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RESULTS & DISCUSSION

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APPENDIX/ANNEXURE

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PRODUCTION FUNCTION ANALYSIS OF MEMBERS DAIRY COOPERATIVE SOCIETY FOR MILCH BUFFALO IN DISTRICT ETAWAH, INDIA

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ABSTRACT

The international body on the farm sector in its latest 'Food Outlook' report estimates global milk production in 2020 grow by 2 percent to 772 MTs. India's milk production rose by 4 percent i.e., 127.9 MTs in 2011-12 and per capita availability was 291 gms per day while in 2010-11 milk production was 121.8 MTs and per capita availability was 281 gms per day. In domestic market there is surge in demand of milk and dairy products not adequately met by the production and processing facilities of the same so far. The study analyzed various factors of production in (INR) like Feeding cost included (dry fodder + green fodder), expenditure of Concentrate included (grain + khali + mineral material and chunni / choker) and miscellaneous expenses included (labor charge and fixed cost) on milk produced by the buffalo of dairy cooperative society members in annual in different categories of farmers i.e, landless, marginal, small, medium and large on the basis of land holding capacity. Further, the researchers have found out the comparative analysis of all the categories of dairy cooperative society members. Cob Douglas production function and Tukey and Kramer analysis is applied on member's dairy cooperative society for milch buffalo in district Etawah of U.P, INDIA by means of taking post- stratified sample of Landless, Marginal, Small, Medium and Large herd size categories.

KEYWORDS

elasticity of fodder, elasticity of concentrate, elasticity of miscellaneous, return to scale.

INTRODUCTION

As per an assessment made by the Planning Commission Report-2012, the domestic demand for the milk by 2020-21 is expected to be 172.20 Million Tonnes (MTs) and hopefullly India would have sufficient production to complement surging demand. The international body on the farm sector in its latest 'Food Outlook' report also estimates global milk production in 2020 grow by 2 percent to 772 MTs. India's milk production rose by 4 percent i.e., 127.9 MTs in 2011-12 and per capita availability was 291 gms per day while in 2010-11 milk production was 121.8 MTs and per capita availability was 281 gms per day. In domestic market there is surge in demand of milk and dairy products not adequately met by the production and processing facilities of the same so far. The study analyzed various factors of production in (INR) like Feeding cost included (dry fodder + green fodder), expenditure of Concentrate included (grain + khali + mineral material and chunni / choker) and miscellaneous expenses included (labor charge and fixed cost) on milk produced by the buffalo of dairy cooperative society members in annual in different categories of farmers i.e, landless, marginal, small, medium and large on the basis of land holding capacity. Further, the researchers have found out the comparative analysis of all the categories of dairy cooperative society members. At last Tukey and Kramer test was applied to all the categories of dairy cooperative society members in milch buffalo to get into the depth of the problem under investigation. This study is helpful to find out the elasticity of different factors of milk production and comparative analysis in all categories of member's dairy cooperative society in milch buffalo.

"Etawah" in Uttar Pradesh is famous for its Bhadawari breeds of buffalo and Jamunapari breed of goats. The said breed of buffalo was also known for consuming less fodder relative to the production of high fat content milk. However, all the milch animals such as buffalo, cow and goats are grazed in the ravines and the forest area between Jamuna and Chambal rivers of Etawah district of U.P. The numbers of milch livestock of Etawah district during 2012 were reported as total number of female adult cows 1, 10,825 total number of adult females' buffaloes 92065 and total female adult goats were 2, 41, 61.

The trend shows that very soon Etawah district will get an important place in the future, map of "milk Grid" of India by producing on an average of 2.801 lakh liters per day during 1986-87 which was increased to 3.83 lakh litres per day during 2006-07 and now 2011-12 it will be increasing 5.20 lakh litres per day. There were 3020 cooperative milk producer societies during 1986-87, which has increased to 4272 during 20011-12. Cooperative milk societies of Etawah produced 0.22 lacs liters per day in 1986-87 while they produced 2.53 lacs liters per day in 2006-07. Recently the latest production of milk in 2011-12 was 3.86 lacs liters per day.

REVIEW OF LITERATURE

Murithi, Festus Meme, (2002), study was motivated by the need to find means of increasing milk supply in Kenya in order to meet an expected rise in demand. The study was concerned with the efficiency of resource use in smallholder milk productlon. The major objective of the study was to determine whether there are possibilities of increasing milk production through re-allocation of the resources used in milk production. The problems encountered by farmers involved in milk production were also examined. The data used in the study were collected from 60 smallholders who are members of five Dairy Co-operative Societies which are affiliated to the Meru Central Farmers Co-operative Union. A Cobb-Douglas milk production function was fitted using the inputs used in milk production. The results showed that concentrates significantly influenced milk yields. The test for efficiency of resource use revealed that there was inefficiency in the used concentrates. Profit maximization requires that the marginal value product of an input be equated to the price. If this condition is fulfilled in the study area with respect to concentrates, the average milk yield per animal per year would increase by 73% above the current levels. An important conclusion of the study is that there could be substantial in milk output and consequently gains in farm profits if the amount of concentrates fed to the animals is increased above the current levels. It is recommended that:- (i) efforts be intensified to educate the benefits of increased feeding of concenterates to the (i) animals, constraints which contribute to the unavailability of concenterates when farmers need them be removed, (iii) farmers be educated on how they can the excess animal feeds which is produced the wet season to feed the animals during the (iv) be and educated on how best season, they can utilize the farm by-products while they are of high nutrition value to feed the animals.

Prajneshu, (2008), the set of Cobb-Douglas production functions is usually fitted by first linearize the models through logarithmic transformation and then applying method of least squares. However, this procedure is valid only when the underlying assumption of multiplicative error-terms is justified. Unfortunately, this assumption is rarely satisfied in practice and accordingly, the results obtained are of doubtful nature. Further, nonlinear estimation procedures generally yield parameter estimates exhibiting extremely high correlations, implying thereby that the parameters are not estimated independently. In this paper, use of expected-

value parameters has been highlighted and the advantages of their use have also been discussed. Finally, the developed methodology has been illustrated by applying it to the wheat yield time-series data of Punjab.

Venkatesh P. and Sangeetha V., (2011), study was conducted to examine the cost structure and resource use efficiency of dairy farms at the Madurai district of Tamil Nadu. The dairy farmers were selected by using multi stage random sampling technique. Tabular analysis and Cobb-Douglas production function were used in this study. Total costs per lactation per animal estimated were of the order of INR 12776.09, INR 11791.20 and INR 12079.28 and returns per rupee of investment 0.78, 1.08 and 0.95 respectively on small, large and pooled farms. Feed cost was the higher input cost in dairy farming (61.6 percent). The cost of production milk per litre was less in case of large farms (INR 4.62) compared to small farms (INR 5.39). Results indicated the inverse relationship with the size and the herd of the total costs, due to economies of scale. Functional analysis showed barring human labour on small farms all the selected input variables such as green fodder, dry fodder, concentrates and health care were positive and significant impact on the production of milk indicating the potentiality of their further use.

Meena G. L. et.al., (2012), study was undertaken in Alwar District of Rajasthan with the objectives to examine the input-output relationships and assess the resource use efficiency in milk production. The study covered 75 cooperative member milk producers and 75 non-cooperative member milk producers. The results of Cobb-Douglas production function revealed that concentrate had positive and significant influence on returns from buffalo milk across all the household categories for both the member and non-member groups. Green fodder and dry fodder were also influenced the returns from milk significantly across all the household categories for both the member and non-member groups with the sole exception of large category of non-member group. D1 (winter) and D2 (Rainy) dummy variables were found to be positive and statistically significant. The results of Chow's test clearly revealed that the production functions between member and non-member groups differed significantly. The results of the resource use efficiency revealed that green fodder was over-utilized in small and medium categories for both the member and non-member groups, dry fodder was over-utilized by medium category of member group, concentrate was over-utilized by only medium category of member group and by small & medium categories of non-member group while it was under-utilized by large category of non-member group and labour was over-utilized by only small category of member group.

RESEARCH METHODOLOGY

District Etawah milk producers' cooperative union was purposively selected from state of Uttar Pradesh. Exhaustive lists of all the milk producers' cooperative societies in Etawah district milk producer's cooperative union were prepared. Researchers have selected randomly 150 non member of dairy cooperative society & 150 members of dairy cooperative society from 10 Villages of 2 blocks selected in district Etawah. All the milk producing households members and non members were classified into five categories, viz., Land less, Marginal, Small, Medium and Large farmers on the basis of land holding capability. Thus in all, 300 households were interviewed during the year 2008-09. The primary data were collected with help of well structured pre-tested schedule by personal enquiry method. The data collected were subjected to tabular analysis in order to study the comparative economics of milk production. Cobb-Douglas type Production Function analysis was applied on buffalo milk production with three variables like-fodder, concentrate and miscellaneous of different categories landless, marginal, small, medium and large member farmers of dairy cooperative society.

The study effect of various factors of production in (INR) in case of milk cooperative societies members in annual in different categories.

$$y = a\, x_1^{b_1}\, x_2^{b_2}\, x_3^{b_3} \quad \ldots (1)$$

$$\log y = \log a + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 \quad \ldots (2)$$

Where,

Y	=	Production of milk in (Rs.)
X_1	=	Feeding cost included (dry fodder + green fodder)
X_2	=	Expenditure of Concentrate included (grain + khali + mineral material and chunni / choker)
X_3	=	Miscellaneous expenses included a labor charge and fixed cost.
b_i	=	Respective elasticity's of milk production
a	=	constant

Having estimated the cost of milk production, it is desirable to ascertain the reliability of these fodder cost, concentrate cost and miscellaneous expanses estimates. The most commonly used "t" test was applied to ascertain whether the cost of milk is significantly different from zero or not at some specified probability level.

"t" cal=b_j / standard error of b_j.

If calculated "t" value is greater than the table value of "t" at a specified probability level and "n-k-1" degree freedom, bag is said to be statistically significant.

RESEARCH AND FINDINGS

TABLE 1: COBB DOUGLAS PRODUCTION FUNCTION ANALYSIS OF MEMBERS DAIRY COOPERATIVE SOCIETY (BUFFALO)

Category of farmers	Elasticity Fodder	Elasticity of Concentrate	Elasticity of Miscellaneous	R^2 value
Land less	1.4070	0.94780	-1.39421	86.82
"t" test value	0.35	1.50	-0.34	
S.E value	(4.0316)	(0.6307)	(4.0610)	
Marginal	0.0221	1.04526*	-0.02030	57.51
"t" test value	0.10	4.62	-0.46	
S.E value	(0.2262)	(1.2262)	(0.0.04379)	
Small	-0.05292	0.5855*	0.2374	77.70
"t" test value	-0.82	2.48	0.71	
S.E value	(0.0644)	(0.2360)	(0.3323)	
Medium	-0.80540	0.74999	1.15337	96.04
"t" test value	-1.49	0.91	1.65	
S.E value	(0.5393)	(0.8206)	(0.6962)	
Large	0.15615*	0.84582	0.0566	93.29
"t" test value	0.34	0.85	0.09	
S.E value	(0.4538)	(0.9911)	(0.6206)	

The analysis has revealed that Landless member farmers of dairy cooperative society failed to give sufficient all input variables like Fodder, Concentrate and Miscellaneous to the milch buffalo so it could not provide significant effect result on buffalo milk production and further marginal and small category only concentrate could provide a significant effect on milk production and next medium member farmers were doing same as land less farmers and in large member farmers, only fodder could provide a significant effect on milk production of milch buffalo The analysis further revealed that 86.82, 57.51, 77.70, 96.04 and 92.29 percent of the variation was explained by three input variables in land less, marginal, small, medium and large member farmers of dairy cooperative society respectively. Moreover, all the variables in this category remained the same. In R2 analysis maximum variation was occur in marginal category (57.51 percent) and minimum variation in medium category (96.04 percent).

SUMMARY OF ALL CATEGORIES OF DAIRY COOPERATIVE SOCIETY MEMBERS FOR MILCH BUFFALO

FIG. 1: ONEWAY ANALYSIS OF PRICE BY CATEGORY

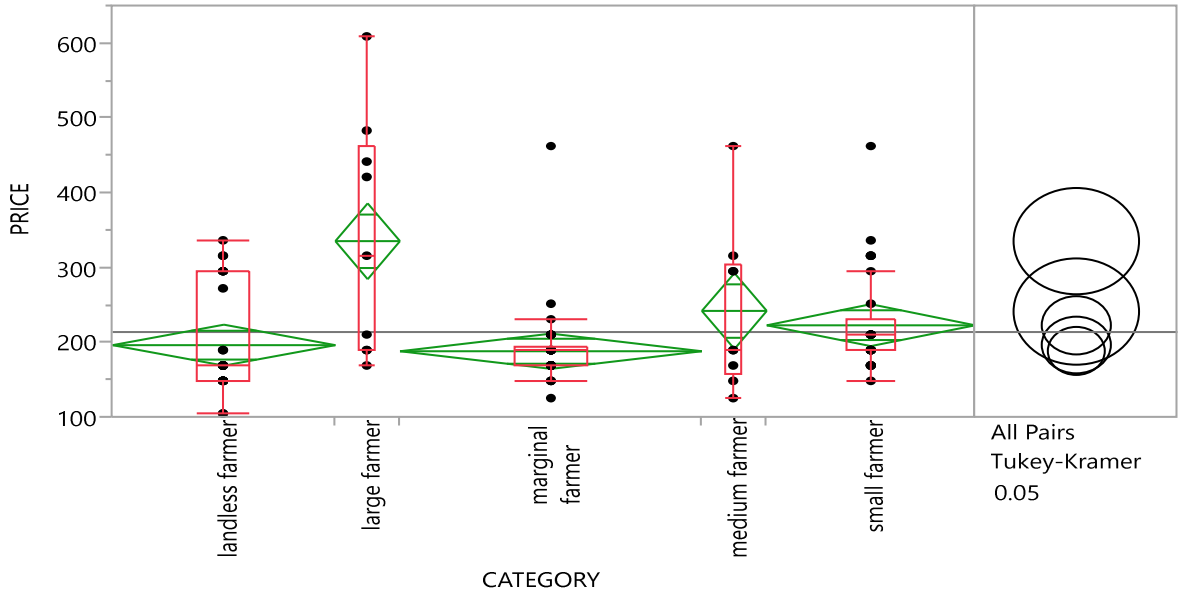

TABLE 2: CONNECTING LETTERS REPORT

Level			Mean
large farmer	A		336.00000
medium farmer	A	B	242.66667
small farmer		B	223.75862
landless farmer		B	197.12903
marginal farmer		B	189.00000

Levels not connected by same letter are significantly different.

TABLE 3: ORDERED DIFFERENCES REPORT

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value		
large farmer	marginal farmer	147.0000	28.13673	69.0181	224.9819	<.0001*		
large farmer	landless farmer	138.8710	29.00429	58.4846	219.2574	<.0001*		
large farmer	small farmer	112.2414	29.22846	31.2337	193.2491	0.0019*		
large farmer	medium farmer	93.3333	36.11005	-6.7469	193.4136	0.0799		
medium farmer	marginal farmer	53.6667	28.13673	-24.3153	131.6486	0.3193		
medium farmer	landless farmer	45.5376	29.00429	-34.8488	125.9241	0.5196		
small farmer	marginal farmer	34.7586	18.49439	-16.4992	86.0165	0.3343		
small farmer	landless farmer	26.6296	19.78929	-28.2171	81.4763	0.6634		
medium farmer	small farmer	18.9080	29.22846	-62.0997	99.9157	0.9669		
landless farmer	marginal farmer	8.1290	18.13804	-42.1412	58.3992	0.9916		

SUMMARY OF ALL CATEGORIES OF DAIRY COOPERATIVE SOCIETY MEMBERS OF MILCH BUFFALO

The analysis are revealed that mean of large farmers was observed Rs. 336.00 followed by medium farmers INR 242.667, small INR 223.759, land less farmers INR 197.129 and least for marginal farmers INR 189.00. This indicated the fact that large member farmers interestedness in milch animals, especially in buffalo is the highest.

Tukey test was applied to get into the depth of the problem under investigation. This indicated that there is no significant difference between large and medium farmers for milch buffalo. Further, there is no significant difference between Medium, Landless, Marginal and Small farmers.

Further, indicated the fact that the P value for Large and Marginal farmers, large and landless farmers and large and small farmers were observed significant at the 5 % level of probability (0.0001.0.0001 and 0.0019) respectively.

TABLE 4: RETURN TO SCALE FOR THE DAIRY COOPERATIVE SOCIETY MEMBERS (BUFFALO)

S.n.	Category	β_1	β_2	β_3	Total (β_{1+} β_{2+} β_3)	Return to Scale ≥1
1	Landless	25.217	8.8674	-24.786	9.2984	≥1
2	Marginal	1.0522	11.0983	-1.04785	11.10265	≥1
3	Small	-1.1295	3.8503	1.7274	4.4482	≥1
4	Medium	-6.3898	5.6232	14.2354	13.4688	≥1
5	Large	1.4326	7.0116	1.1392	9.5834	≥1

β_1= Elasticity of Fodder

β_2= Elasticity of Concentrate

β_3= Elasticity of Miscellaneous expanses

The above table no 4 reveal that Elasticity of milk production for all the five categories of member of dairy cooperative society in buffalo namely Landless, marginal, small, medium and large farmers. The last column indicates their economies of scale. Their respective value was observed 9.2984, 11.1026, 4.4482, 13.4688 and 9.5834 i.e., out of these five categories none of the any category member farmers were observed had decreasing return to scale.

The all five categories i.e., landless, marginal, small, medium and large exhibited increasing returns to scale and analysis, further reveals that return to scale was the highest for medium farmers followed by marginal, large, landless and small member farmers of dairy cooperative society in case of buffalo.

CONCLUSION

The results of the study revealed that Landless member farmers of dairy cooperative society failed to give sufficient Concentrate and Miscellaneous inputs to the milch cow but Fodder could provide significant effect result on cow milk production and further medium category only fodder and concentrate could provide a significant effect on milk production and next small farmers were doing same as marginal farmers and in large member farmers, only fodder could provide a significant effect on milk production of cow but in medium members farmers, none of the variables like Fodder, Concentrate and miscellaneous inputs could provide a significant effect result on buffalo milk production. Analysis of Tukey test indicated that there is no significant statistical difference between small, large and medium member farmers and no difference between Large, Landless and Marginal farmers.

Analysis of Elasticity of milk production for all the five categories of member of dairy cooperative society in buffalo, namely Landless, marginal, small, medium and large farmers. Out of these five categories that return to scale was the highest for marginal farmers followed by landless and medium member farmers.

It will here mention that the policy makers and planners engaged in dairy enterprise should concentrate all the above two categories small and large member farmers in case of buffalo should be given proper attention to enhance milk production in the area under jurisdiction.

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