Effect of herd size on cost of milk production of cross-bred cows and murrah buffaloes in Fatehabad Block of Agra district

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Abstract

The lactation milk yield of cross-bred cows and murrah buffaloes in Small, medium and large herd size groups was studied in Fatehabad block of Agra district and found that the per lactation milk yield of cross-bred cows and Murrah buffaloes in small, medium and large herd size groups was 2863±44 and 2386±39, 2781±41 and 2303±38 and 2597±36 and 2114±34 litre, respectively. The milk yield of cross-bred cows was significantly (P<0.01) higher than murrah buffaloes in all herd size groups. the milk yield decrease significantly (P<0.01) with increase herd size. The cost of milk production per litre in cross-bred cows (Rs.20.76 ± 0.48, 19.13 ± 0.53 and 17.28 ± 0.58) was significantly lower than that of Murrah buffaloes (Rs.27.18 ± 0.61, 26.03 ± 0.58 and 24.47 ± 0.53) and in above herd size group. The effect of herd size on cost of milk production per litre was also significant at 1% level of significant. The cost of milk production per litre decrease with increase herd size groups but the input-output ratio and net return per litre was significantly increase with increase herd size.

Introduction

Livestock sector contributes about 4.0 percent of the total GDP and 23 percent of the Ag.GDP in the year 2008-09. Milk is an important commodity not only as a source of dairy industrial raw material but also a nutritive food for the poepole. Milk has been considered nearly a complete food for the infants and growing children. India continues to be the largest producer of milk in the world. The estimate milk production in 2011-12 is 127.9 million tone and is likely to reach 133.7 Mt. This year making a per capita availability of milk at national level has increased from 260 gr. per day in 2007-08 to 290 gram per day in 2011-12 against 285 gram per day per capita recommended by world Health Organization (WHO).

The milk production is one of the important economic indicators of the dairy animals. Since it is the milk yield that ultimately gives the return to the cattle keepers. The total milk production per milch animal in a lactation depends on the daily milk production, efficiency of the animal, duration in milk, herd size of animal, holding size of families, species and breeds of the animals and its level of feeding (Bhaskar and Gupta, 1992).

The economic milk production could be envisaged through two angles, viz.: (1) decreasing the unit cost of milk production and (2) Increasing the milk productivity of milch animals. Any attempt to achieve these objectives will encourage the producers to produce more milk by mobilization of the available resources. The demand of milk and milk products shall continue to rise due to better nutritional consciousness, which calls for increased milk production and its availability at regional price.

Thus, keeping in view of the role of dairying as an instruments in augmenting the income of rural households through increased production of milk, the present study envisage the various problems associated with the upkeep of such animals as cross-bred cows and Murrah buffaloes and would also look into the possibility of harvesting maximum return through judicious combination of various inputs and outputs. The present study was, therefore, undertaken to assess the "Effect of herd size on cost of milk production of cross-bred cows and Murrah buffaloes in Fatehabad block of Agra district." with the following objectives:

1. Effect of herd size on productive performance of ruminants.

2. Effect of herd size on reproductive performance of ruminants.

3. Effect of herd size on cost and return of milk production of ruminant.

Materials and Methods

This study was conducted in eight villages of Fatehabad block of Agra district during the session 2013-14 which is located about 20 KM from Agra city. After selection of villages, a list of families having cross-bred cows and Murrah buffaloes was prepared. In all, 79 dairy farms were selected for this study. There were a total of 115 animals studies, out of which 60 were cross-bred cows and 55 were Murrah buffaloes which belongs to different lactation number and herd size groups. Herd size was divided into three groups viz.:

1. Small (having one animals),
2. Medium (having two animals) and
3. Large (having more than two animals.)

From each of the selected milk producers, detailed information regarding fixed capital investment, cost of animal, feed cost, length of lactation, feed given to animal, labour charges and other miscellaneous charges and milk yield per lactation per animal, sale price per litre and dung value were collected. The information on all aspects of production and marketing were collected through the records maintained by producers and personal interview.

Fixed cost are calculated as depreciation and interest on animal cost, cattle shed value and chaff cutter and equipment cost and repair charges made on cattle shed, equipments and machines etc. The variable cost was calculated as feed and fodder cost, labour charges, medicine and salt, ropes, service charges, if any. The maintenance cost was calculated by adding fixed and variable cost. Net maintenance cost was calculated by deducting dung value from maintenance cost. Cost of milk production per litre was calculated by dividing the net maintenance cost by the total milk production. Input-output ratio was determined by dividing the value of milk by the net maintenance cost incurred on each animal. The net return per litre was calculated after deducting the net maintenance cost from the rate of milk.

Results and Discussion

The effect of herd size variation on different components of milk production and cost of milk production of cross-bred cows and Murrah buffaloes was studied in depth and the salient features are abridged below:

The lactation milk yield of cross-bred cows in different herd size groups viz. small, medium and large was found to be 2863 ± 44, 2781 ± 41 and 2597 ± 36 litre, respectively. In case of Murrah buffaloes, it was

Table 1: Milk Production per lactation in different herd size groups

S.No. Herd Size	Milk Production per lact.(lit.)		Overall average (lit.)	Test of significant
	Cross-bred cows	Murrah Buffaloes		
Milk Production per lactation				
Small	2863.00±44.20(28)	2386.00±39.00(23)	2624.00±41.20(51)	5.479[++]
Medium	2781.00±41.60(22)	2303.00±38.10(20)	2542.00±39.60(42)	5.963[++]
Large	2597.00±36.30(10)	2114.00±34.60(12)	2355.00±36.00(22)	7.348[++]
Variance ratio	4.631[++]	4.298[++]		
Milk Production per day				
Small	8.57±0.34 (28)	7.50±0.38 (23)	8.04±0.50 (51)	2.24[+]
Medium	8.48±0.29 (22)	7.28±0.40 (20)	7.88±0.33 (42)	2.30[+]
Large	8.09±0.31 (10)	6.80±0.36 (12)	7.45±0.33 (22)	2.28[+]
Variance ratio	1.063[NS]	1.231[NS]		
Value of milk/ lactation				
Small	85890±716(28)	81124±889(23)	83507±803(51)	2.136[+]
Medium	83430±756(22)	78302±864(20)	80866±808(42)	2.361[+]
Large	77910±734(10)	71876±879(12)	74893±812(22)	3.632[+]
Variance ratio	4.369[++]	5.674[++]		

Note: Figures in parenthesis indicate number of animals

+ significant at $p \leq 0.05$ ++ significant at $p \leq 0.01$

Table 2: Cost of Milk Production of cross-bred cows and Murrah buffaloes

S.No. Herd Size	Cost of Milk Production (per litre)			Test of significant
	Cross-bred cows	Murrah Buffaloes	Overall average	
Lactation length (days)				
Small	334±2.10 (28)	318±2.00 (23)	326±2.00 (51)	5.631[++]
Medium	328±2.30 (22)	316±1.80 (20)	322±2.05 (42)	6.032[++]
Large	321±1.90 (10)	311±1.90 (12)	316±1.10 (22)	5.109[++]
Variance ratio	0.963[NS]	1.039[NS]		
Maintenance cost (Rs.)				
Small	63474.17±563(28)	69567.11±612(23)	66520.64±584(51)	5.963[++]
Medium	57077.21±541(22)	64550.50±586(20)	60813.86±563(42)	7.346[++]
Large	48589.59±526(10)	56145.87±579(12)	52367.73±562(22)	6.748[++]
Variance ratio	4.819[++]	6.924[++]		
Dung Value (Rs.)				
Small	4038.29±36.2 (28)	4715.63±46.40(23)	4376.96±42.20(51)	4.139[++]
Medium	3876.68±39.60(22)	4603.41±51.00(20)	4240.05±46.80(42)	5.216[++]
Large	3713.43±34.80(10)	4416.29±47.90(12)	4064.86±41.80(22)	4.986[++]
Variance ratio	7.463[++]	8.098[++]		
Net Maintenance cost (Rs.)				
Small	59435.88±513(28)	64851.48±583(23)	62143.68±548(51)	8.416[++]
Medium	53200.53±503(22)	59947.09±546(20)	56573.81±523(42)	9.963[++]
Large	44876.16±486(10)	51729.58±513(12)	48302.87±500(22)	6.498[++]
Variance ratio	5.364[++]	6.219[++]		
Cost of milk Production per litre (Rs.)				
Small	20.76±0.48(28)	27.18±0.61(23)	23.97±0.54(51)	4.635[++]
Medium	19.13±0.53(22)	26.03±0.58(20)	22.58±0.55(42)	5.129[++]
Large	17.28±0.58(10)	24.47±0.53(12)	20.88±0.54(22)	4.936[++]
Variance ratio	7.631[++]	6.294[++]		
Input-output Ratio				
Small	1:1.445±0.03 (28)	1:1.251±0.02 (23)	1:1.348±0.02 (51)	5.347[++]
Medium	1:1.568±0.02 (22)	1:1.326±0.02 (20)	1:1.437±0.02 (42)	6.892[++]
Large	1:1.736±0.03 (10)	1:1.389±0.03 (12)	1:1.562±0.03 (22)	4.968[++]
Variance ratio	6.296[++]	2.713[+]		
Net return per litre (Rs.)				
Small	9.24±0.21 (28)	6.82±0.16 (23)	8.03±0.18 (51)	5.063[++]
Medium	10.87±0.24 (22)	7.97±0.16 (20)	9.42±0.20 (42)	5.194[++]
Large	12.72±0.25 (10)	9.53±0.17 (12)	11.13±0.21 (22)	6.793[++]
Variance ratio	6.268[++]	5.961[++]		

Note: Figures in parenthesis indicate number of animals   NS = Non-significant
+ significant at p ≤ 0.05   ++ significant at p ≤ 0.01

2386±39, 2303±38 and 2114±34 litre in above herd size groups, respectively. The herd size had significant (p≤ 0.01) effect on milk production in both ruminants. The greater milk production was recorded from the herds of small as well as medium in both ruminants. Per day milk yield was also greater in this herd size groups of both ruminents. The value of milk was found to be greater in cross-bred cows than Murrah buffaloes. The herd size of small and medium fetched a significantly (p≤ 0.01) higher value of milk per lactation in both ruminants.

The cross-bred cows had in general, longer lactation period than Murrah buffaloes. However, herd size variation had little effect on lactation period in

both types of animals. The maintenance cost of cross-bred cows and Murrah buffaloes in small, Medium and large herd size groups was found to be Rs.63474±563 and 69567±612, 57077±541 and 64550±586 and 48589±528 and 56145±579, respectively. The maintenance cost of Murrah buffaloes was greater than cross-bred cows in all herd size groups, significantly ($p \leq 0.01$). The herd size variation was significant in both types of milch animals. The size of herd increase, the maintenance cost was decrease significantly in both ruminants. The herd size effect on dung value was also observe significantly in both type of ruminants. The net maintenance cost was significantly higher in murrah buffaloes than cross-bred cows. The effect of herd size on net maintenance cost was also significant at $p \leq 0.01$ in both ruminants.

The cost of milk production per litre of cross-bred cows and Murrah buffaloes in Small, Medium and Large herd size groups was Rs.20.76±0.48 and 27.18±0.61, 19.13±0.53 and 26.03±0.58 and 17.28±0.58 and 24.47±0.53, respectively. The cost of milk production per liter was significantly higher in Murrah buffaloes than cross-bred cows. The effect of herd size on it was also significant in cross-bred cows as well as Murrah buffaloes at 1% level of significance. The input-output ratio and net return per liter of cross-bred cows was greater than Murrah buffaloes significantly ($p \leq 0.01$) in all three herd size groups. The effect of herd size on input-output ratio and net return per litre was also significant at 1% level of significance. The input-output ratio and net return per litre was increase with increase in herd size in both type of ruminants.

It is clear from the above study that the cross-bred cows have better milk production performance, longer lactation period and lower cost of milk production per litre with greater input-output ratio and net return per litre than that of Murrah buffaloes. The herd size variation was also had significant effect. The cost of milk production per litre was decrease with increase in herd size but input-output ratio and net return per litre was increase significantly in both milch animals.

Our results on milk production, cost of milk production per litre, input-output ratio and net return per litre are similar with these reported by Bhaskar et.al.(1991), Kumar et.al.(2006), Bhaskar et .al 2007, Singh et.al (2008) and Kumar and Bhaskar (2013).

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