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Resource use efficiency in local buffalo 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 local buffalo milk production. The study covered 120 milk producers. Out of which 28 milk producers were rearing local buffalo. The results of Cobb-Douglas production function revealed that, the value of partial regression coefficient value were positive in medicines and vaccination (x3), grazing (x5), breeding (x7), transportation cost of inputs (x8), veterinary doctor fees (x9) & calcium dose (x11) respectively as 0.043, 0.05362, 0.0066, 0.1261, 0.02338, 0.0280 & 0.833. Where as partial regression coefficient value were negative in he variables *viz*; dry fodder, (x1), green fodder (x2), concentrate feed (x4), watering charges (x6), & cleaning expenses (x10) respectively as -0.8640, -0.5210, -0.3080, -0.0020. & -0.2105. The maximum partial regression coefficient value was observed as 2.8333 i,e interest in working capital and minimum partial regression coefficient value was observed as 0.0020 in watering charges. In other words the elasticity of variables x12 i,e, interest on working capital was found maximum and the elasticity of variables x6 i, e, watering charges was found minimum. It was shown, grazing, breeding, &calcium dose were significant. Where as milk yield elasticity with respect to breeding was low. It is also concluded that, in the local buffalo milk production, high milk yield could be achieved by the use of green fodder and concentrate feeds at the time of milking.

Keywords: Coefficient, variables, fodder & milk production

Introduction
India with the total milk production of 132.43 million tones is the world's highest milk producing country for the past one decade now and accounted for about > 15% of the world milk production. The importance of dairy enterprise in the national economy can be gauged from the fact that, the value of output from group is highest among all the agricultural commodities, accounting for nearly one fourth of the value of output from agricultural sectors. 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 milchcows 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 local buffalo milk production.

Methodology
To study the resource use efficiency in local buffalo milk production, the data was collected from 120 milk producers randomly in four tahasils in Amravati district through questionnaire. Out of which, 28 local buffalo milk producers were selected for study. Resource use efficiency was calculated by using Cobb-douglas production function. The functional model is presented in the fallowing equation.

$$Y = a\ X_1^{b1} \times X_2^{b2} \times X_3^{b3} \times X_4^{b4} \times X_5^{b5} \times X_6^{b6} \times X_7^{b7} \text{ ------} \times X_{12}^{b12}$$

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

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

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)
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 different variables in the local buffalo milk production.

Sr. No.	Variables	Be-coefficient	SE Standard error	t-(stat) Value
	Intercept (a)	1.4269	1.4806	0.9637
1	X_1 – dry fodder	-0.8640	0.65563	-1.3179
2	X_2- green fodder	-0.5210	0.4212	-1.2388
3	X_3- medicines & vaccination	0.04330	0.403901	1.11054
4	X_4- concentrate feed	-0.3082	0.3339	-.9230
5	X_5- grazing	0.05362	0.0408	1.3245
6	X_6 – watering charges	-0.0020	0.0517	-0.04036
7	X_7- breeding	0.0066	0.01104	0.6006
8	X_8- transport of inputs	0.1261	0.5287	0.23859
9	X_9- veterinary doctor's fees	0.02338	0.5287	0.23859
10	X_{10}- cleaning expenses	-0.2105	0.6105	-0.34476
11	X_{11}- Calcium dose	0.0280	0.1688	0.1663
12	X_{12}- interest on working capital	2.8333	1.6461	1.072117
	R^2 - (R-square)	0.85513		
	Numbers of observations	28		

The above statistical co-relation about various resources used in the local buffaloes milk production denoted that, the value of partial regression coefficient value were positive in medicines and vaccination (x3), grazing (x5), breeding (x7), transportation cost of inputs (x8), veterinary doctor fees (x9) & calcium dose (x11) respectively as 0.043, 0.05362, 0.0066, 0.1261, 0.02338, 0.0280 & 0.833. Where as partial regression coefficient value were negative in the variables *viz*; dry fodder, (x1), green fodder (x2), concentrate feed (x4), watering charges (x6), & cleaning expenses (x10) respectively as -0.8640, -0.5210, -0.3080, -0.0020. & -0.2105.
The maximum partial regression coefficient value was observed as 2.8333 i,e interest in working capital and minimum partial regression coefficient value was observed as 0.0020 in watering charges. In other words the elasticity of variables x12 i,e, interest on working capital was found maximum and the elasticity of variables x6 i, e, watering charges was found minimum.,
The critical observations in the regression coefficient of various resources used in local buffaloes milk production revealed that, feeds and other services together explain 85% of variation in milk yield (as detected in the table). The regression coefficient of vaccination, grazing, breeding, calcium dose (mineral mixture) were found positive and significant. However the milk yield elasticity with respect to breeding was low. In this analysis, it was observed that, the responsiveness of milk yield to proper vaccination, grazing & calcium dose was high.

Conclusion
As per the regression analysis, in the local buffalo milk production, it was represented that, the partial regression coefficient values were found positive in variables *viz*; grazing (x5), breeding (x7), & veterinary doctor's fees (x9),. Whereas regression coefficient values were negative in variables *viz*; dry fodder (x1), green fodder(x2) & concentrate feeds (x4). It was shown, grazing, breeding, &calcium dose were significant. Where as milk yield elasticity with respect to breeding was low. It is also concluded that, in the local buffalo milk production, high milk yield could be achieved by the use of green fodder and concentrate feeds at the time of milking.

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