

Economic viability of milk production in private dairy farms in Uttar Pradesh

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ABSTRACT

The present study based on data collected from 70 private dairy farms in Muzaffarnagar district of Uttar Pradesh during reference period 2011-12 was undertaken to analyze economic viability of milk production in private dairy farms in study area. The analysis of the data (ANOVA) on plot size in blocks revealed the significant difference ($p < 0.01$). The total plot sizes, plot size used by dairy were 687.86 ± 21.40 yards², 565.00 ± 24.28 yards² respectively. Analysis of data revealed that blocks had also significant ($P \leq 0.01$) effects on per litre sale price of cow and buffalo milk along with total daily milk sale (Table 40). The overall mean of litre sale price of cow and buffalo milk along with total daily milk sale were ₹ 27.03 and ₹ 32.0 per liter and ₹ 4713.90 per day. The blocks had also highly significant effect ($P \leq 0.01$) on total monthly income (₹) through sale of milk, sale of manure and gunny bags. The overall mean for total monthly income (₹) through these traits were ₹ 143231.77 ± 4260.46 were ₹ 1575.00 and ₹ 665.71 respectively.) The overall mean for total monthly receipts monthly recurring expenditure and monthly net economic gain were ₹ 145472.49 ± 4298.80 , ₹ 109106.09 ± 2494.28 and ₹ 36366.39 ± 2447.71 .

Keywords: Plot size, Milk sale, net economic gain ANOVA

Dairy farming provides possibility of generating employment and is an important source of subsidiary income to small and marginal farmers, landless labours, rural housewives and rural unemployed youth. Misra and Pal (2003) reported that 25% of the total earnings of villagers comes from dairying as a subsidiary activity of crop livestock integration in rural area. The cost and return structure of dairying is an important aspect for producers and consumers to get better remunerative prices for milk sale and purchasing price by consumers at reasonable and cheaper rates. The major source of income of farmers in Muzaffarnagar area is sugarcane (58.00%) followed by livestock and cereal crops (Planning Commission, GOI, 2009). About 70% of the total milk produced in the region is sent to the market for selling. India

has the world's largest dairy herds (including both cattle 18.551 million and buffalo (23.80 million) and ranks first in milk production (121 MT) in the world. (BAHS, 2012). Uttar Pradesh by producing 21.031 MT milk, ranks first in India. And milk of cattle and buffalo share 10.75% and 23.48% respectively in total milk production of Uttar Pradesh (BAHS 2012). Muzaffarnagar district, among districts of UP, possesses rare distinction of having highest exotic cattle population (735) and the dairy farmers of Muzaffarnagar district are very keen in rearing high yielding exotic as well as crossbred cattle and also have progressive approach. Buffalo milk production is not lucrative enterprise in the Muzaffarnagar district because of low or negative returns from buffalo milk production (Kumar and Gupta, 1992).

The present study was undertaken study the prevalent management practices and economic performance, at field level.

Table 1. Total plot size, plot size used for dairy by dairy farmers

Particulars	Total plot size (Yd ²)	Plot size used by dairy (Yd ²)
Overall mean (μ)	687.86±21.40 (70)	565.00±24.28 (70)
Small (< 500 yd2)	603.95±23.73 (38)	414.47±10.14 (38)
Medium (501-750 yd2)	705.26±31.04 (19)	631.58±10.96 (19)
Big (751-1000 yd2)	883.33±27.06 (12)	883.33±27.06 (12)
Very big (> 1000 yd2)	1200.00 (1)	1200.00 (1)

Material and Methods

Muzaffarnagar is a district of Uttar Pradesh state consisting of 5 tehsils and 14 blocks. Livestock population of Muzaffarnagar district is 11,30375 numbers (18th Livestock Census) with good Veterinary infrastructure having 45 Veterinary Hospitals 59 Livestock Service Centres and 44 Artificial Insemination. Centres (Sankhyakiya Patrika, 2006). For present study survey was conducted in Muzaffarnagar district of Uttar Pradesh and all 5 tehsils and 14 blocks were selected for survey. For collecting the data on dairy performance from each block, 5 private dairy farms (each keeping at least 15 adult animals (cattle or buffaloes or both) were selected randomly. Ultimately a total of 70 private dairy farms were selected for study. Data were collected on herd strengths and Performance of livestock. **The receipts were through sale of milk,**

manure and gunny bags. The net economic gain per month (₹ /m) was estimated as follows:

Net economic gain (₹ /m) = Total output (sale of milk, manure and gunny bags/m)

- Total input (costs of green/dry fodder/concentrate, chaffing charges, salary of workers, veterinary/ AI costs, deworming cost, electricity and water charges)

To evaluate the performance of private dairy farms, collected data were analyzed by using ANOVA technique as per standard procedures by using SAS (9.2 version) software.

Result and Discussion

(a) Total plot size and plot size used for dairy by dairy farmers

The analysis of the data (ANOVA) on plot size in blocks revealed the significant difference ($p < 0.01$). (Table 2) The total plot sizes, plot size used by dairy were 687.86±21.40 yards², 565.00±24.28 yards² respectively. It has also been observed that the total plot size ranged from 520.00±40.62 (Charthawal) to 940.00±87.18 yards² (Baghra). The range for plots size used for dairy varied from 360.00±18.71 (Charthawal) to 940.00±87.18 yards² (Baghra). (Table 1)

(b) Source of Milk sale

It has been observed that milk sale source had highly significant effects ($P \leq 0.01$) on per litre sale price of cow and buffalo milk along with total daily milk sale (Table 4). The overall means for per litre sale price of cow and buffalo milk along with total daily milk sale were ₹ 27.03±0.42 and ₹ 32.01±0.55 per liter and ₹ 4713.91±136.23 per day. The return from milk sale was more from buffaloes milk. Chandra

Table 2. Age group class wise analysis of variance (ANOVA) for total plot size, plot size used by dairy, plot used for household purposes and total plot cost

Traits	Sources of variation	Sum of Squares	df	Mean Square	F	Sig.
Total plot size	Between Groups	60830.67	1	60830.67	1.923	0.170
	Within Groups	2151347.91	68	31637.47		
	Total	2212178.57	69			
Plot size used by dairy	Between Groups	24127.05	1	24127.05	0.581	0.448
	Within Groups	2822622.95	68	41509.16		
	Total	2846750.00	69			

Table 3. Different sources of sale wise means for per liter price of cow and buffalo milk along with total daily milk sale

Particulars	Per litre sale price of milk (₹)		Total daily milk sale (₹)
	Cow	Buffalo	
Overall mean (μ)	27.03±0.42 (59)	32.01±0.55 (67)	4713.91±136.23 (70)
Milk sale source			
Cooperative societies	24.88±0.32	29.12±0.36	4281.58±185.25
Milkmen	22.83±0.31	25.83±0.54	3441.67±128.07
Open Market	28.75±0.46	33.98±0.63	5066.09±171.99
Periodicity of payment			
Daily	24.10±0.30	28.00±0.44	4095.45±181.83
Monthly	28.54±0.45	33.72±0.61	4997.37±165.90
Blocks			
Shamli	35.67±1.20	39.60±0.40	5204.80±259.89
Oon	27.75±0.25	31.80±0.20	4420.00±287.05
Thana Bhawan	24.40±0.51	28.60±0.60	3950.00±204.94
Morna	22.80±0.37	25.00±0.00	4060.00±676.46
Jaansath	28.00±0.00	29.20±0.80	4230.00±197.23
Charthawal	23.60±0.25	28.00±0.00	3840.00±215.87
Purkaji	26.00±0.00	28.60±0.40	5220.00±732.39
Khatauli	30.20±1.36	35.40±2.04	4980.00±453.21
Sahapur	25.67± 0.67	31.00±0.58	4220.00±245.76
Baghra	25.25± 0.48	28.80±0.80	4670.00±346.27
Muzaffarnagar Sadar	28.00±0.00	38.50±0.50	6960.00±754.72
Kairana	29.20±0.49	37.20±0.49	4860.00±213.54
Kandhla	27.80±0.20	35.00±0.00	5020.00±292.23
Budhana	26.60±0.68	31.20±0.49	4360.00±274.96

*Figures in the parenthesis denote the number of surveyed private dairies farms.

and Agarwal (2000) also reported that keeping milch buffaloes was more economical with large farmers than milch cows with medium farmers in Uttar Pradesh. Acharya and Pawar (1980) reported that an average crossbred cow gave a profit of ₹ 1538 per lactation. Kumar and Pandian (2003) in Tamil Nadu calculated the cost of milk per litre for crossbred cows, indigenous cows and buffaloes as ₹ 9.71, 11.96 and 11.44, respectively. The ranges for these traits varied from ₹ 22.83 (milkmen) to ₹ 28.75 (open market), ₹ 25.83 (milkmen) to ₹ 33.98 (open market) and ₹ 3441.67±128.07 (milkmen) to ₹ 5066.09±171.99 in open market (Table 3).

The same work was done by Desai (2005) on economic analysis of milk production and disposal pattern of milk in rural area of Bidar district of Karnataka. Tripathi (1999) also examined the cost

and return structure of buffalo milk production in Indian central Himalaya. It indicated that milkmen were purchasing the milk at the cheapest rate whereas the open market sale to clients was at the best possible rates. Kaur and Singla (2001) found that in marketing of milk, low participation was found for selling of milk at home and through milk venders.

(C) Periodicity of milk sale payment

It has also been observed that periodicity of payment of milk sale i.e. daily and monthly, had expressed its highly significant effects ($P \leq 0.01$) on per litre sale price of cow and buffalo milk as well as total daily milk sale (Table 5). The periodicity of milk sale wise ranges for these traits varied from ₹ 24.10±0.30 (daily) to ₹ 28.45±0.44 (monthly), ₹ 28.00±0.44 (daily) to ₹ 33.72±0.61 (monthly) and ₹

Table 4. Sources of milk sale wise analysis of variance (ANOVA) for per litre sale price of cow milk, per litre sale price of buffalo milk and total daily milk sale

Traits	Sources of variation	Sum of Squares	df	Mean Square	F	Sig.
Per litre sale price of cow milk	Between Groups	290.58	2	145.29	27.180	0.000
	Within Groups	299.35	56	5.35		
	Total	589.93	58			
Per litre sale price of buffalo milk	Between Groups	541.41	2	270.71	22.110	0.000
	Within Groups	783.58	64	12.24		
	Total	1324.99	66			
Total daily milk sale	Between Groups	18800000.00	2	9422129.94	8.920	0.000
	Within Groups	70800000.00	67	1056636.77		
	Total	89600000.00	69			

4095.45±181.83 (daily) to ₹ 4997.37±165.90 monthly (Table 3). It indicated that the agencies doing the daily payment are paying cheaper rates of milk as compared to agencies paying at monthly intervals. Singh *et al.* (2001) did a study on economics of milk production in different herd size groups of buffaloes in Etah district of Uttar Pradesh.

(D) Blocks wise milk sale

It has been also observed that block had highly significant effects ($P \leq 0.01$) on per liter sale price of cow and buffalo milk and total daily milk sale (Table 6). Block wise figures indicated that per litre sale price of cow and buffalo milk were lowest in Morna block (₹ 22.80±0.37 and ₹ 25.00±0.00, respectively) whereas these were highest in Shamli block (₹ 35.67±1.20 and ₹ 39.60±0.40, respectively) (Table 3). Bhardwaj *et al.* (2006). Also founded the corresponding figures for net gross returns per day per buffalo were ₹ 65.80, ₹ 71.02 and ₹ 73.16 and net profit per day per buffalo

were ₹ 11.50, ₹ 7.22 and ₹ 8.86, respectively. For total daily milk sale, the block wise range varied from ₹ 3840.00±215.87 (Charthawal) to ₹ 6960.00±754.72 (Muzaffarnagar Sadar)

(E) Monthly receipts of private dairy farms

1. Sale of milk

It has been observed that the block had highly significant effect ($P \leq 0.01$, on total monthly income (₹) through sale of milk. (Table 8) The overall mean for total monthly income (₹) through sale of milk was ₹ 143231.77±4260.46. The range for total monthly income (₹) through sale of milk varied from ₹ 115106.56±3296.99 (Thana Bhawan) to ₹ 210489.60±25974 (Muzaffarnagar Sadar) (Table 7). Deoghare and Bhattacharya (1994) reported that the net and the overall income per buffalo per year and input-output ratio were highest on large size farms. Chand *et al.* (2002) did an economic analysis of commercial dairy herd in arid region of Rajasthan.

Table 5. Periodicity of milk payment wise analysis of variance (ANOVA) for per litre sale price of cow milk, per litre sale price of buffalo milk and total daily milk sale

Traits	Sources of variation	Sum of Squares	df	Mean Square	F	Sig.
Per litre sale price of cow milk	Between Groups	260.44	1.00	260.44	45.05	0.00
	Within Groups	329.49	57.00	5.78		
	Total	589.93	58.00			
Per litre sale price of buffalo milk	Between Groups	459.58	1.00	459.58	34.52	0.00
	Within Groups	865.40	65.00	13.31		
	Total	1324.99	66.00			
Total daily milk sale	Between Groups	12270000.00	1.00	12270000.00	10.79	0.00
	Within Groups	77370000.00	68.00	1137754.28		
	Total	89640000.00	69.00			

Table 6. Block wise analysis of variance (ANOVA) for per litre sale price of cow milk, per litre sale price of buffalo milk and total daily milk sale

Traits	Sources of variation	Sum of Squares	df	Mean Square	F	Sig.
Per litre sale price of cow milk	Between Groups	514.30	13	39.56	23.54	0.00
	Within Groups	75.63	45	1.68		
	Total	589.93	58			
Per litre sale price of buffalo milk	Between Groups	1185.19	13	91.17	34.56	0.00
	Within Groups	139.80	53	2.64		
	Total	1324.99	66			
Total daily milk sale	Between Groups	40970000.00	13	3151697.13	3.63	0.00
	Within Groups	48670000.00	56	3151697.13		
	Total	89640000.00	69	869051.09		

Table 7. Sale prices of milk, manure and gunny bags obtained by surveyed private dairy farmers

Particulars	Monthly income (₹) through sale of		
	Milk	Manure	Gunny bags
Overall mean (μ)	143231.77±4260.46(70)	1575.00±45.13(70)	665.71±21.04(70)
Blocks			
Shamli	160171.52±8191.40	1960.00±40.00	900.00±63.25
Oon	130944.96±7114.04	1820.00±91.65	760.00±24.50
Thana Bhawan	115106.56±3296.99	1460.00±67.82	580.00±48.99
Morna	123101.76±20826.0	1380.00±174.36	500.00±77.46
Jaansath	128798.72±6467.03	1920.00±165.53	720.00±37.42
Charthawal	116200.96±6735.98	1180.00±91.65	580.00±37.42
Purkaji	160323.52±22492.22	1640.00±273.13	700.00±104.88
Khatauli	152705.28±14057.74	1340.00±188.68	520.00±48.99
Sahapur	128458.24±7637.47	1180.00±91.65	460.00±50.99
Baghra	142527.36±10006.66	1710.00±146.97	820.00±80.00
Muzaffarnagar Sadar	210489.60±25974.35	1780.00±188.15	760.00±67.82
Kairana	148510.08±7370.04	1680.00±73.4	680.00±48.99
Kandhla	154584.00±8898.17	1620.00±96.95	760.00±74.83
Budhana	133322.24±8709.70	1380.00±73.49	580.00±20.00

*Figures in the parenthesis denote the number of surveyed private dairies farms.

2. Sale of manure and gunny bags

The blocks have also expressed highly significant effects ($P \leq 0.01$, on total monthly income (₹) through sale of manure and gunny bags. (Table 8) The overall means for these traits were ₹ 1575.00±45.13 and ₹ 665.71±21.04. The range for these traits varied from ₹ 1180±91.65 (Charthawal) to ₹ 1960.00±40.00 (Shamli) and ₹ 460.00±50.99 (Sahapur) to ₹ 900.00±63.25 (Table 7). Bardhan *et. al.* (2005) also reported in The average

annual returns including returns from dung were found out to be ₹ 20054 which means that these could not cover the cost of maintenance for all categories of farmers in Udham Singh Nagar.

(F) Total monthly receipts, total monthly recurring expenditure and monthly net economic gain (₹)

The blocks had highly significant effect ($P \leq 0.01$) on total monthly receipts monthly recurring expenditure and monthly net economic gain (Table10). The

Table 8. Block wise analysis of variance (ANOVA) for monthly income (₹) through sale of milk, manure and gunny bags

Traits	Sources of variation	Sum of Squares	df	Mean Square	F	Sig.
Monthly income through sale of milk	Between Groups	39761600235.96	13	3058584633.54	3.575	0.000
	Within Groups	47910094229.50	56	855537396.96		
	Total	87671694465.46	69			
Monthly income through sale of manure	Between Groups	4306750.00	13	331288.46	3.354	0.001
	Within Groups	5532000.00	56	98785.71		
	Total	9838750.00	69			
Monthly income through sale of gunny bags	Between Groups	1113714.29	13	85670.33	4.685	0.000
	Within Groups	1024000.00	56	18285.71		
	Total	2137714.29	69			

Table 9. Block wise means for total monthly receipts, total monthly recurring expenditure and monthly net economic gain (₹)

Particulars	Monthly amount (₹)		
	Total receipts	Total recurring expenditure	Net economic gain
Overall mean (μ)	145472.49±4298.80 (70)	109106.09±2494.28 (70)	36366.39±2447.71 (70)
Blocks			
Shamli	163031.52±8163.02	117024.04±3820.32	46007.48±5147.22
Oon	133524.96±7197.43	104470.72±5037.71	29054.24±3188.99
Thana Bhawan	117146.56±3338.41	92579.76±4979.19	24566.80±3224.76
Morna	124981.76±21070.52	94254.80±11956.48	30726.96±9163.57
Jaansath	131438.72±6630.73	105065.60±9426.08	26373.12±7243.32
Charthawal	117960.96±6803.27	93024.80±3902.3	24936.16±4965.13
Purkaji	162663.52±22844.43	111167.04±8560.85	51496.48±15289.06
Khatauli	154565.28±14140.04	98115.32±4200.92	56449.96±13487.84
Sahapur	130098.24±7578.29	102413.72±778.99	27684.52±7066.38
Baghra	145057.36±10139.30	115410.28±8104.78	29647.08±3216.70
Muzaffarnagar Sadar	213029.60±26187.92	150553.40±13515.01	62476.20±14138.49
Kairana	150870.08±7430.47	115375.72±4849.48	35494.36±2995.26
Kandhla	156964.00±9053.26	119793.28±9094.83	37170.72±1344.04
Budhana	135282.24±8734.77	108236.84±3304.56	27045.40±5866.65

*Figures in the parenthesis denote the number of surveyed private dairies farms.

Table 10. Block wise analysis of variance (ANOVA) for total monthly receipts, total monthly recurring expenditure and monthly net economic gain (₹)

Traits	Sources of variation	Sum of Squares	df	Mean Square	F	Sig.
Total monthly receipts	Between Groups	40354328211.10	13	3104179093.16	3.555	0.000
	Within Groups	48902436261.50	56	873257790.38		
	Total	89256764472.61	69			
Total monthly recurring expenditure	Between Groups	14672644963.88	13	1128664997.22	4.110	0.000
	Within Groups	15376836042.42	56	274586357.90		
	Total	30049481006.30	69			
Monthly net economic gain	Between Groups	10353855344.31	13	796450411.10	2.400	0.010
	Within Groups	18584051121.49	56	331858055.74		
	Total	28937906465.79	69			

overall mean for total monthly receipts monthly recurring expenditure and monthly net economic gain were ₹ 145472.49±4298.80, ₹ 109106.09±2494.28 and ₹ 36366.39±2447.71. (Table 9).

Conclusion

The total plot sizes, plot size used by dairy were 687.86±21.40 yards², 565.00±24.28 yards² respectively. The overall mean of litre sale price of cow and buffalo milk along with total daily milk sale were ₹ 27.03 and ₹ 32.0 per liter and ₹ 4713.90 per day. The periodicity of milk sale wise ranges for these traits varied from ₹ 24.10±0.30 (daily) to ₹ 28.45 (monthly), ₹ 28.00 (daily) to ₹ 33.72 (monthly) and ₹ 4095.45±181.83 (daily) to ₹ 4997.37±165.90 (monthly). The overall mean for total monthly income (₹) through milk sale, sale of manure and gunny bags were ₹ 143231.77±4260.46 were ₹ 1575.00 and ₹ 665.71 respectively. The overall mean for total monthly receipts monthly recurring expenditure and monthly net economic gain were ₹ 145472.49±4298.80, ₹ 109106.09±2494.28 and ₹ 36366.39±2447.71

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