed that the annual average net income from dairying for the member households (Rs. 17,590.85) was significantly ($p < 0.01$) higher as compared to the non-members (Rs. 10,227.74). The annual average employment from the dairy activities was higher for the members (219.33 man-days) as compared with non-members (184.33 man-days). From the results of the partial regression analysis, the dummy variable (D) was found to be positive and significant; implying that membership of dairy co-operatives had a positive influence on gross income from the dairying. The regression coefficients of variables value of concentrate, educational score of respondent, labour employed in dairying, number of milch animals and veterinary expenses had positive and significant influence on gross income from dairying. Overall, the dairy co-operative societies had positive influence on income and employment for dairy farmers in all the regions of Karnataka.

Keywords: Dairy Co-operatives, Employment, Income, Karnataka, Membership

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India's share in world milk production is 20 per cent with production of 187.7 mt in the year 2018-19 (GoI, 2019). Despite significant success in the dairy co-operatives, still unorganised milk marketing channels procure about 60 per cent of the marketed surplus milk. In India, about 87.7 per cent of the livestock holders are marginal, small and semi-medium land holding farmers, who are most affected by the un-organized milk marketing channels and faced diseconomies of scale. Presently, dairy co-operatives (DCS) procure and handle about 20 per cent of the marketed surplus of the milk (GoI, 2018). Even in dairy co-operative successful states like Karnataka, there is an inter-regional disparity in the distribution and procurement of milk through dairy co-operatives. The Karnataka Milk Federation (KMF) procures about 74.66 lakh liters of milk per day and in which majority of the milk i.e. about 75% is procured by the societies coming under southern region. The milk procurement of the dairy co-operatives is directly proportionate to the number of dairy co-operative and their number of active members as well influence of unorganised milk marketing channels. The procurement and marketing of milk through dairy co-operatives is directly provide regular flow of income and employment to the milk producers. Studies conducted by Rather (2013) in Jammu, Meena *et al.* (2010) in Rajasthan, Kumari and Malhotra (2016) in Bihar, Srikanth (2007) in Karnataka and others had shown positive influence of dairy co-operatives on income and employment of members. With this backdrop, the present study was

conducted in the Karnataka to assess the impact of dairy co-operatives on income and employment of dairy farmers.

MATERIALS AND METHODS

Karnataka state was selected purposively, as this state is one of the fore-runner in co-operative movement in the country as well as the second largest in the milk procurement through dairy co-operatives. Karnataka state has 14 milk unions which are located in three regions of state i.e. Northern, Central and Southern regions. From each region, one milk union was selected randomly. From Northern, Central and Southern region, Ballari, Raichur and Koppal District Milk Union (RBKMUL), Shivamogga, Davanagere and Chitradurga District Milk Union (SHIMUL) and Bengaluru urban and rural and Ramanagar District Milk Union (BAMUL) were selected, respectively. From each milk union, six dairy co-operative societies were selected randomly. From each dairy co-operative, ten members were selected randomly and a total sample of 180 members were selected. For facilitating good comparison, an equal number of non-members were selected based on similar socio-economic status and resource situation. The primary data were collected from the selected respondents to assess the impact of dairy co-operatives among dairy farmers.

To estimate the impact of dairy co-operatives, multiple regression analysis with dummy variables was used. It determines the influence of membership of DCS on the income obtained from dairy farming.

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Selection and Specification of Variables: Income function provides us knowledge of the factors that affect the income from dairying. The dependent variable was taken as gross income from dairying and the explanatory variables were educational score, age of the respondent, number of milch animals, value of green fodder fed per day, value of dry fodder fed per day, the value of concentrate fed per day, value of labour per animal per day and expenditure on veterinary services.

The Model: The functional form thus, was specified as follows: $Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7)$

Where,

Y = Gross income from dairy (Rs.)

X_1 = Education score of the respondents (No.)

X_2 = Age of the respondent (years)

X_3 = Number of milch animals (No.)

X_4 = Value of green fodder fed per day (Rs.)

X_5 = Value of dry fodder fed per day (Rs.)

X_6 = Value of concentrate fed per day (Rs.)

X_7 = Value of labour per animal per day (Rs.)

X_8 = Value of expenditure on veterinary services (Rs.)

Pooled income functions were also fitted using dummy variable. The dummy variable was introduced as under:

D = 1, if member

D = 0, otherwise (non-member)

Choice and specification of model: The choice of a specific functional form was based on econometric, statistical and economic criteria i.e. sign and value of the estimated parameters while statistical criteria depends on the statistical significance of estimated parameters and coefficient of multiple determination (r^2). Four types of functional forms, viz. Cobb-Douglas, Linear and Semi log (both linear-log and log-linear models) were tried whose algebraic forms are given as:

Linear Form : $Y = a + \sum_{i=1}^n b_i X_i + u$

Semi log (log - Lin) Form : $\ln Y = a + \sum_{i=1}^n b_i X_i + u$

Semi log (Lin - long) Form : $\ln a + \sum_{i=1}^n b_i \ln X_i + u$

Cobb Douglas (Log - Log) form : $\ln Y = \ln a + \sum_{i=1}^n b_i \ln X_i + u$

Where,

Y = Gross income from dairy

X_i = i^{th} explanatory variable,

A = constant term,

b_i = partial regression coefficient of the i^{th} explanatory variable,

U = Random error distributed normally with zero mean and constant variance.

E = base of natural log

The best function was selected on the following economic and statistical criteria:

- i. The ability of the function to provide economically meaningful results.
- ii. Significant level of individual regression coefficients, and
- iii. The value of coefficient of multiple determination (r^2).

Employment generation from dairying: Actual time spent in various operations of dairy farming was recorded for each household. Total time spent by the women and children was converted into man days by assuming 8 working hours. The following conversion was used.

1 day of women labour = 0.67 man day (3 women = 2 men)

1 day of children work = 0.5 man days (2 children = 1 men)

Number of hours per day in different types of activities for members and non-members in the study area was calculated and aggregated to work out the utilization of their time in dairy operations.

RESULTS AND DISCUSSION

Average milk productivity of the bovine species of sample respondent: Farmers desire to get higher milk productivity from their respective milch animals as increased productivity leads to higher earnings from dairy farming. Therefore, the average milk productivity per animal per day for cattle and buffalo species in different regions is presented in table 1. The milk productivity of the indigenous cow, crossbred cow and buffalo was significantly ($P < 0.01$) higher for members as compared to non-members in the study area.

Overall in the southern region, the milk productivity of the cattle and buffalo species of milch animal was higher in both members and non-members as compared to other regions. It can be concluded that higher productivity of milch animals on members' household as compared to their counterparts, could be attributed to better feeding and dairy management practices followed besides better market access of DCS for members.

Income generation from dairying: Table 2 displays that the annual average net income from dairying for the member and non-members of DCS in different regions. The perusal of the result indicated that the annual average

Table 1

Average milk productivity (Liters/day/milch animal) of bovine species of member and non-member households

Particulars	BAMUL		SHIMUL		RBKMUL		Overall		Mean difference	Z-value
	M	NM	M	NM	M	NM	M	NM		
Indigenous cow	3.05	2.84	2.97	2.75	2.90	2.64	2.97	2.74	0.23	2.842**
Crossbred cow	8.20	7.14	7.72	6.98	6.81	6.04	7.58	6.72	0.86	4.802***
Buffalo	4.26	3.90	4.36	4.08	4.12	3.88	4.25	3.95	0.30	3.107***

M-Member, NM-Non-member; (***) , (**) and (*) indicates significant difference at 1%, 5% and 10%, respectively.

net income for the member household (Rs. 17,590.85) was higher as compared to the non-members (Rs. 10,227.74). This could be attributed to higher milk production of bovine species of the members which might due to the technical inputs and veterinary services provided by the dairy co-operative societies to their members in the study area. The mean differences between the average annual net income of the members and non-members in all regions were found to be statistically significant ($P < 0.01$). The findings of the present study is in conformity with findings of the Srikanth (2007) and Ravishankar (2014) who conducted study in Karnataka and reported that the dairy co-operatives had positive influence on income and employment of the membership. Other studies across India such as Meena *et al.* (2010) and Prajapati *et al.* (2017) in Rajasthan, Singh and Chauhan (2015) in Meghalaya, Kumari and Malhotra (2016) in Bihar, Chhabra *et al.* (2016) in Punjab, Kashish *et al.* (2017) and Priscilla and Chauhan (2019) in Manipur carried on dairy co-operatives and reported that dairy co-operatives had positive impact on milk productivity, income and employment of the membership. Also, reported that there is statistically significant difference in the income derived from dairy farming among the members and non-members of the dairy co-operatives.

Partial regression analysis with dummy variable: In order to know whether the DCS have any positive impact on members income in the study area; Cobb-Douglas production function was fitted. The coefficients of the variables of the production function are presented in the table 3. The coefficients represent the elasticity of the explanatory variables. The coefficient of determination (R^2) was found to be 0.830, which means about 83 per cent of variation in the dependent variable (gross income from dairying) was explained by the selected independent variables in the model. Among the feed and fodder, the concentrate feed appears to be important in influencing the gross income from dairying. Its regression coefficient was found to be positive and significant ($P < 0.01$). It implied that the one per cent value increase in the concentrate feed increased the 0.065 per cent of the income from the dairying. The variable age of the respondent were found to

Table 2

Annual average income (Rs./Annum/Household) from dairying for members and non-members in different regions of Karnataka

Particulars	BAMUL	SHIMUL	RBKMUL	Overall
Member	22,879.95	16,144.61	13,748.01	17,590.85
Non-member	13,319.11	9,639.02	7,725.07	10,227.74
Mean difference	9,560.84	6505.59	6,022.93	7,363.12
Z-value	3.412***	2.938***	3.331***	5.378***

(***) , (**) and (*) indicates significant difference at 1%, 5% and 10%, respectively.

be negative and statistically non-significant ($P > 0.1$). Other variable, dry fodder found to be statistically ($P < 0.1$) negative with one per cent increase in value of dry fodder led to decrease in 0.036 per cent of income from dairying. A further perusal of the table indicated that the variable labour employed was found to be statistically positive. On an average, one per cent increase in labour employment leads to increase the 0.368 per cent of gross income from dairying. A regression coefficient of the number of milch animals was found to be statistically ($P < 0.01$) positive with one per cent in the number of milch animals increase leads to 0.535 per cent increase in gross income from the dairying. The expenditure on veterinary services found to be statistically ($P < 0.01$) positive with one per cent of expenditure on the veterinary services increases the 0.064 per cent of the gross income from the dairying. Membership as dummy variable (D) was used to know whether membership to the dairy co-operatives has any influence on the gross income from dairying. It was found that the dummy variable (D) had positive and statistically significant ($P < 0.01$) influence. It indicated that the membership to the dairy co-operatives has higher positive income from dairying. Similar findings were observed by Meena *et al.* (2010) and Kumari and Malhotra (2016). The technical inputs and other services provided by dairy co-operatives to their members may help them to gain more income from dairying.

Employment generation from dairying: In milk production, the one fifth of the total cost was spent on labour

Table 3**Partial regression coefficient of the factor affecting the income**

Variable	Regression Coefficients	Standard error
Constant (a)	2.575***	0.543
Value of green fodder (X3)	0.0001	0.019
Value of dry fodder (X4)	-0.036*	0.018
Value of concentrate (X5)	0.065***	0.025
Value of labour employed (X6)	0.368***	0.046
Value of education score (X6)	0.074***	0.019
Number of milch animals	0.535***	0.034
Age of the respondent	-0.072	0.022
Veterinary expenses (X7)	0.064***	0.019
Membership (D)	0.076***	0.029
R-square	0.830	

(***), (**) and (*) indicates significant difference at 1%, 5% and 10%, respectively.

Table 4

**Average annual employment
(Mandays/Household/Annum) from dairying for members
and non-members of DCS in study area**

Particulars	Member	Non-Member	The mean difference	Z-test
Southern	232	191	41	6.358***
Central	217	186	31	6.836***
Northern	209	176	33	3.907***
Overall	219.33	184.33	35	9.496***

(***), (**) and (*) indicates significant difference at 1%, 5% and 10%, respectively.

utilization. So, it is necessary to estimate employment generation from dairy farming in the study area. Table 4 indicates that the annual average man-days generated from the dairying in the different regions for the members and non-members. In overall, the annual average employment from the dairy activities was higher for the members (219.33 man-days) as compared with non-members (184.33 man-days). Srikanth (2007) and Ravishankar (2014) in their study on dairy co-operative in Karnataka found that the membership to the dairy co-operatives had positive and higher employment generation from the dairying for the members as compared to non-members. Other studies like Meena *et al.* (2010), Singh and Chauhan (2015), Kumari and Malhotra (2016), Chhabra *et al.* (2016), Prajapati *et al.* (2017), Kashish *et al.* (2017) and Priscilla and Chauhan (2019) also reported the higher employment generation from the dairying for the members as compared to non-members in their respective studies. The mean differences between the average annual employment between the members and non-members were

statistically significant ($P < 0.01$).

The study assessed the Impact of Dairy Co-operatives membership on income and employment of dairy farmers in Karnataka State. Overall the dairy co-operative societies had positive influence on income and employment for dairy farmers in all the regions of Karnataka. Hence, dairy farmers should be made aware about benefits of DCS and should be encouraged to become a member of these DCS.

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