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Resource use efficiency in cross breed cow milk production

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Abstract
The study was undertaken in eight villages in four tahsils of Amravati district in Maharashtra to examine the input- output relationship and assess the resource use efficiency in cross breed cows milk production. The study covered 120 milk producers. Out of which 32 milk producers were rearing cross breed cows. The results of Cobb-Douglas production revealed that, value of partial regression coefficient were found positive in variable viz; X_1 – dry fodder, X_3- medicines & vaccination, X_6 – watering charges, X_8- transport of inputs, X_9- veterinary doctor fees, X_{11}- Calcium dose were respectively0.001968, 0.5607, 0.0301, 1.3353, 0.2775, and 0.05866. On the contrary, value of partial regression coefficient were found negative in variable viz;X_2- green fodder, X_4- concentrate feed, X_5- grazing, X_7- breeding, X_{10}- cleaning expenses, X_{12}- interest on working capital, and in X_{13}- family labour were respectively -0.19166, -0.02579, -0.01061, -0.2261, -0.07588, -0.63596 and -0.6324. It was clearly seen that, the maximum partial regression coefficient was observed in variable X_8- transport of inputs it was 1.3353 whereas, the minimum value of partial regression was found in X_{12}- interest on working capital. In other word, it was indicated that elasticity of variable X_{12}- interest on working capital was maximum and elasticity of variable X_1 dry fodder was minimum.

Keywords: Fodder, concentrates, labour, resource use efficiency

Introduction
In India, agriculture and allied sectors provide livelihood to about 70 percent of the population and contribute only one fifth of national income, with the land available for cultivation remaining unchanged that is 139.4 million hectares. The per capita available land is 0.12 hectare. The pressure exerted by over increasing occupancy on the land by increasing strength of population has been further reducing the per capita available land. It is insufficient for maintaining minimum standard of living hence, it is utmost necessary that, subsidiary agro-based industries or occupation must be tried by rural people to seek over the means for their survival.

As a subsidiary agro-based industry, dairy provide drought power and manures which augment the crop production, Milch animals are one of the solutions to solve the problem of uncertainty associated in family business. Dairy enterprise is marginally profitable and farmers have ample opportunities to increase output by using more feed and hired labour inputs. The family members (men, women and children) and paid labours share each other in most of the related in dairy entrepreneurship. Therefore, to bring improvement in dairy enterprise and rural life, self employment of rural family members could contribute in the improvement of dairy farming activities as well as rural life.

There is great variation in the productivity and resource use efficiency of different breeds of milch cows reared in different resource situation due to variation in genetic characteristics feeding and management practices. Ultimately, these resources affect milk production. These resources have to be optimally utilized in order to get maximum income from dairy enterprise. Thus, present research study was under taken to provide guidelines for recognition of dairying by the improvement of dairy productivity in Amravati district in Maharashtra to cope with the object to study on resource use efficiency in the cross breed cows milk production.

Methodology
To study the resource use efficiency in cross breed cows milk production, the data was collected from 120 milk producers randomly in four tahasils in Amravati district through questionnaire. Out of which, 32 cross breed cows milk producers were selected for study. Resource use efficiency was calculated by using cobb-Douglus production function.

The functional model is presented in the fallowing equation.

$Y= a X_1^{b1} x X_2^{b2} x X_3^{b3} x X_4^{b4} x X_5^{b5} x X_6^{b6} x X_7^{b7}$

The Function was fitted in logarithms. The transformed function is -----

$LogY = \log a + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + b_7 \log X_7 + b_8 \log X_8 + b_9 \log X_9 + b_{10} \log X_{10} + b_{11} \log X_{11} + + b_{12} \log X_{12} + b_{13} \log X_{13}$

Where---
Y= Total receipt in rupees.
X_1-hired human labour (Rs) X_2-dry fodder (Rs)
X_3- green fodder (Rs) X_4-medicines & vaccination (Rs)
X_5- concentrate feed (Rs) X_6- grazing charges (Rs)
X_7- watering (Rs) X_8-breeding (Rs)
X_9- transportation of inputs (Rs) X_{10}- cleaning expenses (Rs)
X_{11}- calcium dose (Rs) X_{12}- interest on working capital (Rs)
X_{13}-family labour charges (Rs)
a = Constant intercept which indicate the level of output when zero inputs are use.
b_1 to b_7 = Production elasticity's partial regression coefficient of respective variables.

Above Cobb-Douglas production function is used for different variables and its results shown as resource use efficiency in the results and discussions.

Results and Discussion

After the analysis of data, it is tabulated as under

Table 1: Cobb-douglus production function for cross breed cows milk production

Sr. No.	Variables	Be-coefficient	SE Standard error	t-(stat) Value
	Intercept (a)	5.2379	3.5855	1.46083
1	X_1 – dry fodder	0.001968	0.1981	0.0099
2	X_2- green fodder	-0.19166	0.2622	-1.407
3	X_3- medicines & vaccination	0.5607	0.1633	2.137
4	X_4- concentrate feed	-0.02579	0.07671	-0.1579
5	X_5- grazing	-0.01061	0.0477	-0.1382
6	X_6 – watering charges	0.0301	0.2436	0.62996
7	X_7- breeding	-0.2261	0.9374	-0.9280
8	X_8- transport of inputs	1.3353	0.2247	1.4224
9	X_9- veterinary doctor fees	0.2775	0.35009	1.2384
10	X_{10}- cleaning expenses	-0.07588	0.0484	-0.2167
11	X_{11}- Calcium dose	0.05866	0.4526	1.2105
12	X_{12}- interest on working capital	-0.63596	0.4526	1.4049
13	X_{13}- family labour	-0.6324	0.8116	-0.7792
	R^2 - (R-squre)	0.496099		
	No. of observations	32		

Above statistical regression about resources use efficiency in the cross breed cows milk production shown that, value of partial regression coefficient were found positive in variable viz; X_1 – dry fodder, X_3- medicines & vaccination, X_6 – watering charges, X_8- transport of inputs, X_9- veterinary doctor fees, X_{11}- Calcium dose were respectively0.001968, 0.5607, 0.0301, 1.3353, 0.2775, and 0.05866. On the contrary, value of partial regression coefficient were found negative in variable viz;X_2- green fodder, X_4- concentrate feed, X_5- grazing, X_7- breeding, X_{10}- cleaning expenses, X_{12}- interest on working capital, and in X_{13}- family labour were respectively -0.19166, -0.02579, -0.01061, -0.2261, -0.07588, -0.63596 and -0.6324. It was clearly seen that, the maximum partial regression coefficient was observed in variable X_8- transport of inputs it was 1.3353 same observations were found in Meena G.L *et al*. 2012 [3]. Whereas the minimum value of partial regression was found in X_{12}- interest on working capital. In other word, it was indicated that elasticity of variable X_{12}- interest on working capital was maximum and elasticity of variable X_1 dry fodder was minimum, same analysis observed in Pandian SS, A, Shilpa Shree, A, Bhoopathy Raja, Vetrivel D. (2013) [5].
The regression results of the production in case of various resources used in cross breed cows milk production reveals that, feed inputs and labour together explain 49 percent if variation in milk yield (as shown in table No 1). The regression coefficient of dry fodder, calcium dose, medicines and vaccination were found positive and highly significant however, the milk output elasticity with respect to dry fodder was very low. In next observation, it was seen that, the responsiveness of the milk yield to calcium dose and proper vaccination was quite high. The labour showed negative though not significant. This may due to over employment of family labour in dairy farming.

Conclusions

As per the cob-douglus production function, regression coefficient values in cross breed cows milk production were found positive in the variable i e, dry fodder, (x1), medicines and vaccination (x3) and watering (x6). Whereas, it shown negative values in the variable viz green fodder (x2), concentrate feed (x4), and grazing (x5), it was -0.19166, -0.25579, and -0.01061respectively. It can be concluded that, the value of dry fodder, calcium dose, medicines and vaccination were found positive and had significant. Whereas, labour inputs shown negative though not significant.

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