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ALLOCATIVE EFFICIENCY IN MILK PRODUCTION IN CHURU DISTRICT (RAJASTHAN)

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ABSTRACT

The study examines the input-output relationship and resource use efficiency in milk production in Churu district of Rajasthan, a dry area. The results indicate a sub-optimal use of resources for milk production both from local cows as well as buffaloes. Milk production may be enhanced by increased use of concentrates and green fodder. Since production of green fodder in the area is contingent on rains, emphasis should be placed on the increased use of concentrates.

Introduction

Given the technology, allocative efficiency refers to optimisation of output so as to maximise net income. To achieve optimum output in milk production, it is imperative to know the input-output relationship as well as the efficiency in the use of various resources. Several researchers have studied input-output relationship and resource productivity in milk production and have found it different in different parts of the country. But no study has been conducted to probe into the milk production function and efficiency in the use of resources in dairying in Churu district of Rajasthan which is a part of the arid zone and has hardly any irrigation facilities. The present study was carried out to examine the input-output relationship and resource-use efficiency in milk production in this dry area.

Methodology

The study was conducted in Churu district which consists of seven tehsils. Out of these, one tehsil was randomly selected, and from the selected tehsil, two villages were further selected randomly. All the milk producing households in each selected village were listed and divided into four categories, viz., landless labourers, marginal farmers, small farmers and large farmers on the basis of operationsl land holding. From these 4 categories, a sample of 103 households (50 from one village and 53 from the other) was selected for detailed investigation based on probability proportional to the total number of households of each category in each selected village.

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The data were collected from the sample households regarding the quantity and price of green fodder, dry fodder and concentrates fed per animal per day; labour used in the process of milk production (which was all family labour) and the prevailing wage rates of permanent hired labour in the villages to impute the value of family labour; milk yield and its sale price in respect of local cows and buffaloes during the summer (March-June), rainy (July-October) and winter (November-February) seasons of 1990-91.

To ascertain the input-output relationship in milk production, multiple regression analysis was employed separately for cows and buffaloes. The production functions were fitted to the data aggregated for all categories of households as there was no significant difference in feeding practices as well as the value of fodders and feed fed by the different groups of households.

The linear model was found to be the best fit for milk production functions. Owing to the absence of dry fodder in rainy season and that of green fodder in summer in the feeding schedules of the dairy farmers in the study area, the following milk production functions were fitted for different seasons:

Winter season :

$Y = a+b^1 GF+b^2 DF + b^3 C + b^4 L+u$

Where Y = Milk yield per animal per day (in litres)

GF = Value of green godder fed per animal per day (in rupees).

GF = Value of dry fodder fed per animal per day (in rupees).

C = Value of concentrates fed per animal per day (in rupees).

L = Value of human labour per animal per day (in rupees).

a = Intercept.

b_1, b_2, b_3 and b_4 are regression coefficients of respective variables and U is error term.

Summer Season :

$Y = a+b_1 DF + b_2 C+b_3 L+u$

Rainy Season :

$Y = a + b_1 GF + b_2 C+ b_3 L+u$

To examine the resource use efficiency, the marginal value products (MVP) of all those inputs which were retained in the equations were computed at their mean levels for different seasons and compared with their corresponding prices. The difference between the MVP and factor price was calculated in each case and tested for significance of its deviation from unity.

Results and Discussion

Milk Production Functions

It may be observed from Table 1 that in the case of both local cow and buffalo, concentrate was a highly significant variable with a positive sign of coefficient which affected the milk yield in all seasons. Similarly, green fodder was also found highly signigicant with a positive regression coefficient influencing the milk yield of both the animal species in rainy and winter seasons. There was no availability of green fodder in summer season in the study area.

As regards dry fodder, it was not available in rainy season while in winter and summer seasons its regression coefficient was non-significant in the case of cow as well as buffalo indicating that there was not much difference in the use of this input among the milk producers in the two seasons and it made no impact on the milk yield.

The regression coefficient of human labour too was found non-significant except in the case of cow in winter season when it was significant. It showed that this input also did not affect milk yield significantly as the use of human labour did not generally vary much as between the households.

Resource-use Efficiency

Table 2 exhibits marginal value products (MVP) of resources used in cow and buffalo milk production in comparison to their respective prices in different seasons. It is manifest from Table 2 that the MVP of concentrates was significantly higher than its price in milk production from local cow as well as buffalo in all the seasons. It indicated that this resource was not being used at optimal level by the milk producers and there was much scope for increasing net returns from milk production by enhancing the use of this resource. In the sam way, green fodder, which was fed in rainy and winter seasons and not in summer season, had a significantly greater MVP than its

price in the case of cow as well as buffalo in both rainy and winter seasons. It suggested that this input was also being used at sub-optimal level and there was need for increasing its use in feeding both types of animals to attain optimum level of feeding.

In the case of labour the difference between its MVP and price was found significant only for cows in winter season. It signifies that cow milk yield in winter season could be improved by increasing the use of labour to optimum level.

The foregoing analysis reveals that the resource use for milk production from local cow as well as buffalo was not optimal in the study area. There was enough scope for improving the efficiency of various resources by affecting rational adjustment in their use. The milk production could be appreciably enhanced by increased use of concentrates and green fodder in the study area. But since the production of green fodder in a dry area like Churu is fraught with uncertainty, it being contingent on rains, the major thrust under the existing situation should be directed towards increasing the use of concentrates.

Table 1: Milk Production Functions of Local Cow and Buffalo.

Season	Constant	Regression Coefficient				R^2	No. of observations
		Green fodder	Dry fodder	Concentrates	Labour		
Local Cow							
Rainy	1.2783	0.3540*	–	0.5260*	0.2904	0.54	69
	(0.3044)	(0.0487)		(0.0610)	(0.2753)		
Winter	-1.2972	0.4867*	0.0008	0.4484*	0.7091*	0.43	81
	(0.3594)	(0.0485)	(0.1695)	(0.0780)	(0.2365)		
Summer	0.6171	–	-0.0494	0.7550*	0.0140	0.89	73
	(0.2586)		(0.1491)	(0.0470)	(0.1849)		
Buffalo							
Rainy	1.4343	0.3225*	–	0.6407*	0.1972	0.71	50
	(0.4674)	(0.0330)		(0.0604)	(0.3464)		
Winter	2.7185	0.5797*	-0.2543	0.5840*	0.2118	0.73	58
	(0.4973)	(0.0376)	(0.2280)	(0.0558)	(0.3585)		
Summer	-0.0585	–	0.1065	0.5124*	-0.0310	0.52	53
	(0.6595)		0.3103)	(0.0767)	(0.5273)		

Note : Figures in parentheses are standard errors of respective regression coefficients.
* Signinficant at 1% level.

Table 2 : Comparison of Marginal Value Products of Resources with their Prices in Different Seasons.

Item		Local cow			Buffalo		
		Rainy	Winter	Summer	Rainy	Winter	Summer
Gree fodder							
	MVP	1.4160	1.9468	–	1.3706	2.4637	–
	Price	1	1		1	1	
Difference		0.4160**	0.9468***	–	0.3706**	1.4637**	
		(0.1910)	(0.3161)		(0.1428)	(0.5314)	–
Concentrates							
	MVP	2.1040	1.7936	3.3975	2.7229	2.4820	2.5620
	Price	1	1	1	1	1	1
Difference		1.1040***	0.7936***	2.3975***	1.7229***	1.4820***	1.5620***
		(0.3223)	(0.2956)	(0.1896)	(0.2037)	(0.1956)	(0.2207)
Labour							
	MVP	–	2.8364	–	–	–	–
	Price		1				
Difference			1.8364*				
			(0.9245)				

Note : Figures in parentheses are standard errors.

*** Significant at 1% level.

** Significant at 5% level.

* Singnificant at 10% level.

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