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RESOURCE PRODUCTIVITY IN MILK PRODUCTION

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A milk production function was estimated from the primary data collected from the dairy producers. Results obtained provide evidence that the profit of the dairymen can be increased through the efficient use of resources.

INTRODUCTION

Over the period 1971-72 to 1982-83, the total milk production in Pakistan increased from 6.3 to 7.8 million tonnes with an annual growth rate of 1.30 percent. Over the same period, human population increased from 65.31 to 89.12 million heads with an annual growth rate of 3.10 percent. Consequently, the average annual per capita consumption of milk in Pakistan declined from 97 to 88 kilograms (Government of Pakistan 1981-83).

The bulk of milk production in our country is in the hands of millions of small producers scattered all over the country. To most of them, it is a supplementary or complementary enterprise only. Therefore, there exists a vast scope for improving the milk production by commercialising this enterprise. Milk production can be increased either by increasing the number of milch animals or by improving the productivity of the individual animal. It may not be possible to rear substantially additional number of animals as there is already a heavy pressure of animals per unit of land (Irfan, 1979). Moreover, pressure of cash and food crops on land is increasing day by day leaving less land for growing fodder crops.

However, milk production can be increased significantly by improving the productivity of animals which presently is very low. The average daily milk yield for a buffalo in the country is estimated to be 5.3 litres.

Increase in the productivity of animals may come from two directions, namely, feeding and managment and breeding. Compared to the former, breeding and selection are relatively slow processes. In the short run, feeding and management are the major factors influencing milk production (Reiman, 1952). The dairy men who rear the milch animals have little specific knowledge about

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the feeding requirements since they are usually illiterate. They mostly depend on the practices and myths left by their ancestors. They feed large amount of dry roughages with little green fodder and a few Kg of unbalanced concentrate mixture to the milch animals. The well-to-do people overfeed their animals due to lack of interest. A few studies have been conducted in Pakistan pertaining to various sspects of milk production (Aslam and Haider, 1991) but none of those aimed at determining the optimum level of various inputs which maximize the profit of the producers. The present study was, therefore, conducted with the following objectives.

1. To estiblish input-output relationship in milk production.
2. To determine the optimum quantities of various inputs and milk output.

METHODOLOGY

As a matter of fact this study should have been conducted in rural areas. But, in these areas, animals are fed in lots and the exact quantity of feed consumed per animal cannot be ascertained. Since most of producers in the urban areas buy the roughages/concentrate from the market, therefore it is easy to get accurate information about the quantity of various feeds fed per day. The study was thus confined to Committee No. 8 of Faisalabad city comprising of Ghulam Muhammad Abad, Raza Abad and Madanpura. The study involved only the buffaloe as these contribute about 71 percent of the total milk production in Pakistan.

Before the data collection, a comprehensive interview schedule was designed. After pretesting, the interview schedule was used for data collection. Data were collected for the first two weeks of March, 1984 from the milk producers for 110 buffaloes.

Various functional forms of production function were tried to express the relationship between milk output per milch animal and the various input factors influencing it. Of these, quadratic production function was chosen on the basis of signs of coefficents, level of significance of the included variables, and for its highest R^2 (Coefficient of mltiple determination). Quadratic production function used in this study is as under.

$$Y = a + b_1WN + b_2CC + b_3 ST + b_4 WB + b_5 B + b_6 SL + b_7 L + b_8 WN^2 + b_9 CC^2 + b_{10} ST^2 + b_{11} WB^2 + b_{12}B^2 + b_{13} SL^2 + b_{14}CCLN + b_{15}STB + b_{16}LNSL + b_{17}WBCC.$$

Where :

Y = Average daily milk yield per milch buffalo in kilograms over the previous week.

WN = Kilograms of wheat bran fed per milch animal per day in the previous week.

CC = Kilograms of cottonseed cake fed per milch animal per day in the previous week.

SΓ = Kilogrsms of sugarcane tops fed per milch animal per day in the pervious week.

WB = Kilograms of wheat bdoosa fed fed per milch animal per day in the previous week.

B = Kilograms of berseem fed per milch animal per day in the previous week.

L = Labour hours used per animal per day.

SL = The stage of lactation, i.e., period since calving in months.

LN = The number of lactation.

RESULTS AND DISCUSSION

The estimated equation expressing milk yield as a functiou of wheat bran, cottonseed cake (undecorticated), sugarcane tops, wheat bhoosa, berseem, labour and other variables such as lactation unmber and advancement of lactation, is given in Table 1.

An examination of the conffıcients of multiple determination of the production equation revealed the value of R^2 to be 0.98, implying thereby that the independent variables explained about 98 per cent of the total variation in milk yield. Both the linear and quardratic terms for different variables had the signs which were expected according to economic theory.

Maximization of milk yield through resource adjustment.

To determine the extent of increase in the milk yield through the optimal allocation of inputs, the optimum quantity of various inputs was determined. The optimally allocated level of various inputs alongwith their existing levels are presented in Table 2.

It may be noted that the level of wheat bran and cotton seed cake increased from 1.89 kg and 1.88 kg in the existing plan to 3.15 kg and 2.96 kg, respectively at the optimal level, while that of wheat bhoosa and sugarcane tops

Table 1. *Estimated production function for different variables.*

Independent Variables		Regression Co-efficients.	Standard Errors.	t-Value
Constant.		–4.84260	—	—
Wheat bran	(WN)	3.40206**	0.741	4.59
Cottonseed Cake.	(CC)	2.50938**	0.903	2.78
Sugarcane Tops.	(ST)	0.22366**	0.075	2.98
Wheat bhoosa.	(WB)	0.66913*	0.267	2.51
Berseem.	(B)	0.09068[b]	0.070	1.30
Stage of lactation.	(SL)	0.22926**	0.063	3.64
Labour.	(L)	–0.36139	0.423	0.85
	(WN^2)	–0 49583**	0.181	2.74
	(CC^2)	–0.10162	0.219	0.46
	(ST^2)	–0.00449*	0.002	2.25
	(WB^2)	–0.02611	0.022	1.19
	(B^2)	–0.00065	0.001	0.65
	(SL^2)	–0,02198	0.006	3.66
	(CCLN)	0.02405[b]	0.016	1.50
	(STB)	–0.00584[a]	0.003	1.95
	(LNSL)	–0.01360*	0.006	2.27
	(WBCC)	–0.19111	0.054	3.54

R^2 = 97.97 per cent. F. Ratio = 260.65

a = Significant at 10 per cent level of significance.

b = Significant at 20 per cent level of significance.

* = Significant at 5 per cent level of significance.

** = Significant at 5 per cent level of significance.

Table 2. *Optimal and existing levels of feeds and fodder inputs (Kgs).*

Level	Wheat Bran	Cotton Seed Cake	Sugarcane Tops	Wheat Bhoosa	Berseem
Extisting	1.89	1.88	7.50	6.36	22.80
Optimal	3.15	2.96	5.12	4.19	22.80*

* This fodder item was non-significant and has been kept at its existing level.

decreased from 6.36 kg and 7.50 kg in the existing plan to 4.19 kg and 5.12 kg, respectively, at the optimal level. This revealed a shift of inputs from roughages to concentrates. These results confirmed the general observation that the dairy farmers are using large amounts of roughages and small quanties of various concentrates. The optimum level of milk output was determined by substituting the optimally allocated quantities of various inputs into the estimated equation. The optimum milk output per day came to be 9.42 kg compared with 6.55 kg, under the existing quantities of various inputs. The increase in milk through the adjustment of feeds and fodder inputs was 43.9 percent. Thus, a shift from existing level of feeding to an optimal one would involve an additional expenditure of Rs. 3.90, while the additional income from additional milk would be Rs. 12.89. This would further increase the profit of the dairy producer by Rs. 8.99 per day.

POLICY GUIDELINES

(a) The results of the study revealed that there existed great potential for increasing milk propuction through intensive use of concentrates, as the milch animals are fed at much lower level than the optimum. A number of reasons may be attributed to the low use levels of concentrates. The major constraints, of course, include poor financial position of the dairy men and lack of knowledge/ incentive or the high prices of the feeds. To correct the situation the following points deserve special sttention.

(i) Provision of production credit on easy terms to the milk producers for the purchase of concentrates.

(ii) Short-duration practical training courses should be instituted for the dairy farmers in animal feeding and management.

(b) Conventionally, cottonseed cake (undecorticated), wheat bran, rapeseed cake, etc. have been used as dairy concentrate. Little efforts were made to introduce new commercial feeds by providing necessary incentives to the feed manufacturing sector and the consuming farmiug sector. Since there are no big pasture lands in the country, only the development of some efficient concentrated feeds can solve the problem.

(c) Milk production, among other factors, depends on the health of animals. More emphasis must be put to provide better health cover to dairy animals.

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