Economics of Milk Production Around Madurai, Tamilnadu*

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A study on ecomics of milk production around Madurai revealed that the average dairy herd size per respondent was generally small in both, region I and region II. The concentrates had more impact on milk production rather than roughages. The variable, value of the animal has a significant bearing on milk yield. The milk yield of cross-bred cows was higher than desi cows in both the regions. The unit cost of milk production was the lowest in the case of cross-bred cows. The input-output ratio was higher for cross-bred cows than the desi cows.

In India dairy development is recognised as an important activity suitable for increasing the income level of small and marginal farmers and landless rural agricultural labourers. The relatively low price variability of milk as compared to crop production activities, the spread of income over the entire lactation period and the availability of family labour and crop residues make milk production particularly suitable to low income families.

The efficiency of dairy management is largely reflected in the unit cost of milk production. The profit margin can be maximised only when the cost of milk production is kept down to the base minimum. This can be fulfilled if there is an nuderstanding of the various components of the cost structure, their relatieve contribution to total cost and the way in which the expenses can be reduced. With this aim in view economic sub-urban regions were pooled and called as region I and the urban region was treated separately as region II for the purpose of further analysis.

MATERIAL AND METHODS

The required data on the aspects of milk production and cost from the selected respondents were collected with the help of a pre-tested questionnaire. The data regarding the quantity of roughages and concentrates fed per year per cow were collected. The feeds were converted into total digestible nutrients (TDN). The total number of hours spent on looking after the animals was collected and converted in to man day units using the ratio of 2 : 3 : 4 for men, women and children employed as adopted by the Farm Management Research Centre, Tamil Nadu Agricultural University.[1]

The interest and depreciation on the value of the animal, the value of the cattle shed and value of the tools and implements constituted the fixed cost. The interest for the value of the animal was calculated at the rate of ten per cent per annum and depreciation was calculated at the rate of 12·5 per cent per annum for the animals which were above the age of five years. The expenditure on feed, labour charges, miscellaneous charges and veterinary charges constituted the variable cost.

The cost of production per litre of milk was computed by discounting the value of farmyard manure from the total cost.

The input - output relationship in milk prduction was examined in fitting Cobb - Douglas type of production functions separately for region I desi cows, region I cross-bred cows and for region II desi and cross-bred cows with a dummy variable to discriminate the breed character.

The general form of the function is:

$$Y = a \, X_1^{b_1} \, X_2^{b_2} \, X_3^{b_3} \, X_4^{b_4}$$

Where Y— Milk output in litres per cow per lactation

X_1 — TDN in Kgs. supplied by concentrates per year

X_2 — Value of the animal in rupees

X_3 — Amount of labour input in mandays per year

X_4 — TDN in Kgs. supplied by roughages per year

b_1 to b_4 — are parameters (factor elasticities) in the equation

a — constant

From the sample, it was found that in region II, cross-bred cows numbered 17 and desi cows numbered 13; so in order to have a pooled function and to discriminate the effect of breed the dummy variable was used as explained by Kelejian and Oates.

RESULTS AND DISSCUSION :

Organisational Structure of milk-en terprise. The average dairy herd size per society was 1·67 and 1·49 in region I and region II respectively. Majority of the respondents maintained one to two cows only. Out of 100 respondents, 49 owned lands and the average land size was 1.37 hectares in region I and 0.40 hectare in region II. It was clearly observed that the percentage share of crop enterprise to total income was relatively higher than the dairy enterprise in both the regions. However, the share of milk enterprise in region II was greater than that in region I.

	Region I	Region II
Crop Enterprise (%)	78·17	57·20
Dairy Enterprise (%)	21·83	42·80

Cost Structure :

The details of cost and return in milk enterprise are presented in Table I. The gross cost of maintenance per desi cow per annum was Rs. 1050 in region I while the same was Rs, 1298

TABLE I Economic of Milk Production around Madurai

Items	Desi cows Region I** Average cost of Maintenance/cow	Average cost of prodn./litre of milk	Percentage	Desi cows Region II*** Average cost of main./cow	Average cost of prodn./litre of milk	Percentage	Cross-bred cows Region I** Average cost of Main./cow	Average cost of prodn./litre of milk	Percentage	Cross-bred cows Region II*** Average cost of Main./cow	Average cost of prodn./litre of milk	Percentage
Dry fodder	253.72	0.25	24.16	437.53	0.40	33.70	289.88	0.20	22.53	501.28	0.36	31.17
Green fodder	2.22	*	*	34.84	0.03	2.68	9.86	0.01	0.77	62.91	0.04	3.91
Concentrates	373.36	0.37	35.56	411.78	0.38	31.72	445.52	0.31	34.62	540.70	0.38	33.62
Labour charges	215.63	0.21	20.54	162.17	0.15	12.49	222.94	0.15	17.32	144.67	0.10	9.00
Depreciation and interest	173.46	0.17	16.52	225.24	0.21	17.35	282.59	0.20	21.96	307.68	0.22	19.13
Miscellaneous	29.93	0.03	2.85	25.51	0.02	1.97	31.88	0.02	2.48	49.92	0.04	3.11
Veterinary cost	1.67	*	*	1.11	*	*	4.19	*	0.32	1.00	*	0.06
Gross cost	1049.99	1.03	100.00	1298.18	1.19	100.00	1286.86	0.89	100.00	1608.16	1.14	100.00
Farmyard manure	30.14	0.03	—	16.15	0.01	—	23.12	0.02	—	20.94	0.01	—
Net cost excluding farm-yard manure	1019.85	1.00	—	1282.03	1.18	—	1263.74	0.87	—	1587.22	1.13	—
Average milk production in litre	1011.42	—	—	1091.69	—	—	1333.22	—	—	1307.95	—	—
Gross income	1340.81	—	—	1595.52	—	—	1752.82	—	—	1925.50	—	—
Net income	290.82	—	—	297.34	—	—	465.96	—	—	317.34	—	—
Input-output ratio	1:1.28	—	—	1:1.23	—	—	1:1.39	—	—	1:1.34	—	—

* Negligible; ** Rural and Sub-urban; *** Urban

in region II. Similarly, the cost of maintenance of cross-bred cows also was higher in region II than in region I amounting Rs. 1608 and Rs. 1287 respectively. The increase in cost of maintenance in region II is attributed to higher value of dry and green fodder in the urban area and also to high depreciation and interest charges on relatively higher value of the cows. The cost of feed accounted for 67 to 69 per cent in rural area while it was 63 to 68 per cent in urban area. The proportion of the cost of concentrate feed to total maintenance cost was about 35 per cent in region I and 32 to 34 per cent in region II. The relatively higher cost for concentrates in region I is due to increased value of oilcakes in the rural area. However, the value of concentrate feed accounted for one-third the total maintenance cost for all breeds and all regions while the bulky fodder constituted 22 to 24 per cent in rural area and 31 to 34 per cent urban area. One important feature was that the respondents in urban area fed the cows invariably with purchased green fodder while those in rural area allowed grazing and collected green fodder and sugarcane tops from fields through family labour; hence the proportion of cost of labour was relatively higher in rural area than in urban area.

The cost of production per litre of milk was higher for desi cows than for cross-bred cows. This was due to higher yield from cross-bred cows. The cost per litre was however, higher in Region II than in region I.

Yield and Return: The desi cows in region II were able to yield more than those in region I due to better care and management. Eventhough there was wide variation in the gross income of region I and region II desi cows, the net income derived seems to be almost equal. It could be inferred that the additional cost incurred in feeding the cows in region II over region I was compensated by additional milk yield. The input-output ratio showed that the level of profitability was higher in region I than in region II. The average milk yield of cross-bred cows for region I was higher than region II; the reason could be the presence of more young stocks in region I. The net income derived from a cross-bred cow was Rs. 466 in region I and Rs. 317 in region II. The probable reason might be the higher milk yield per lactation in region I than in region II.

Production Function: The estimated fuctions from the sample data are presented in Table II The co-efficient of multiple determination in the case of desi cows in region I was 0.84 indicating that 84 per cent of variations in milk yield could be explained by the included variables. This function indicated a significant influence of all the identified variables on milk yield. The TDN from concentrates, TDN from roughage and the value of the animal had positive influence while the labour had negative influence. The regression co-efficients in the present model are the co-efficients of elasticity of production.

TABLE II Milk Production Function — 1975-76

Particulars	Region I - Desi cows		Region I Cross-Bred cows		Region II Desi and Cross-bred cows	
	Regression coefficient	Mean value	Regression coefficient	Mean value	Regression coefficient	Mean value
Constant (a)	0.6610*	—	1.6800**	—	2.8292; 2.8461 NS @	—
X₁ TDN in kg. from concentrates	0.7872*	500.6	0.1368***	591.0	0.2152**	559.8
X₂ Value of the animal in rupees	0.0174**	593.2	0.3095*	1047	0.3308*	917.9
X₃ Amount of labour put in. in mandays	—0.1263*	40.95	0.0791**	42.87	—0.0092 NS	28.94
X₁ TDN in Kg from roughages	0.1157*	1442	0.0097NS	1518	0.0961 NS	1327
e dummy variable (1 for crossbred cows and otherwise)	—	—	—	—	0.0169 NS	3.686
Coefficient of multiple determination	0.84*	—	0.50*	—	0.84*	—
Sum of elasticities	0.7940	—	0.5350	—	0.6498	—
Number of observations	69	—	66	—	—	—
Output (yield) in litres	—	1011	—	1333	—	1199

*** Significant at ten per cent level
** Significant at five per cent level
* Significant at one per cent level
NS Non-significant
@ For Desi and Cross-bred cows respectively.

One would state, for instance that an increase in quantity of concentrates fed to the cows by one per cent above the mean value of 500.6 kgs. TDN, other things being the same, would increase the milk yield by 0.7872 per cent above the mean level of 1011 litres. Similarly, the elasticity of production of milk yield with reference to other variables in this function as well as in the other functions, could be interpreted.

In the case of cross-bred cows for region I the TDN from roughages alone had no significant influence on milk yield while all the other variables had significant and positive influence. The estimated function for region II desi and cross-bred cows with a dummy variable indicated that except concentrates and value of the animal, all other regression co-efficients were not statistically significant.

Certain policy measures could be discerned from the results obtained from the study.

In general, cross-bred cows have higher milk yield potentials than desi cows. The Animal Husbandry Department can possibly focus attention in up-grading the desi cows by artificial insemination with pedigree bulls. The proportionate share of concentrates in the total maintenance cost of cows accounts for nearly 30 per cent. The Madurai Milk Project could take necessary steps in supplying the members of the Cooperative Societies with concentrates at reasonable prices which could augment greater milk production in the study area. The possibilities of substituting farm grown concentrate fodder like lucerne in place of purchased feed may be explored in potential farms and popularised. As the labour input seems to be propertionately high, the herd size may be increased to improve labour efficiency.