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COMPARATIVE ECONOMICS OF REARING CROSS-BRED AND NON-DESCRIPT CALVES UNDER VILLAGE CONDITIONS

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Calf rearing on scientific lines is taken up in some of the livestock farms with a view to improving milk production and supplying better quality of males for breeding and draught power. In the rural areas some people take up calf rearing to supplement their income through the sale of calves. With the introduction of cross-breeding programme, the farmers are persuaded to rear cross-bred calves particularly female ones as cross-breeding is the quickest method of genetic improvement of production potential of our indigenous cattle. The study of rearing and production traits of cross-bred animals as compared to other breeds and non-descript ones under different conditions would help in judging their efficiency.

Hardly any systematic study has been made in the country to work out the economics of rearing calves excepting in some livestock farms where proper records on various aspects of livestock keeping are maintained regularly. The results obtained for animals maintained in farm conditions would not be similar to those in village management conditions. The study of economics of calf rearing under village conditions is complicated due to the fact that householders are not in a position to maintain any detailed or systematic accounts and they are hardly aware of the potentialities by way of returns. The householder is not likely to take up calf rearing on a regular basis unless he is convinced that he would get due return from the enterprise. In the absence of any systematic accounts maintained by the householders in the rural areas, sample surveys will have to be undertaken for the collection of relevant data following cost accounting approach. One such survey, the first of its kind was undertaken by the Indian Agricultural Statistics Research Institute (IASRI) during 1963-66 in Hissar district of Haryana State.[1] A similar study has been taken up in Nadia district of West Bengal. The present study is intended to compare the economics of rearing cross-bred as well as non-descript calves in the rural area of West Bengal.

Material and Methods

The IASRI has undertaken a large scale sample survey since 1977 to evolve a suitable statistical methodology for working out the cost of rearing calves and maintenance of adult animals in Krishnanagar area of West Bengal where cross-breeding of local cows with exotic Jersey breed is in progress for more than a decade. A two-stage sampling design has been adopted taking villages (covered under Artificial Insemination Centres) as the first stage units and households maintaining bovines as second stage units. A random sample of 384 households maintaining bovines in 79 villages has been selected

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1. K. C. Raut, V. N. Amble and Shivtar Singh: Economics of Raising Cattle and Buffaloes—A Technical Report, Indian Agricultural Statistics Research Institute (ICAR), New Delhi, 1973.

for recording data. The approach adopted for the enquiry was one of cost accounting, each selected household being visited once a fortnight by trained investigators throughout the period of enquiry. The data on feeds given to the animals are recorded by direct weighment and other information, such as particulars of animals, calvings, quantum of labour, prices of feeds and fodders, labour wage rates, transaction of animals, mortality, etc., through observation and careful enquiry. Utilizing the data collected from the selected households during a period of one year (1977-78), some studies have been carried out to indicate the cost of rearing calves separately for cross-bred and non-descript ones from birth till three years of age and also for the female ones up to their age at first calving.

The components of rearing cost are feed, paid labour, family labour, depreciation on assets and equipments, interest on capital and miscellaneous recurring expenditure. From the gross cost the income, mainly from dung, has been deducted to obtain the net cost on rearing. Since mortality of calves should be considered in working out the rearing cost, this aspect has also been discussed taking into account the number of calves died at various age groups and the expenditure incurred on them till their death. The procedure of working out various components of cost is given by Panse *et al.*[2]

Rearing Cost

As given in Table I, the cost of rearing a cross-bred female calf from birth till three years of age was estimated to be Rs. 1,764 including family labour and Rs. 1,305 excluding family labour. In these calculations the value of milk sucked by a calf has not been taken into account. Considering the break-up of expenditure, the net rearing cost upto one year of age accounted for 16.3 per cent of the total cost up to the three years of age, 34.3 per cent from one to two years and 49.4 per cent from two to three years of age. The proportions were similar for different age groups when family labour was excluded from rearing cost. The average age at first calving of cross-bred calves in the area was about 39 months. The additional expenditure incurred during the further period of three months after three years of age was estimated to be Rs. 210 including family labour and Rs. 160 excluding it.

In the case of a non-descript female calf the rearing cost up to three years of age was estimated to be Rs. 1,163 including family labour and Rs. 896 excluding it. The break-up of the total rearing cost according to various age groups is given in the table and the trend is similar to those in the case of cross-bred calves. The average age at first calving of a non-descript female was 51 months. The additional expenditure incurred during the further period of 15 months after three years was of the order of Rs. 895 including family labour and Rs. 664 excluding it. It may be observed that the rearing cost of a cross-bred calf was initially higher than that of a non-descript but in view of early age at maturity and calving, the total expenditure upto age at first calving was Rs. 1,974 for a cross-bred calf and Rs. 2,058 for a non-

2. V. G. Panse, V. N. Amble and K. C. Raut: Cost of Milk Production in West Bengal, ICAR Report Series No. 28, Indian Council of Agricultural Research, New Delhi, 1967.

TABLE I—ESTIMATES OF REARING COST OF CALVES INCLUDING FAMILY LABOUR

Age group	Female						Male					
	Cross-bred			Non-descript			Cross-bred			Non-descript		
	No.	Cost (Rs.)	Per cent	No.	Cost (Rs.)	Per cent	No.	Cost (Rs.)	Per cent	No.	Cost (Rs.)	Per cent
Upto one year	188	287(6·2)	16·3	127	171(6·3)	14·7	146	245(7·0)	18·4	111	203(7·6)	19·1
1 to 2 years	153	605(4·1)	34·3	80	413(5·8)	35·5	56	494(6·9)	37·2	68	350(5·2)	32·9
2 to 2½ years	65	434(6·5)	24·6	48	271(7·7)	23·3	13	300(12·8)	22·6	26	218(6·4)	20·4
2½ to 3 years	41	438(5·8)	24·8	35	308(8·4)	26·5	9	288*(29·8)	21·8	23	294(8·7)	27·6
Total (birth to 3 years)		1,764(2·8)	100·0		1,163(3·1)	100·0		1,327(4·6)	100·0		1,065(3·7)	100·0
3 years to age at first calving	62	210(5·1)		69	895(5·6)							

N. B.:—Figures in brackets indicate the percentage standard errors of the estimates.

* Based on inadequate number of observations.

descript one. Upto the age at maturity the rearing cost was Rs. 1,254 for a female cross-bred calf and Rs. 1,458 for a non-descript one. During the gestation period the additional expenditure was Rs. 720 and Rs. 600 for these two categories.

In the case of a male calf the net rearing cost including family labour from its birth till three years of age was estimated to be Rs. 1,327 for a cross-bred calf and Rs. 1,065 for a non-descript one. The proportions of rearing cost for various age groups were similar to those observed in the case of female calves.

The cost on feed was worked out on the basis of prevailing market rates of feeds and fodders fed irrespective of whether these were partly or wholly purchased or home-grown. Raut and Singh[3] observed that the cost of production of home-grown feeds would be 25 per cent to 35 per cent less than the prevailing market rate. Utilizing this information the cost of feeds and fodders fed to animals and which were home-grown can be worked out at 30 per cent less than the market rate. The rearing cost including family labour would be of the order of Rs. 1,410 for a female cross-bred calf and Rs. 930 for a non-descript one up to three years of age. Similar estimates can be worked out for male calves as well.

The rearing cost did not include the cost of milk sucked by a calf as it was not possible to record it. However, a rough estimate of the quantity of milk sucked was obtained on the basis of the number of teats sucked and the time allowed. Evaluating this quantity of milk at the cost of production rate, it was estimated that a female and a male cross-bred calf sucked milk worth Rs. 160 and Rs. 135 respectively. In the case of non-descript, the estimate was about Rs. 100 for each sex of calf. These estimates when added to those given in the table would provide a picture about the cost on rearing including the quantity of milk sucked.

Components of Rearing Cost

Table II gives the components of rearing cost up to three years of age. Feed cost accounted for 60 to 65 per cent, paid labour 4 to 8 per cent, family labour 21 to 30 per cent of the gross cost of rearing. Income from dung accounted for 4 to 10 per cent of the rearing cost.

Rearing Cost including Calf Mortality

In the estimates of cost on rearing given in Table I, the loss due to calf mortality has not been taken into account. Since the householder incurs loss when a calf dies at a particular age, the expenditure incurred on various items till the age at death should be taken into account for estimating the costs on rearing of the remaining calves. During the period of study, the calf mortality for female and male cross-bred calves in the selected stalls was 18.2 per cent and 38.0 per cent respectively. The corresponding mortality

3. K. C. Raut and Shivtar Singh, "Does Calf Rearing Pay in Rural Areas?", *Indian Farming* Vol. XXII, No. 9, December 1972.

TABLE II—COMPONENTS OF REARING COST (EXPRESSED AS PERCENTAGE OF GROSS COST) UPTO THREE YEARS OF AGE

(per cent)

Components	Cross-bred		Non-descript	
	Female	Male	Female	Male
Feed	62·9	62·7	63·7	64·9
Paid labour	3·9	4·3	6·2	5·3
Unpaid labour	24·8	25·9	21·5	21·8
Depreciation on asset and equipment	0·7	0·9	0·8	0·9
Interest on capital	6·0	4·0	5·6	4·8
Miscellaneous recurring expenditure	1·7	2·2	2·2	2·3
Gross cost (Rs.)	1,859	1,430	1,246	1,167
Income from dung (per cent) ..	5·0	7·2	6·7	8·8

rates for non-descript calves were 17.9 per cent and 14.6 per cent respectively. Since these calves died at various age groups the expenditure incurred on them has been added to the rearing cost of the surviving calves. Considering all these aspects, it was estimated that for a female calf an amount of Rs. 316 for a cross-bred calf and Rs. 197 for a non-descript one would be added to the rearing cost upto three years of age. In the case of male calves, the component of cost due to calf mortality was estimated to be Rs. 425 and Rs. 277 for cross-bred and non-descript respectively.

Margin of Return

The prices of animals sold and purchased along with their particulars at the time of transactions were recorded from the selected stalls during the period of enquiry. Comparing the prevailing market rates of the calf at different age groups with the corresponding rearing cost, one can compare the extent of net return realised by the stall owner. It was observed that the market rates were substantially less than the rearing cost including family labour at each age group, meaning thereby the stall owners did not realise any profit. Excluding family labour, the rearing cost when home-grown feeds evaluated at the cost of production rate would almost equal the prevailing market rate. The maximum sale price of a female cross-bred calf of two years of age was about Rs. 600. If the prevailing market rates of the calf would be compared with the rearing cost including calf mortality the margin of loss by a stall owner would be widened. There would be some margin of profit only if feed cost and calf mortality can be reduced substantially.

Studies on Labour

In a household, there were about 8 family members including men, women and children, which would be equivalent to 6.9 standard men if a woman and child are converted to standard man units on the basis of wage

rates. Of these, hardly two men worked both for agricultural operations and for maintenance of animals. Most of the labour utilized for the maintenance of animals was by family members. Only about 1.6 standard man-hours were utilized per day per animal excluding the time spent for taking the animals for grazing. The extent of involvement in the maintenance of animals was almost in equal proportion by a man and woman, the child labour being a small fraction and mostly utilized for grazing operation. It was observed that about 120 and 98 man-days were utilized on rearing a female and male cross-bred calf respectively from birth to three years of age. About 75 man-days were utilized for a non-descript calf of either sex upto three years of age.

PROSPECTS OF INCREASING INCOME AND EMPLOYMENT ON MIXED FARMS

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Taking into consideration the facts that for the majority of farmers land is the major limiting factor in raising their income and employment; as milk production enterprises require relatively less land and more labour to generate a given level of income as compared to foodgrain crops, mixed farming system suits the small farms; milk and milk products are the chief source of animal proteins in the average Indian diet; the average per capita availability of milk is far below the minimum requirements as per nutritional standards; with the increase in population and real income the demand for milk would increase at a much faster rate ensuring its remunerative price, the future of dairy industry seems to be quite promising. On the mixed farms in the country, the number of cattle and buffaloes is mainly determined by the availability of fodders (crop by-products). At the individual farm-firm level, the availability of fodders could be augmented through the purchases from the other farms. However, due to the very bulky nature of roughage fodders, its supply can not be augmented easily at the aggregate (macro) level through purchases. Therefore, at the aggregate level, the total quantities of fodders required for feeding the livestock must not exceed the total quantities of the same available (produced) in the area. With these considerations this paper attempts to determine the extent to which the farm income and employment could be increased on typical mixed farms as well as the aggregate of the area as a whole from the optimal crop and milk production plans derived by using the common and improved production technologies.

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