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COMPARATIVE COSTS OF MILK PRODUCTION IN RELATION TO THE STRENGTH OF MILCH CATTLE IN A DAIRY FARM : A CASE STUDY OF BARAMATI TAHSIL

DEVIKAR A.A. and DATYE V.S., Pune

ABSTRACT : The present work attempts to analyze and compare the cost of production of milk and income derived from dairy activity with respect to cows herds in differents parts of Baramati tahsil. The cost structure of ten herds from the irrigated areas, seven from the non-irrigated areas and five from Baramati town was examined.

Among all the factors of cost of production, cost of feed and fodder is very significant. The proportion of expenditure on feed and fodder ranges from 56.4 to 65.4 per cent in the total cost of production. The share of expenditure on feed and fodder is comparatively higher in the irrigated areas only because of availability of green and dry fodder throughout the year. The labour expenditure is second important item of cost of milk production. In all three areas, it varies from about 13 to 15 percent of total cost of production. In small size herds the percentage of expenditure on labour was as high as twenty per cent. The small dairy operators generally take the help of family and do not employ hired labour. As the size of heard increases the net profit per day per animal also increases. Thus, economies of scale are realised. The miscellaneous expenses are insignificant in the total cost of production. The per day per animal income is maximum in Baramati town.

INTRODUCTION

Milk is a very important constituent of human diet. For about last ten thousand years milk has been used in human diet. Milk being a perishable commodity, the dairy activity had to be located near the city in pre-automobile period. Today this activity is practised by people irrespective of caste or community in Maharashtra. But in the past, this activity was practised by Gawali community. The nature of dairy activity before the independence was completely different. The dairy activity after independence has developed on co-operative basis. The role of village co-operative societies in this respect is very important. In Baramati tahsil there were 192 co-operative societies which collected 46.77 million ltrs of milk in 1994-95. The contribution of irrigated areas, non irrigated areas and Baramati town was 67.87%, 31.47% and 0.87 percent respectively. Among the breeds of cows, the prortation of Holstein is very high followed by Jersey and Indigenous varieties. There is not a single village in Baramati tahsil where Jersey and Holstein cows are not found.

STUDY AREA

Baramati tahsil lies in the eastern part of Pune district of Maharashtra (Fig. 1). The tahsil has an area of 1382 sq. km. According to 1991 census, the population of the tahsil is 374207. Baramati Taluka Milk Federation has two chilling plants located at Malegaon Bk, just

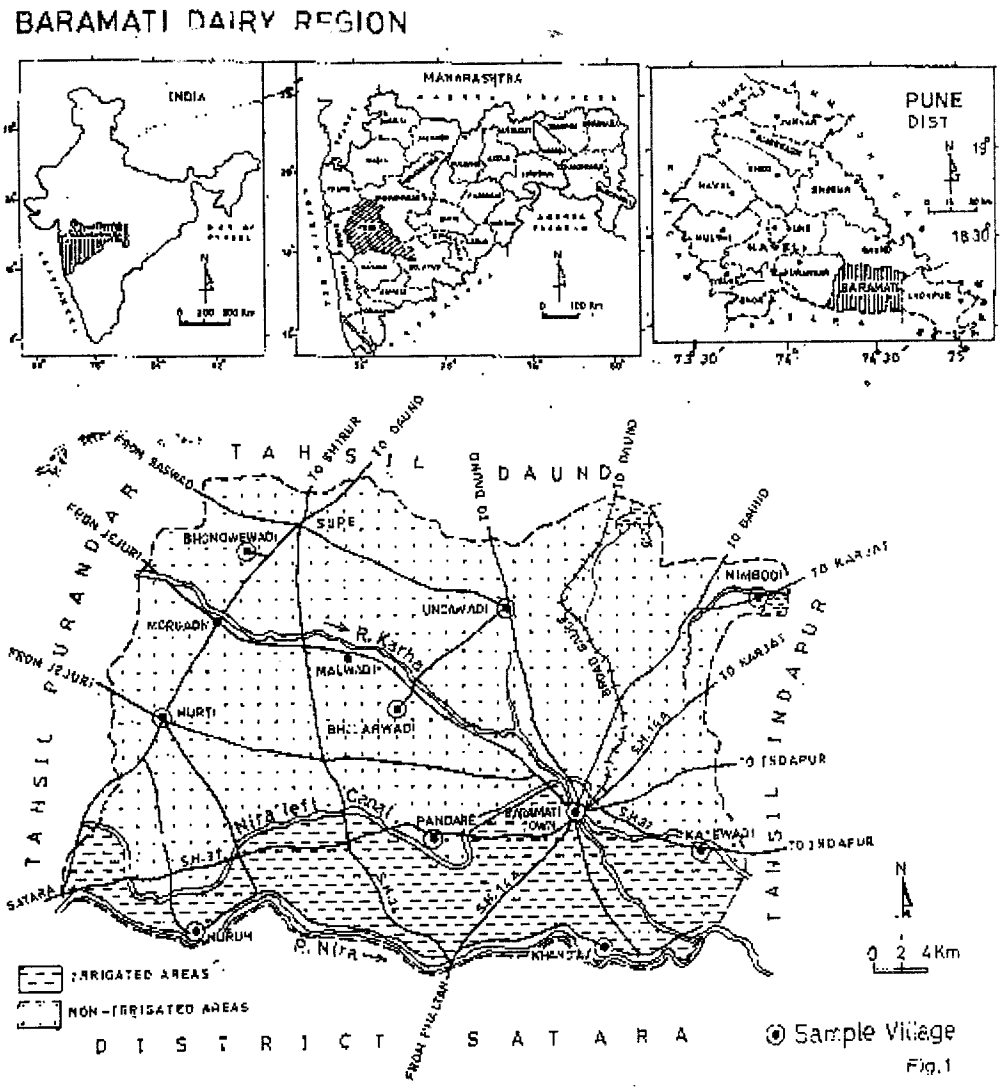

Fig.1

Fig. 1 : Baramati Dairy Region

five km away from Baramati. The average annual rainfall received is less than 500 mm but the Nira left bank canal has changed the agricultural landscape in the southern parts of the tahsil.

OBJECTIVES

The main objective of the present work undertaken is to compare the cost structure and income derived from the dairy activity with special reference to cows herds in Baramati tahsil. The following are the main components:

1. To study the cost of milk production in different size groups of cows herds in the irrigated, non-irrigated areas and Baramati town.
2. To find out the net profit per litre of milk and per day per animal income derived from dairy activity.

METHODOLOGY

Initially in order to understand variations in the nature of dairy activity, Baramati tahsil was divided into three different areas such as the irrigated areas, the non-irrigated areas and the town (Baramati). From these three areas ten, seven and five herds of cows respectively were selected to assess the cost of production. While selecting these herds, preference was given to the dairy operators who maintained records. Since most of the herds included both cows and buffaloes it was difficult to Identify herds of cows only.

To calulate the cost of production, necessary information was collected through the personal interviews and from village co-operative societies in the respective areas.

COST OF PRODUCTION

Cost of milk production from the irrigated and the non-irrigated areas and Baramati town is calculated as follows :

1. While selecting sample of cows herds, those dairy operators who maintain the records of feed and fodder, expenditure on labour, sale and purchase price of animals were considered.
2. In most of cows herds bullocks are tied under one and same stable where feed and fodder consumed by them is not known to dairy operators. In such cases, average quantity of feed and fodder consumed by bullocks is subtracted from the total feed and fodder.
3. The quantity of milk consumed by calves is not known to dairy operator. The calves are considered as income side in income-expenditure analysis. While considering calves in income side, they are charged at prevailing market price.
4. The dairy operators have invested lot of capital for purchasing the dairy animals and construction of stables. Interest is charged on total investment at the rate of 12% per annum.

There are a number of methods for calculating the cost of production. Following are the four items included in the cost of production commonly used in all methods. They are :

A) Cost of feed and fodder

B) Labour cost

C) Replacement cost

D) Miscellaneous expenses.

A) Cost Of Feed And Fodder

Among the items of cost of production cost of feed and fooder is a singnificant factor. Dry fodder is one of the important items of feed and fodder. In the non-irrigated areas nearly one-third amount of the total expenditure is accounted for by dry fodder followed by the irrigated areas and Baramati town (Table 1). There was very little

Table 1 :

Expenditure on Feed and Fodder : Cows Herd (1995)

Irrigated Areas

Size Group	Total animals in the herd	Dry fodder (Rs.)	Percentage of expen-diture on dry fodder	Green fodder (Rs.)	Percentage of expen-diture on green fodder	Walis (Rs.)	Percentage expen-diture on walis	Concentrates (Rs.)	Percentage expen-diture on concentrates	Total (Rs.)	Per day per /animal expenditure on feed & fodder (Rs.)
Upto - 05	05	25.50	36.7	9.00	12.9	10.00	14.4	25.00	36.0	69.50	13.90
06-10	09	41.00	35.7	18.00	15.6	17.00	14.8	39.00	33.9	115.00	12.70
11-15	15	55.00	31.3	25.50	14.5	33.00	18.8	62.00	35.4	175.50	11.70
16-20	19	67.00	26.5	35.00	13.9	60.50	23.9	90.00	35.7	252.50	13.28
21-25	23	93.50	28.6	48.00	47.7	75.00	23.0	110.00	33.7	326.50	14.19
26-30	28	104.00	28.0	59.00	15.9	73.00	19.7	135.00	36.4	371.60	13.25
31-35	34	120.00	29.0	65.00	15.7	82.00	19.8	147.00	35.5	414.00	12.17
36-40	40	157.50	30.8	90.00	17.6	98.50	19.3	165.00	32.3	511.00	12.77
41-45	44	175.00	30.2	110.00	19.0	105.00	18.1	190.00	32.7	580.00	13.18
46-50	49	209.50	30.3	125.00	18.1	138.00	20.0	218.50	31.6	691.00	14.10
TOTAL	266	1048.00		584.50		692.00		1181.50		3506.00	
%			29.9		16.7		19.7		33.7	100.00	13.18
NON-IRRIGATED AREAS											
Upto-05	05	20.00	32.0	8.00	12.8	8.00	12.8	26.50	42.4	62.50	12.50
06-10	08	32.00	34.0	20.00	21.3	18.00	19.2	24.00	25.5	94.00	11.75
11-15	14	45.00	28.1	24.00	15.0	29.00	18.1	62.00	38.8	160.00	11.42
16.20	20	62.00	27.0	47.00	20.4	40.00	17.4	81.00	35.2	230.00	11.50
21.25	24	119.00	43.1	60.00	21.7	-	-	97.00	35.2	276.00	11.50
26-30	28	108.00	34.2	82.00	25.9	52.00	16.5	74.00	23.4	316.00	11.28
30-35	33	119.00	31.3	80.00	21.1	70.00	18.4	111.00	29.2	380.00	11.51
Total	122	505.00		321.00		217.00		475.50		1518.50	
%			33.3		21.1		14.3		31.3	100.00	11.50
BARAMATI TOWN											
Upto-05	05	20.00	30.8	13.00	20.0	10.00	15.4	22.00	33.8	65.00	13.00
06-10	09	38.00	31.7	25.00	20.8	24.00	20.0	33.00	27.5	120.00	13.33
11-15	14	50.00	26.2	38.00	20.0	33.00	17.3	69.50	36.5	190.50	13.57
16-20	19	72.00	26.7	53.00	19.6	46.00	17.0	99.00	36.7	270.00	14.21
21-25	24	108.00	31.5	83.00	24.2	45.50	13.3	106.00	31.0	342.50	14.27
TOTAL	71	288.00		212.00		158.50		329.50		988.00	
%			29.1		21.5		16.0		33.4	100.00	13.91

difference in the amount spent on dry fodder by the operators in different areas.

It was observed (Table 1) that the proportion of expenditure on green fodder is lower in the small herds particularly in the irrigated and the non-irrigated areas. In the total cost of feed and fodder the proportion of expenditure on green fodder was nearly the same in the non-irrigated areas and Baramati town i.e. about 21 per cent. In the irrigated areas the proportion of expenditure on green fodder was comparatively lower in the total cost of feed and fodder. In the non irrigated areas, there were some herds where percentage of expenditure on green fodder to the total cost of production was as high as 26 percent.

It was noted that nearly all the dairy operators use *walis* as fodder. The *walis* was comparatively cheaper than other three items of fodder, that is why in the total cost of production, the proportion of expenditure on *walis* in three areas is very low. It ranges between 14.3 and 19.7 per cent.

Higher proportion of expenditure on concentrates was observed in all three areas. Out of the total cost of feed and fodder nearly 29 to 42 per cent amount was accounted for by concentrates in the study area. The per day per animal expenditure on feed and fodder ranges from Rs. 11.28 to Rs. 14.27. Lower per day per animal expenditure on feed and fodder was reported from the non-irrigated areas.

B) Labour Expenses

Labour plays an important role in dairy activity. Small operators use family labour for dairy operations so they have no problem of labour as faced by the big dairy operators. Thus, in the small size groups no hired labour is used. The table (Table 2) indicates that first two size groups from the irrigated areas, first five size groups from the non irrigated areas and first two size groups from Baramati town were reported without the hired labour. In the non irrigated areas out of the seven herds only two herds employed hired labour. Thus, in the non-irrigated areas the family labour contributed as much as 92.5 per cent of the total labour force. The highest hired labour contribution (57.47%) was reported from the irrigated areas. In Baramati town the proportion of family and hired labour input was 60 and 40 per cent respectively.

Labour input per day per animal in the small size groups was higher while it was relatively lower in the large size groups in all three areas. Thus, labour economy is achieved as the herd increases. Similar trend was also observed in the irrigated and the non-irrigated areas. However, because of higher labour input in small size groups the per day per animal expenditure was higher but it was lower in large size groups.

C) Replacement Cost

In dairy activity it is essential that supply of milk should not fluctuate widely. Milk supply is affected if a part of stock goes dry or the animal dies. The cost incurred by the addition of the fresh stock is the replacement cost. The average length of time that a cow stays in a miliking herd varies between 3 and 4 years in most areas of the U.S.A. and even India. Therefore, 25 to 33 per cent of the milking herd must be replaced each year (Sastry, 1973).

The average cost of replacement per animal varies from one size group to another in the tahsil. The lowest average cost of replacement (Rs. 4300/-) was reported in cows herd of the irrigated areas while the

Table 2

Daily Expenditure on Labour In Different Size Groups of Cows Herd (1995)

IRRIGATED AREAS

Size group	Total animals in the herd	Total family labour input (Hours & minutes)	Total hired labour input (Hours & minutes)	Total labour input (Hours & minutes)	Average labour input per day per	Average wage rate perhour labour	Total expenditure on family labour	Total expenditure on hired labour	Total expenditure on hired labour	Labour expenditure per day per animal
						(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Upto-05	05	7.00	-	7.00	1.24	3.25	22.75	-	22.75	4.55
06-10	09	11.00	-	11.00	1.13	3.25	35.75	-	35.75	3.97
11-15	15	14.45	-	14.45	0.59	3.25	47.93	-	47.93	3.19
16-20	19	12.00	6.00	18.00	0.57	3.25	39.00	19.50	58.50	3.07
21-25	23	9.00	12.30	21.30	0.56	3.25	29.25	40.62	69.87	3.03
26-30	28	14.00	10.00	24.00	0.51	3.25	45.50	32.50	78.00	2.78
31-35	34	7.45	20.00	27.45	0.49	3.25	25.18	65.00	90.18	2.65
36-40	40	9.00	22.15	31.15	0.47	3.25	29.25	72.31	101.56	2.53
41-45	44	6.30	28.00	34.30	0.47	3.25	21.12	91.00	112.12	2.54
46-50	49	6.00	32.00	38.00	0.47	3.25	19.50	104.00	123.50	2.52
TOTAL	266	96.20	130.45	227.5	6.50	-	315.23	424.93	737.16	-
%		42.6	57.4	100	-	-	42.6	57.4	100	2.77
NON-IRRIGATED AREAS										
Upto-05	05	6.00	-	6.00	1.12	3.25	19.50	-	19.50	3.90
06-10	08	8.30	-	8.30	1.04	3.25	27.62	-	27.62	3.45
11-15	14	13.30	-	13.30	0.58	3.25	43.87	-	43.87	3.13
16-20	20	16.00	-	16.00	0.48	3.25	52.00	-	52.00	2.60
21-25	24	20.00	-	20.00	0.50	3.25	65.00	-	65.00	2.70
26-30	28	18.00	4.00	22.00	0.47	3.25	58.50	13.00	71.50	2.55
30-35	33	20.00	4.30	24.30	0.45	3.25	65.00	14.62	79.62	2.41
TOTAL	132	101.60	8.30	120.30	4.64	-	331.49	27.62	359.11	-
%		92.50	7.5	100.00	-	-		7.50	100.00	2.72
BARAMATI TOWN										
Upto-05	5	7.30	-	7.30	1.30	3.25	24.37	-	24.37	4.87
06-10	9	9.00	-	9.00	1.00	3.25	29.25	-	29.25	3.25
11-15	14	10.00	5.00	15.00	1.03	3.25	32.50	16.25	48.75	3.48
16-20	19	12.00	6.00	18.00	0.57	3.25	39.00	19.50	58.50	3.07
21-25	24	6.00	18.00	24.00	1.00	3.25	19.50	58.50	78.00	3.25
TOTAL	71	44.30	29.00	73.30	5.30	-	144.62	94.25	238.87	-
%		60.50	39.50	100.00	-	-	60.5	39.50	100.00	3.53

highest average cost of replacement was observed in the first size group of Baramati town (Table 3). The average cost of replacement in the first size group was high because out of the total cows nearly sixty per cent cows were of Holstein breed which is very costly. In the last lactation replacement is made by the dairy operators so that cost of replacement in this herd was higher than any other size groups. In Baramati town average cost of replacement per animal was Rs. 5000/- and more.

Table 3

Total Replacement Cost in Each Size-group of Cows Herd

Size Group	Average Purchase price per animal (Rs.)	Average sale price per animal (Rs.)	Average costof replacement per animal (Rs.)	Total replacement	Percentage of replacement	Total cost of replacement (Rs.)	Total cost per size group per day (Rs.)
IRRIGATED AREAS							
Upto-5	9500	5000	4500	1	20	4500	12.32
6-10	10700	5500	5200	2	22.22	10400	28.49
11-15	10000	5700	4300	3	20	12900	35.34
16-20	11000	5800	5200	4	21	20800	56.98
21-25	9500	5000	4500	5	21.7	22000	60.27
26-30	10750	5350	5200	6	21.4	31200	85.47
31-35	10750	5550	5200	6	17.6	31200	85.47
36-40	12500	6500	6000	9	22.5	54000	147.94
41-45	10200	5300	4900	8	18.1	39200	107.39
46-50	10500	5500	5000	9	18.3	45000	123.28
NON-IRRIGATED AREAS							
Upto-5	10000	5000	4500	1	20.0	4500	12.32
6-10	10500	5200	5300	2	25.0	10600	29.04
11-15	10200	5100	5100	3	21.4	15300	41.91
16-20	10700	5300	5400	4	20.0	21600	59.17
21-25	10600	5000	5600	5	20.8	28000	76.71
26-30	10000	4000	6000	5	17.8	30000	82.19
31-35	12500	6300	6200	6	18.1	37200	101.91
BARAMATI TOWN							
Upto-5	12000	5000	7000	1	20.0	7000	19.17
6-10	11000	5500	5500	2	22.2	11000	30.13
11-15	10700	5000	5700	3	21.4	17100	46.84
16-20	12000	7000	5000	1	21.0	20000	54.79
21-25	11000	6000	5000	4	16.6	20000	54.79

Each year about 16.6 to 25 per cent cows were replaced in the study area. It means that cows were used for 4 to 6 years and during the lean period of milk yield cows were sold in the market. It was also observed that the percentage of replacement in the large size group was low. It shows that big dairy operators are not very careful about the replacement.

D) Miscellaneous Expenses

The share of expenditure on equipment in the total miscellaneous expenses was very low as compared to other items. In Baramati town the percentage of expenditure on equipment was slightly higher than the irrigated and the non-irrigated areas. In the irrigated areas there are as many as five herds where expenditure on equipment was less than one per cent (Table 4).

In the miscellaneous expenses, expenditure on transportation was also an important item. The table clearly indicates that in Baramati town the proportion of expenditure on transportation was very high than the irrigated areas. Most of the dairy operatores in Baramati town do not sell milk to co-operative dairies. They deliver milk at consumer's houses every day. This practice is popularly known as 'ratib' for which vehicles are used by the dairy operators. That is why higher percentage of expenditure on transportation was reported from Baramati town.

In dairy activity cows require veterinary facilities. Jersey and Holstein cows require veterinary facilites more frequently. The veterinary expenses range between 1.2 and 8.6 per cent. The highest percentage of expenditure on veterinary facilities was observed in Baramati town. In the irrigated areas the expenditure on this item was lower than the non-irrigated areas and Baramati town.

The table clearly indicates that the proportion of expenditure on interest in the total miscellaneous expenses was very high in all three areas. The expenditure on interest on capital varies from 91 to 96.1 per cent. In Baramati town the proportion of expenses on interest on capital was little lower than the irrigated and the non-irrigated areas (Table 4). In all three areas the per day per animal expenditure was between 1.88 and 2.72 rupees.

TOTAL EXPENDITURE

Here, total expenditure on milk production in each size group of three areas was calculated with the help of cost of feed and fodder, labour expenditure, replacement cost and miscellaneous expenses. The percentage of expenditure on four items of cost of production was also found out and lastly per day cost of production in each size group was calculated.

It was clear from the table (Table 5) that the proportion of cost of feed and fodder in the total cost of production was higher than other items of cost of production. The proportion of feed and fodder cost in the total cost of production was 62.4, 59.4 and 61.4 per cent in the irrigated areas, the non-irrigated areas and Baramati town respectively.

In the non-irrigated areas green fodder was not available throughout the year. During the summer season this problem is very acute. Dairy operators in the irrigated areas were in a position to provide green fodder to the animals throughout the year. It was also observed that share of feed and fodder cost was higher in big size-groups. This pattern is mainly observed in the irrigated areas and Baramati town.

Table 4

Miscellaneous Expenses : Cows Herd (1995)

Size Group	Total animals inthe herd	Equipment (RS.)	Percentage of expenditure on equipments	Annual expenditure on transport	Percentage of expenditure on transport (Rs.)	Veterinary expenses	Percentage of veterinary expenditure	Interest on capital (Rs.)	Percentage of expenditure on Interest on capital	Total miscellaneous expenses (Rs.)	Per day expenses (Rs.)	Expenditure per day per animal (Rs.)
IRRIGATED AREAS												
Upto-05	5	35	1.0	110	3.2	-	-	3300	95.8	3445	9.43	1.88
06-10	9	50	0.8	135	1.9	90	1.2	6840	96.1	7115	19.49	2.16
11-15	15	160	1.2	210	1.6	210	1.6	12540	95.6	13120	35.94	2.39
16-20	19	190	1.2	290	1.8	490	3.1	15000	93.9	15970	43.75	2.30
21-25	23	220	1.2	360	2.0	370	2.1	17124	94.7	18074	49.51	2.15
26-30	28	175	0.7	500	2.1	465	2.0	22368	95.2	23508	64.40	2.30
36-40	40	230	0.6	1200	3.1	985	2.5	36240	93.8	38655	105.90	2.64
41-45	44	309	0.8	1300	3.4	1090	2.9	35448	92.9	38147	104.51	2.37
46-50	49	326	0.8	1450	3.4	1270	2.9	40176	92.9	43222	118.41	2.41
NON-IRRIGATED AGEAS												
Upto-05	5	-	-	-	-	210	5.7	3480	94.3	3690	10.10	2.02
06-10	8	75	1.2	140	2.2	360	5.7	5760	90.9	6335	17.35	2.16
11-15	14	130	1.3	190	1.8	490	4.7	9600	92.2	10410	28.52	2.03
16-20	20	150	1.0	215	1.4	560	3.7	14040	93.9	14965	41.00	2.05
21-25	24	200	1.1	400	2.2	1000	5.2	17280	91.5	18880	51.72	2.15
26-30	28	230	1.0	515	2.4	950	4.3	20280	92.3	21975	60.20	2.15
31-35	33	260	1.0	650	2.5	1050	4.1	23760	92.4	25720	70.46	2.13
BARAMATI TOWN												
Upto-05	5	58	1.2	500	10.7	400	8.6	3720	79.5	4678	12.81	2.56
06-10	9	160	1.8	650	7.3	700	7.8	7440	83.1	8950	24.52	2.72
11-15	14	240	2.0	800	6.7	800	6.7	10146	84.6	11986	32.83	2.34
16-20	19	270	1.6	900	5.5	700	4.3	14580	88.6	16450	45.06	2.37
21-25	24	305	1.3	1000	4.4	650	2.9	20821	91.4	22776	62.40	2.60

Table 5 :

Total cost of maintance of milch cows in the dairies of different animal strength

IRRIGATED ARES

Size croup	Total Animals in the herd	Expenditure on feed & fodder (Rs.)	parcentage of expenditure on food & Fodder	Labour wages (Rs.)	Pearsentage of expenditures labour	Replaceme-nt cost (Rs.)	Percentage of expenses on replace-ment	Miscellane ous expenses	Percentage of expenses Miscellane-ous expenses	Total cost (per day) (Rs.)	Per day per animal cost of production (Rs.)
Upto-5	5	69.50	60.9	22.75	20.00	12.32	10.8	9.43	8.3	114.00	22.88
6-10	9	115.00	57.9	35.75	18.00	28.49	14.3	19.49	9.3	198.73	22.08
11-15	15	175.50	59.6	47.93	16.30	35.30	12.0	35.94	12.1	294.71	19.64
16-20	19	252.50	61.30	58.50	14.20	56.98	13.8	43.78	10.7	411.73	21.67
21-25	23	326.50	64.5	69.87	13.80	60.27	11.9	49.51	9.8	506.15	22.00
26-30	28	371.00	61.00	78.00	13.00	85.47	14.3	64.40	10.8	598.87	21.38
31-35	34	414.00	61.7	90.18	13.40	85.47	12.7	81.70	12.2	671.35	19.74
36-40	40	511.00	59.0	101.56	11.70	147.94	17.1	105.90	12.2	866.40	21.66
41-45	44	580.00	64.2	112.12	8.30	107.39	11.9	104.51	11.6	904.02	20.54
46-50	49	691.00	65.4	123.50	11.70	123.28	11.7	118.41	11.2	1056.19	21.55
TOTAL	266	3506		740.16		742.95		633.04		5622.15	
Percentage			62.4		13.1		13.2		11.3	100.00	21.13
NON-IRRIGATED AREAS											
Upto-05	5	62.15	59.8	19.50	18.7	12.32	11.8	10.10	9.6	104.42	20.88
6-10	8	94.00	56.00	27.62	16.4	29.04	17.3	17.35	10.3	168.01	21.00
11-15	14	160.00	58.30	43.87	16.0	41.91	15.3	28.52	10.4	274.30	19.59
16-20	20	230.00	60.2	52.00	13.6	59.17	15.5	41.00	10.8	382.17	19.10
21-25	24	276.00	58.8	65.00	13.9	76.71	16.3	51.72	11.0	469.43	19.55
26-30	28	316.00	59.7	71.50	13.4	82.19	15.5	60.20	11.4	529.89	18.92
31-35	33	380.00	60.1	79.62	12.6	101.91	16.1	70.46	11.2	631.99	19.15
TOTAL	132	1518.50		359.11		403.25		279.35		2558.21	
Percentage			59.4		14.0		15.8		10.8	100.00	19.38
BARAMATI											
Percentage	59.40		14.00		15.80	10.80	100.				
Upto-05	5	65.00	53.5	24.37	20.0	19.37	16.0	12.81	10.5	121.55	24.31
0-10	9	120.00	58.9	29.25	14.3	30.13	14.8	24.52	12.0	203.90	20.39
11-15	14	190.50	59.7	48.75	15.3	46.84	14.7	32.83	10.3	318.92	22.78
16-20	19	270.00	63.0	58.50	13.7	54.79	23.3	45.006	10.5	428.35	22.54
21-25	24	342.50	63.7	78.00	14.5	54.79	10.2	62.40	11.6	537.69	22.40
TOTAL	71	988.00		238.87		205.92		117.62		1610.41	
Percentage			61.4		14.8		12.8		11.0	100.00	22.68

The labour expenditure is the second most important item of cost of production. The share of labour expenditure in the total cost of production ranges from 13.1 to 14.1 per cent. The workers in the irrigated areas are familiar with dairy work which results in the lower expenditure on wages, while labourers in Baramati town are not very much familiar with dairy work. Therefore, higher proportion (14.8%) of expenditure on wages is reported in Baramati town. In all size-groups of cows herds, the share of replacement cost in the total cost ranges between 13.2 and 15.8 per cent. The share of replacement cost in irrgated areas and Baramati town was nearly the same i.e. 13 per cent of the total cost of production.

It is very interesting to note that the share of miscellaneous expenses in the total cost of production was same i.e.11 per cent in the three areas. The per day per animal cost of production in small size group was comparatively higher but as the size of the herd increases per day per animal cost of production decreases.

INCOME -EXPENDITURE ANALYSIS

After calculating the per day per animal cost of production with respect to each size group of cows herds, per litre cost of milk production was found out. It was obsevered that the per litre cost of production was not same in all size groups of cows herds. It can be seen from the table (Table 6) that the cost of production per

Table 6

Total Yield in Each Size-group, Average Yield and Cost of production Per Litre of Milk in Cows Herd(1995)

Size Group	Total animals in the herd	Total yield (Annual) (Litres)	Average yield per day (Litres)	Total cost of production per herd (Rs.)	Net cost production on per litre (Rs.)	Sale price per litre (Rs.)	Net profit per litre (Rs.)
IRRIGATED AREAS							
Upto-5	5	10585	29.00	114.00	3.93	5.50	1.57
6-10	9	18615	51.00	198.73	3.89	6.00	2.11
11-15	15	27872	76.36	294.71	3.85	5.70	1.85
16-20	19	39785	109.00	411.73	3.78	5.60	1.82
21-25	23	48910	134.00	506.15	3.78	5.73	1.95
26-30	28	60590	166.00	598.87	3.60	5.68	2.08
31-35	34	70540	193.26	671.35	3.47	5.55	2.08
36-40	40	91615	251.00	866.40	3.45	5.60	2.15
41-45	44	96725	265.00	904.02	3.41	5.70	2.29
46-50	49	113880	312.00	1056.19	3.38	5.65	2.27
Total	266	579117	1586.62				
NON-IRRIGATED AGEAS							
Upto-5	5	9636	26.4	104.42	3.95	5.60	1.65
6-10	8	16060	44.0	168.01	3.81	6.00	2.19
11-15	14	25769	70.6	274.30	3.88	6.00	2.12
16-20	20	36318	99.5	282.17	3.84	5.70	1.86
21-25	24	46282	126.8	469.43	3.70	5.75	2.05
26-30	28	54020	148.0	529.84	3.58	5.65	2.07
31-35	33	72270	198.0	631.99	3.19	5.70	2.51
Total	132	260355	713.3				
BARMATI TOWN							
Upto-5	5	12045	33.00	121.55	3.68	6	2.32
6-10	9	19710	54.00	203.90	3.77	6	2.23
11-15	14	31938	87.50	318.92	3.64	6	2.36
16-20	19	45260	124.00	428.35	3.45	6	2.55
21-25	24	59130	162.00	537.69	3.31	6	2.69
Total	71	169178	463.50				

litre of milk was relatively higher in small size groups in all three areas. As the size of cows herds increases the cost per litre of milk decreases. Thus, economies of scale are relised in this case.

It was observed that net profit per litre of milk higher in Baramati town than the irrigated areas and the non-irrigated areas. In Baramati town net profit per litre of milk is more than Rs. 2.23 in all size groups while in the size group (i.e. 21-25) it was as high as 2.69 Rupees.

DAILY INCOME

In dairy activity, income is mainly received from the following items 1) Milk 2) Dung 3) Calves. It was observed that (Table 7) proportion of income derived from milk was

Table 7

Income from Dairy activity: Cows Herds (1995)

Size-Group	Annual milk yield (Litres)	Net profit per litre (Rs.)	Total income from milk (Rs.)	Income from dung (Rs.)	Income from calves (Rs.)	Total income (Rs.)	Daily income (Rs.)	Per day per animal income (Rs.)
IRRIGATED AREAS								
Upto-05	10585	1.57	16618	3500	2200	22318	61.14	12.22
6-10	18615	2.11	39278	6600	3500	49378	135.78	15.03
11-15	27872	1.85	51563	11250	6400	69213	189.62	12.64
16-20	39785	1.82	72408	13300	8200	93908	257.28	13.54
21-25	48910	1.95	95374	17250	10400	123024	337.05	14.65
26-30	60590	2.08	126027	19600	12300	157927	432.67	15.45
31-35	70540	2.08	146723	25500	16500	188723	517.04	15.20
36-40	91615	2.15	196772	3200	17200	246172	674.44	16.86
41-45	96725	2.29	221500	30800	16300	264600	735.89	16.72
46-50	113880	2.27	258507	36750	18500	313757	859.60	17.54
Total			1224970	196550	111500	1533020		
Percentage			79.9	12.8	7.3	100		
Average								14.98
NON-IRRIGATED AREAS								
Upto-05	9635	1.65	15898	3000	2000	20898	57.25	11.45
6-10	16060	2.19	35171	7000	4100	46271	126.76	15.54
11-15	25769	2.12	54630	10200	6800	71630	196.24	14.01
16-20	36318	1.86	67551	12500	8900	88951	243.70	12.18
21-25	46282	2.05	94878	14700	10000	119578	327.61	13.65
26-30	54020	2.07	111821	17200	11300	140321	384.44	13.73
31-35	72270	2.51	181398	20200	12800	214398	587.39	17.79
Total			561347	84800	55900	702047		
Percentage			79.9	12.1	8.00	100		
Average								14.09
BARMATI TOWN								
Upto-05	12045	2.32	27944	2000	1500	31444	86.15	17.23
16-10	19710	2.23	43953	7500	2000	53453	146.44	16.27
11-15	31938	2.36	75374	9800	3500	88674	242.94	17.35
16-20	45260	2.55	115413	11700	4000	131113	359.21	18.90
21-25	59130	2.69	159060	14600	4500	178160	488.10	20.33
Total			421744	45600	15500	482844		
Percentage			87.3	9.5	3.2	100		
Average								18.01

higher (87.3%) in Baramati town and in the irrigated areas and the non-irrigated areas it was same i.e.79.9 per cent. The income derived from dung and calves was also nearly the same in the irrigated and the non-irrigated areas. In case of Baramati town, the income received from dung and calves was comparatively lower than the irrigated and the non-irrigated areas.

The per day per animal income was higher (Rs.18.01) in Baramati town which is three rupees higher than the irrigated areas and four rupees higher than the non-irrigated areas. Thus, one may conclude that the per day per animal income is higher in Baramati town.

CONCLUSIONS

In conclusion it can be stated that the present economic analysis of milk production brings out clearly the extent to which dairy activity with respect to cows herds is profitable in different areas such as the irrigated areas, the non-irrigated areas and urban areas. By practicing the dairy activity, the dairy operators get regular income from the production of milk which is not possible in case of production of crops.

Most of the required facilities are available in the irrigated areas which help dairy development and substantial milk production. The pure commercial dairy operators keep high yielding varieties of cows such as Jersey and Holstein. The analysis reveals that in the case of cows herds, the per day per animal income generally goes on increasing as the size of herd increases. It means that optimum size of the cows herd is the last size group in Baramati tahsil. The number of dairy operators in the irrigated areas and the non-irrigated areas may increase in near future but the size the herd is likely to decrease because of the problems created by hired labour.

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ADDRESS OF AUTHORS

Ms. Devikar A.A.
Sharada Mahila Mahavidyalay, Halegaon
Bramati Tahsil, Dist. Pune.

Dr. V.S. Datye
Reader Deptt. of Geography,
University of Pune, Pune-7.