



RESEARCH ARTICLE

Efficiency of Resources Use in Urban Milk Production in the State of Tamil Nadu, India

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ABSTRACT

The Study was under taken to analyze the Productivity of Resource in Milk Production in urban areas of Tamil Nadu. A Total Sample Size of 90 dairy farmers was selected from three urban milk shed areas of Tamil Nadu namely Chennai (Tambaram), Erode and Vellore for the present Study. To estimate the productivity of resources in milk production, Cobb Douglas Production Function was used. The co-efficient of multiple determinations (adjusted R^2) was 0.912, indicating that the five variables selected for the analysis had explained 91.2 percent variation in total milk production. The Results of Cobb-Douglas Production Function revealed that concentrate, green fodder and labour had Positive and highly significant ($P < 0.01$) influence on Milk Production. The result of allocative efficiency of Resources in milk production revealed that concentrates, labour and veterinary charges were under-utilized, whereas green fodder and dry fodder were over-utilized.

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INTRODUCTION

During the last three decades, our Nation's milk producers have transformed Indian dairying from stagnation to world leadership. In India, dairying is recognized as an instrument for social and economic development. Dairy sector play a significant role in supplementing family income and generating gainful employment in the rural areas besides providing cheap nutritional food to millions of people. The growth of dairy sector during the last three decades has been impressive. The Nation's milk supply comes from millions of small producers. India ranks first in the world in milk production (121.84 million tones). The per capita availability of milk is 281 grams in 2010-2011. Milk emerged as one of the biggest contributor to the value of agricultural output in the country. Increase in milk production with limited resources like quality and quantity of feed, labour, genetic potential of the animal and to ensure the optimal use of various inputs used by the milk producers is matter of primary concern. It is important to know whether the inputs owned by milk producers are used efficiently or not. Resource use efficiency comprised the distribution of a given amount of scare factor among the set of alternatives in the production so as to maximize the profit (Ganeshkumar *et al.* 2000). Education of farmers plays a significant role in both technical and

allocative efficiency (Kumbhakar *et al.* 1991). An empirical assessment of determinants of milk production and resource use efficiency are important for planning, projecting and formulating dairy development policies in a particular region. For the present study, three urban areas of Tamil Nadu namely Chennai, erode and Vellore were selected. This study estimates the various factors of milk production and their levels of allocative efficiency in milk production for local and cross-bred cows in the urban areas. There were a lot of similar studies conducted in rural areas. But very less work is done in urban milk production.

MATERIALS AND METHODS

In Tamil Nadu, three urban milk shed areas namely Chennai (Tambaram), Erode and Vellore were selected for the present study. From each of these areas, 30 dairy farmers were selected by Simple random sampling technique. In all, a total sample size of 90 dairy farmers was selected for the present study.

Period of study

The field survey for this study was conducted during the month of November and December 2012 and the data was collected from the sample units related to the year 2012.

Collection of data

Information relating to various aspects of dairy farming was collected from selected farmers by survey method with a well-designed and pre-tested interview schedule. Details of inputs used like green fodder, dry fodder, concentrates with their quantities and price, labour employed with wage particulars veterinary and breeding expenses, miscellaneous expenses and data on outputs like milk were also collected from the dairy farmers. The data collected are analyzed with a view to achieve the objectives of the study as follows:

Analytical Framework

The log linear regression analysis was used to study the relationship between milk and different factors influencing it. The Cobb-douglas production was used to obtain the parameters for the measurement of productivity of resources in milk production. Various studies are available on the use of Cobb-Douglas production function for the measurement of productivity of resources in milk production (Meena *et al.*, 2012 ; venkatesh *et al.*, 2011; Reddy, 2000; Kumar *et al.* 2012)

The Cobb-Douglas production function for milk production was specified and defined as follows:

$$\ln Y = \alpha_0 + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + \mu$$

Where,

Y = Milk produced per annum (lit)

α_0 = constant

X_1 = Concentrates fed per annum (Kg)

X_2 = Green fodder fed per annum (Kg)

X_3 = Dry fodder fed per annum (Kg)

X_4 = Labour employed per annum (man-days)

X_5 = Veterinary services per year (Rs)

μ = error term

Determining the Economic Efficiency of Resource use

The following ratio was used to estimate the relative efficiency of resource use (r)

$$r = MVP/MFC \quad \text{Where:}$$

MFC = Marginal Factor Cost (cost of one unit of a particular resource)

MVP = Marginal value product, calculated by multiplying the MPP by the price of output,

$$MVP = b_i \frac{Y}{X} P_y$$

Y = geometric mean of total output

X = geometric mean of particular input

b_i = regression coefficient of that input

P_y = price per unit of output

Decision rule

If $r = 1$, resource is efficiently utilized,

If $r > 1$, resource is under-utilized

If $r < 1$, resource is over utilized.

Economic optimum takes place where $MVP = MFC$ i.e. Production is said to be efficient when $MVP = MFC$ (Rajendran and Prabakaran, 1989). If r is not equal to 1, it suggests that resources are inefficiently utilized. Adjustments could be therefore, be made in the quantity of inputs used and costs in the production process to restore $r = 1$. Any deviation of MVP of i^{th} inputs from its unit price are termed as resource use inefficiency.

RESULTS AND DISCUSSION

In a production process, the objective is to co-ordinate and utilizes resources in such a manner that they together yield the highest net returns. This is optimum use of resources in production. To study the resource use efficiency of factors in milk production, a log linear production function was fitted to the data. The independent variables used were concentrate feed (X_1), green fodder(X_2), dry fodder(X_3), labour(X_4), and veterinary charges(X_5). The result of the regression analysis in respect of the production function is presented in Table 1.

Table 1: Regression co-efficients for milk production in the study area

Variables	Regression co-efficients	't' value
Constant	0.252	0.729
Concentrate feed(X_1)	0.357**	5.897
green fodder(X_2)	0.546**	9.431
dry fodder(X_3)	-0.009	-0.202
labour(X_4)	0.128**	3.378
Veterinary charges(X_5)	0.057	1.392
F	186.056**	
R ²	0.917	
Adjusted R ²	0.912	

** Significant at one percent level. (P<0.01)

From the Table 1, it could be observed that the co-efficient of multiple determinations (adjusted R²) was 0.912, which indicated that the five variables selected for the analysis have explained 91.2 percent variation in total milk production. Among the five variables, the concentrate feed, green fodder and labour variables were significant at one percent level. The above analysis clearly indicated the importance of concentrates, green fodder and labour input for higher milk production and profits. Similar findings were reported by Singh *et al.* (2010). The variables dry fodder and veterinary charges were not having any significant influence on milk production in the study area. The dry fodder variable was negative and insignificant. Manoharan (2004) observed the similar findings in their studies. The marginal productivity of concentrates, green fodder and labour was 0.357, 0.546 and 0.128 respectively explaining that one percent increase in these variables would increase the milk production by 0.357, 0.546 and 0.128 percent respectively *ceteris paribus*. Previous studies by Sharma and Singh (1993) and Ahuja *et al.* (1999) observed the strong causal effect between the concentrates and milk production.

From the Table 2 it could be observed that the ratio of marginal value product to marginal factor cost was more than unity for concentrates, labour and veterinary charges indicating that these resources were under-utilized and there was scope for increasing the use of these resources in the study area. Similar findings were reported by Pandian *et al.* (2013) and Ganeshkumar *et al.* (2000) in their study. The variables like green fodder and dry fodder were over utilized. At the same time, they can rationalize the use of green fodder and dry fodder. Since feed and fodder resources encompass around 70 per cent of the cost of milk production, care should be taken to use these resources optimally. Further, now a days, labour is a very

Table 2: Resource use Efficiency of Urban Milk Production

S. No.	Variables	Geometric mean	Elasticity of output	MVP	MFC	MVP/MFC
1	Concentrates	3232.42	0.357	14.994	10	1.499
2	Green Fodder	18530.67	0.546	0.017	5	0.003
3	Dry Fodder	4223.86	0.009	0.189	3	0.063
4	Labour	257.94	0.128	77.952	50	1.559
5	Veterinary Charges	1035.44	0.057	8.379	1	8.379

important resource in urban areas. Hence this resource should be used optimally in an urban milk production system.

Conclusions

The study of Productivity of resources in urban milk production of Tamil Nadu revealed that the variables like green fodder; concentrates and labour were statistically significant and had a positive sign while the dry fodder variable was negative and insignificant. The variables like concentrates, labour and veterinary charges were under-utilized and variables like green fodder and dry fodder were over utilized. Since feed and fodder resources encompass around 70 per cent of the cost of milk production, care should be taken to use these resources optimally. Further, now a days, labour is a very important resource in urban areas. Hence this resource should be used optimally in an urban milk production system.

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