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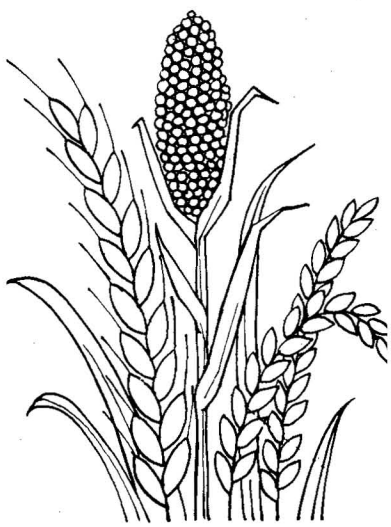

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INSTITUTIONAL FINANCE FOR DAIRY DEVELOPMENT

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Introduction

In India, dairy development is recognized as an important activity suitable for increasing the income level of rural families especially the small and marginal farmers and landless agricultural labourers. The relatively low levels of yield and the price variability of milk as compared to crop production activities, the spread of income over the lactation period, and the availability of family labour and crop residues make cattle keeping particularly suitable to low income families. Therefore, dairy development is included as a component in many rural development programmes.

Milk production can be made profitable through the maintenance of quality cattle, adoption of improved feeding and management practices, and establishment of organized markets for milk to bring a remunerative price to the farmers. The purchase of quality cattle requires substantial initial investment which many small income families cannot meet from their own resources. Therefore, the organization of credit for the acquisition of quality milch cattle to the small farmers becomes an important activity.

The State Bank of India initiated a scheme for financing the purchase of dairy cattle in Baroda district in 1972. This scheme made an attempt to integrate finance with production enhancement and marketing activities and ensured that the repayment schedule did not inconvenience the farmers. The bank advanced loans to individual farmers belonging to the milk societies affiliated to the Baroda dairy. The loan amount was recovered over a period of years from the milk sales. The bank also provided technical help in locating quality cattle and veterinary help through doctors from the dairy. Because of the commercial nature of this scheme, it was considered important to study its impact.

The study covered the following aspects : (1) Private costs and returns to the farmers, (2) Impact on the dairy, (3) Income distribution effects, (4) Impact on the bank, and (5) Social cost-benefits.

Private Costs and Returns to the Farmers

By 1974, the scheme was introduced in 82 villages through the co-operative societies. In 17 of these village societies, the scheme had been in operation for more than one year. From these, four villages from four different talukas were selected for study. The data on the economics of 101 buffaloes purchased by 60 farmers from these four villages were used to study the costs

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and returns to the farmers. The average purchase price of the buffaloes was Rs. 1,670.

The primary benefit to the farmers was measured in terms of the increased income through dairying. Though the secondary effects like increased consumption of milk and better living conditions were likely to have resulted, they were excluded from the study. Since most farmers purchased buffaloes in the second lactation, a further productive life of six lactations was considered. For calculating the costs associated with maintaining buffaloes, the following items were considered :

1. Out-of-pocket expenses incurred on purchased inputs like concentrates, feed, fodder and hired labourers.

2. Value of farm grown green and dry fodder and domestic labour.

3. Cost of capital, valued at the current market rate.

The returns to the farmers included the value of the milk produced and of the farmyard manure, the revenue from the sale of calves/heifers at the end of each lactation, and the scrap value of the animal at the end of its productive life period.

The cost of maintaining one buffalo and the returns from one lactation are given in Table I.

TABLE I—ECONOMICS OF MAINTAINING BUFFALO

(*Rupees*)

Lactation number	Cost/lactation on		Total revenue per lactation	Loan repayment
	Out-of-pocket expenses	Total cost including value of farm grown items		
2	633.61	1,446.61	1,553.70	417.50
3	720.23	1,455.32	1,793.07	417.50
4	656.49	1,369.99	1,872.68	417.50
5	712.58	1,437.08	1,926.75	417.50
6	524.00	1,369.25	1,823.87	—
7	372.60	1,339.00	2,191.87*	—

*Includes the average scrap value of Rs. 410.87.

To determine the viability of the loans, the investment worth was calculated by using four criteria, *viz.*, (*a*) pay-back period, (*b*) net present value, (*c*) internal rate of return, and (*d*) benefit-cost ratio.[1] The value of these measures is presented in Table II.

1. These measures have standard definitions. See, for example, G. S. Gupta and P. S. George, "Profitability of Nagpur Santra (Oranges) Cultivation," *Indian Journal of Agricultural Economics* Vol. XXIX, No. 3, July-September, 1974, pp. 134-142.

TABLE II—MEASURES OF INVESTMENT WORTH PER BUFFALO

Measures	Calculated values (Rs.)	
	Including imputed costs	Excluding imputed costs
Pay-back period (years)	6	3
Net present value at discount rate		
7.5%	2,181.85	5,714.76
10%	1,969.14	5,192.24
Internal rate of return	14.29	54.14
Benefit-cost ratio at discount rate		
7.5%	1.37	3.35
10%	1.36	3.33

The investment of Rs. 1,670 per buffalo was viable even when the imputed costs were taken into account. On an average, the farmers who had taken loan supplied milk worth Rs. 1,253.16. The societies deducted Rs. 529.20 towards loan repayment. A balance of Rs. 723.96 was available to the farmers for meeting the out-of-pocket expenses. From this, the farmers spent Rs. 415.00 for purchasing inputs in the same period, leaving a balance of Rs. 308.66 for other family expenses. In other words, the receipts from milk were more than sufficient to meet the loan obligation and the out-of-pocket expenses for maintaining buffaloes.

Impact on Dairy

The purchase of quality cattle, often from areas outside the dairy's own procurement areas, would increase the total quantity of milk in the area. It is also possible that increased handling of milk by the co-operative societies would strengthen the procurement machinery available to the dairy.

The increase in the supply of milk to the milk societies was estimated by using a relationship between the milk collected per month by each society (S) and the number of milch cattle with the members (M). The results obtained for the four societies are given below.

$$\text{Society 1 : } S = \underset{(1.92)}{124.56}\ M; \quad R^2 = .95$$

$$\text{Society 2 : } S = \underset{(1.09)}{84.82}\ M; \quad R^2 = .67$$

$$\text{Society 3 : } S = \underset{(4.94)}{87.21}\ M; \quad R^2 = .85$$

$$\text{Society 4 : } S = \underset{(1.44)}{84.29}\ M; \quad R^2 = .41$$

(Figures in parentheses are the 't' values.)

The additional milch cattle bought with the help of the bank loan brought an additional supply of milk to the societies and the dairy.

The operating results of all the four societies indicated that after the introduction of the scheme, the societies experienced a rapid growth in the share capital, reserve fund, number of shareholders and gross profit.

Income Distribution Effects

The income of the farmers was assumed to be related to the size of their holdings.[2] To analyse the impact of the loans on income distribution, the size of holdings of farmers belonging to the four villages, of members of the co-operative society, and of farmers using bank loans was compared. The members of the co-operative societies came from a cross-section of the total village population. However, the loan facilities were utilized by a larger proportion of farmers with small and medium sized land holdings as compared with the very small and relatively big farmers (Table III).

TABLE III—DISTRIBUTION OF THE FARMERS

Size of holdings (acres)	Percentage distribution of		
	Farmers from the 4 villages	Members of village societies	Farmers using SBI loan
Up to 1	14.9	7.5	4.1
1.01—3	31.4	15.7	32.0
3.01—5	15.9	8.9	20.6
5.01—10	17.8	13.1	14.6
Above 10	20.0	13.8	13.4
Family members with no land in their name	—	31.5	15.5
Members from nearby villages ..	—	9.5	—

The pattern of addition to the existing stock of cattle with the sample farmers showed that about half the animals were bought by the farmers who had no cattle. This indicates that the loans made an impact on those farmers who were not in a position to acquire cattle with their own resources (Table IV).

2. In the absence of any concrete data, the effects of the economies and diseconomies of scale associated with the size of holdings were ignored.

TABLE IV—ADDITION OF CATTLE TO THE STOCK

Number of cattle per farmer before taking loan	Total number of cattle before taking loan	Number of cattle added through SBI loan
0	—	48
1	19	22
2	6	5
3	3	1
4	4	3
5	15	5
20	20	4
Total	67	88

The pattern of loan distribution and addition to the stock indicated that the cattle development scheme was not one which increased the gap between the rural poor and the rural rich.

Impact on the Bank

Since the bank considered this scheme to be a part of its area development activities, the implementation of the scheme was considered to fulfil a social objective. However, the bank was keen that all the direct costs be met from the returns.

The bank received finance from the Agricultural Refinance Corporation (ARC) at the rate of seven per cent; it charged 9½ per cent from the farmers.[3] Thus a contribution of 2½ per cent was available to the bank to meet the expenses.

In the absence of data on the incremental costs of the scheme, an attempt was made to allocate various cost items to the cattle development scheme. The cost items included the salary and travelling allowances of the staff working for the scheme, allocation for office space, electricity, telephone, and depreciation on furniture. On the basis of the monthly costs incurred on these items, the following cost equation was fitted:

$$C = \underset{(10.52)}{3896.17} + \underset{}{46x} + \underset{(2.36)}{.006\,x^2}; \quad R^2 = .787$$

where C = total monthly expenditure,
x = number of loans outstanding in the month.

(Figures in parentheses are the 't' values.)

3. The cattle development scheme was approved for refinancing by the ARC. Subsequently, these rates were increased.

On the basis of returns and cost to the bank, the minimum number of accounts required to operate at no-profit-no-loss (breakeven level) was calculated; the figure worked out to be 2,270. Considering the potential of the area and the number of advances made in the first two years, this target was easy to achieve. Thus the cattle development scheme helped the bank to achieve a social objective without incurring a financial loss.

Social Cost-Benefit Analysis

The social cost of the cattle development scheme was taken as a total of the costs incurred by the farmers, the bank, and the dairy and the co-operative societies, and the opportunity cost of the capital for other social activities. The average of the out-of-pocket expenses and the total costs including the imputed value of farm grown items and family labour presented in Table I was considered as the farmers' cost. The bank's annual cost for 1973-74 was taken as the cost of running the scheme for one year. The costs to the dairy and the co-operative societies in connection with the scheme were negligible. The opportunity cost of capital was assumed to be 10 per cent.

The total private benefits and the benefits from fulfilling a social objective were considered to be the social benefits of the scheme. The increased income of the small farmers was assumed to have a 20 per cent higher social value than the money income level.[4] The income accrued to the large farmers was assumed to have a 10 per cent less social value than the money value of income. The other benefits to the society included (*a*) increased milk yield per cattle on account of transfer from the unorganized to the organized sector, (*b*) savings in the dairy's overheads due to increased capacity utilization of the dairy, (*c*) increased sale of cattle feed, and (*d*) strengthening of co-operative societies. Some assumptions were used to evaluate the gains from the first three items; the fourth item was ignored.[5] The social costs and benefits of loans for 2,500 buffaloes are presented in Table V.

TABLE V.—SOCIAL COSTS AND BENEFITS OF LOANS FOR 2,500 BUFFALOES

(*lakh rupees*)

Year	Total social cost	Total social benefits
0	47.5	—
1	60.5	34.6
2	71.8	73.1
3	37.1	105.4
4	33.8	102.2
5	28.0	85.3
6	31.3	94.1
7	36.7	102.2
8	34.0	109.2
9	19.8	68.2
10	6.7	29.3

4. In this analysis, farmers with less than 5 acres were considered small farmers and those with more than 10 acres were considered large farmers.

5. Transfer from unorganized to organized sector increased milk availability by 10 per cent. Each additional litre of milk handled by the dairy reduced the overheads by one paisa. The societies were assumed to receive an additional annual commission of Rs. 5 per cattle from the sale of cattle feed.

The internal rate of return was 44 per cent; this indicated that the scheme provided a positive net present value for all rates of returns below 44 per cent.

Conclusion

The analysis offers enough evidence to conclude that institutional financing for dairy development could be organized to suit the interests of all parties concerned. The dairy development scheme was viable and feasible from the point of view of its impact on the direct beneficiaries (farmers and the bank) and the indirect beneficiaries (co-operative societies and the dairy). The scheme assured the farmers of a continuous source of income through self-perpetuation of the cattle loan. The bank recovered all the expenses incurred in running the scheme. The feasibility criteria of the scheme ensured that the investment in the cattle development scheme was justified on economic considerations, and at the same time, provided a built-in tool for demonstrating that it was self-liquidating.[6]

The findings of this paper also endorse the view that dairying could be used as an effective means for increasing the income position of the rural poor if adequate finances linked with extension and marketing facilities are provided. In many regions it is not necessary to introduce any direct subsidies; the creation of infrastructure facilities for production enhancement, procurement, processing and marketing is sufficient.

ECONOMIC OPTIMA IN MILK PRODUCTION

Parmatma Singh and Dayanatha Jha*

India has nearly one-fourth of world's cattle and 60 per cent of the buffalo population. With this population one would normally expect a very high contribution of these animal resources to the national income of the country. In reality, not more than three and half per cent of the national income (nearly 7 per cent of the income from agricultural sector) is derived from animal husbandry and dairying. This seeming paradox is an indicator of continued neglect of livestock enterprise in general and of dairy enterprise in particular. This highlights the need for investigating the resources allocation and output performance in livestock production with a view to detect the irrationalities and for devising appropriate ameliorative measures.

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6. For a detailed discussion on this point, see V. M. Jakhade and M. V. Gadgil, "Production and Repayment Capacity-Oriented Lending for Farm Investment," *Reserve Bank of India Bulletin*, Vol. XXIV, No. 1, January, 1970, p. 56.

* Research Officer, Department of Economics, Haryana Agricultural University, Hissar and Economist, Indian Agricultural Research Institute, New Delhi, respectively. The paper is based on a part of the first author's approved Ph. D. dissertation submitted to the Post-Graduate School, Indian Agricultural Research Institute, New Delhi.