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INTER-DISTRICT VARIATION IN BOVINE POPULATION, COST STRUCTURE, PRODUCTION AND DISPOSAL OF MILK IN HARYANA

A. C. Gangwar†

SUMMARY

The study was undertaken with following specific objectives : (*i*) to examine the inter-district variation in the bovine population, (*ii*) to examine the inter-district variation in the cost structure, production and disposal of milk, and (*iii*) to examine the applicability of the Burns' hypothesis in the State, *i.e.*, the lower the rainfall, the higher was the annual milk yield per cow, the proportion of male cattle increased with rainfall, while the proportion of the female buffaloes fell. For this study secondary data were collected from the Statistical Abstract of Haryana and family budgets of the cultivators in Haryana, 1969-70. The study reveals that the cattle population was about 50 per cent of the total bovine population. There were inter-district variations in the cattle population (44 to 57 per cent), compared to the total bovine population. The population of the male cattle was found higher in the wet districts, whereas the population of the buffaloes in milk was found higher in the wet districts. Thus Burns' hypothesis was found true with respect to the population. In the case of cattle, the rate of mortality was less than the buffaloes. The proportion of cattle in milk was higher in the dry districts and of buffaloes in wet districts. Since cattle consume less feeds and fodder than the buffaloes they are more adoptive to the dry region of the State. The cost of maintenance of a buffalo varied from Rs. 1,256.18 in Hissar district to Rs. 557.89 in Ambala district. Similarly, the cost of maintenance of a cow also varied from Rs. 840.46 in Hissar district to Rs. 328.70 in Jind district. The cost of cows and buffalo's milk was found to be Re. 0.79 and Re. 0.82 (excluding cost of labour) in 1969-70. The cow's milk was mainly used for home consumption. In the case of buffalo the bulk of the milk was either churned for making ghee or consumed as fluid milk. Very little quantity of the milk was sold as fluid milk. Burns' hypothesis was not confirmed with respect to the milk yield of cow and rainfall.

IMPACT OF MILK SCHEME IN AKOLA DISTRICT

D. K. Sohoni, S. L. Deshpande and C. K. Joshi*

SUMMARY

The main object of the establishment of milk scheme is to provide marketing outlets for the milk produced on the farm and to provide loans for the purchase of improved breeds of milch animal. The main purpose of this study was to assess the impact of milk scheme in Akola district. A sample of 30 farmers was drawn from two primary milk co-operative societies in Akola district randomly for determining the average inputs, *e.g.*, fodder, feeds, concentrates, etc., per animal. The impact at the micro level is measured by taking the data published in the performance budget of the Agricultural and Co-operation Department. The study relates to the period 1961 to 1971. The main findings of the study are : (*i*) The decline in the livestock population in Akola district during the year 1971 was due to a reduction of working buffalo population by 57.64 per cent over 1961, due to drought in 1970-71. There seems to be no adverse effect of drought on the population of animals in milk. (*ii*) The population of buffaloes in milk and cows in milk have increased by 4.57 per cent and 0.96 per cent in 1971 over 1961 respectively. (*iii*) The animals in milk constituted 56 per cent of the total milch animal in the case of buffaloes and 42 per cent in the case of cows. The whole livestock herd is dominated by the number of cows which accounted for about 85 per cent of the livestock population. (*iv*) The ratio of population commanded per milch animal has declined from 1 : 11·42 to 1 : 14 in 1971. (*v*) The availability of the resources like pulse *chuni*, cotton seed cake and oil seed cake was found to be inadequate when compared with the schedules of feeds as recommended by the ICAR. (*vi*) In spite of an increase in the production of milk from 245.38 lakh litres to 267.91 lakh litres in 1971 due to an increase in the productivity of milk per animal, the per capita per day consumption of milk declined from 56.52 grammes to 48.80 grammes due to higher rate of increase in population during 1971 over 1961.

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BOVINE ECONOMY OF PANCHMAHALS DISTRICT : A STUDY

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SUMMARY

The Panchmahals district of Gujarat is rich in bovine population. Nearly 11 per cent of the State's bovine population is found in this district. The density of bovine population in the district per sq. km. was 123.47 according to the 1972 livestock census, which is quite high as compared to the State average (50.64). Cattle farming is not a mere adjunct to agriculture but provides independent as well as supplementary sources of livelihood to a large section of the district population. The natural factor endowment and proximity of milk market provides ample scope for the rapid development of cattle farming specially dairy in the district. The district's bovine population during the period 1956-1972 increased by 13.42 per cent as a whole. Between 1956 and 1972 census, all the censuses (except the 1956 census) revealed an increase in the bovine population of the district. The total cattle had increased by 11.15 per cent and buffaloes by 20.30 per cent in the district over a period of 16 years.

The average milk yield of the buffaloes and cows was poor and varied from one to two litres in the case of buffaloes and half to one litre in the case of cows. The estimated average milk yield per day in the district in 1972 was 266,000 litres of which the marketed surplus was about 64,000 litres. Out of 266,000 litres of milk, only 21,000 litres of milk were marketed through the organized milk societies. To start a model dairy plant the minimum requirement is 50,000 to 60,000 litres of milk per day throughout the year. Thus, the gap is large and the present production needs to be increased to two-fold for starting a dairy plant in the district. Though the natural factor endowments are favourable for dairy development in the district, no progress has been made in this direction due to the poor quality of indigenous breed and insufficient nutrition. In order to improve the bovine economy of the district following suggestions merit considerations. (1) To prevent deterioration of the cattle and improving the breed, it is necessary to supply a large number of good bulls in the district. For this it is essential to establish as many bull centres as possible. (2) As animal rearing practices in the area are far from satisfactory, cattle breeders of the district have to be educated in modern management practices of cattle breeding and grazing, etc. (3) Any programme of cattle development will depend upon the availability of adequate feed and fodder. Therefore all steps should be taken to increase the feed and fodder availability. The district had a deficit of 46,42,838 tonnes of feed and fodder in 1972. Unless the feed and fodder availability is increased, the introduction of better breeds will not achieve significant results in improving the bovine economy of the district.

PROJECTIONS OF BOVINE POPULATION, REQUIREMENT AND ECONOMIC DEMAND FOR MILK

K. N. S. Sharma, R. K. Patel and Surendra Singh†

SUMMARY

This study has made an attempt to project the bovine population, requirement and economic demand for milk in the country. By 1978, the end of Fifth Five-Year Plan, the economic demand for milk was estimated at 38.68 million tonnes while, based on a nutritional standard of 210 gm. per capita per day, the requirement worked out to be 50.44 million tonnes. The present rate of increase in milk production is however quite slow. To meet this gap, the milk production should increase at the rate of 3 million tonnes per year upto 1976, 4 million tonnes upto 1979 and thereafter at the rate of 5 million tonnes. The projections for bovine population revealed only marginal increases in cattle population while buffalo population increased at a much faster rate especially in agriculturally advanced States like Punjab, Haryana and Gujarat. To meet the economic demand for milk, the country needs a population of 14 million additional indigenous cows to be brought under cross-breeding programme so as to get 6.3 million breedable cross-bred cows at the end of 1978-79. A successful milk enhancement programme will logically depend on integrated action plan involving genetic improvement, health cover, better nutrition and improved marketing facilities.

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CONSUMPTION AND AVAILABILITY OF MILK IN INDIA

V. K. Gupta and R. K. Pandey†

SUMMARY

During the past decade, there has been a substantial expansion of population and per capita income. Such an expansion may, essentially, call for an expansion in the demand for livestock products. On the contrary, the supply of milk and milk products has been far from satisfactory. The future availability of milk may still be lower. For better planning of dairy development which may be consistent with resource endowments and requirements we need estimates of future consumption and supply of milk products. The per capita demand for milk has been estimated for future year using the relationship[1]

$$Q_t = Q_0\left(1 + \frac{I_t - I_0}{I_0}\right)^e$$

where Q_t = per capita demand in some future year (t),

Q_0 = per capita consumption level in the base year,

I_t = per capita income in future year (t),

I_0 = per capita income in the base year,

e = income elasticity of demand for milk.

The total demand has been estimated from the above formula by multiplying it by the projected population for the future years. The demand for milk has been estimated at 25.84 million tonnes in 1979 and 31.61 million tonnes in 1986.

The supply of milk has also been estimated for future years using the linear relation $Y = a + bT$ where Y = annual production of milk in thousand metric tonnes, and T = time period.

Using this formula, the estimates of the supply of milk have been obtained as 22.32 million tonnes in 1979 and 23.02 million tonnes in 1986. It is evident that there is a gap of 5 to 9 million tonnes of milk between the supply and demand for milk during the future years. This gap has to bridged for better and nutritious diet to be given to our people. An early attention must be given to reduce this gap. Steps should be taken to strengthen the annual milk production. Among other things, the best way of increasing the production of milk is to maintain better management, proper breeding of suitable animals, managing the demand for milk and milk products and proper feeding of livestock.

DAIRY DEVELOPMENT Vs. PRODUCTION AND PRICING OF MILK IN INDIA

V T. Raju*

SUMMARY

This paper has made an attempt to discuss the problems of milk production and pricing of milk in India and solution for the problems. Before discussing these points, dairy development in India is reviewed. Dairy was almost a neglected field in India upto 1956. Dairy development got a fillip in 1970 when 'Operation Flood' was launched with the assistance from the World Food Programme. Though India is fourth highest milk producing country in the world, the yield per animal is very low compared to other leading milk producing countries. The per capita availability of milk in India is only 105 gm., whereas according to the nutritional standards an adult person requires 284 gm. of milk per day. This is due to an increase in the human population and at the same time

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1. The formula has been taken from J. W. Mellor and B. D. Ponteves: Estimates and Projections of Milk Production and Use of Concentrate Feeds in India: 1951-1976, Cornell International Agricultural Development Bulletin 6, 1964, pp. 16-17.

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ow production of milk. The reasons for the low level of production of milk in India are due to lack of intensive breeding facilities, inadequate supply of feeds and fodders and facilities for disease prevention measures, etc. To solve the problems of milk production it is suggested that the cross-breeding programmes and artificial insemination should be advocated. The fodder and feed resources should be improved and proper reserves of feed and fodder should be built against bad years. The milk producers should thoroughly be informed about the husbandry methods to enable the upgraded animals to fulfil their genetic potential in terms of milk production. They should also be provided with the infrastructure for veterinary care, etc., that is needed for the support of the improved animals. Though the prices of milk and milk products are higher than other commodities, the milk producers are not getting remunerative prices for their product. The milk producers have practically no say in the pricing of milk. The determination of the pricing of milk has to be based not only on demand-supply equilibrium but also on the compositional quality of milk. A faulty pricing policy can lead to adulteration, production of one kind of milk, malpractices in payment for milk, etc. A very large section of the dairy industry in India is paying for milk only on the basis of its fat contents. The inequities in fat differential pricing is discussed in detail. Fat differential pricing discourage the production of cow milk as milk is valued only on fat basis completely disregarding the SNF (solids-not-fat) contents. One essential element in an equitable plan of paying a producer for his milk is that both fat and SNF be explicitly recognized and rewarded properly. For this the "two-axis pricing policy" developed by the National Dairy Development Board, Anand is suggested and discussed. This plan recognizes both fat and SNF discourages adulteration and provides a common pricing approach to the cow and buffalo milk.

A COMPARATIVE STUDY OF MILK PROCESSING BY PUBLIC AND CO-OPERATIVE UNITS IN KANPUR DISTRICT, UTTAR PRADESH

R. Kunwar, Y. S. Chauhan and Ram Iqbal Singh†

SUMMARY

The main objective of this study conducted during the year 1974-75 was to work out the economics of milk processing per litre under the public and co-operative units and to examine milk production, costs and income per milch buffalo per annum under the private and co-operative guided management. For the study one public and one co-operative unit were selected purposively while the selection of 30 private and 15 co-operative guided farmers was randomly done. The study revealed that the processing cost per litre in the case of public unit was about one and a half times higher than the co-operative society. The processing cost per litre of milk for the private and co-operative unit was calculated at 36 and 24 paise respectively. The higher cost in the public unit was due to low quantity of milk handled during the year and secondly giving more emphasis to research and experiments and not to profit. The fixed cost and maintenance cost per milch buffalo in respect of co-operative and private farmers were calculated at Rs. 400 and Rs. 1,510 and Rs. 600 and Rs. 1,520 respectively. The gross income per milch animal per annum for co-operative farmers was Rs. 835 while in the case of private milk sellers it was Rs. 189 only. On the basis of this enquiry it is concluded that the co-operative society has superiority over the public unit as well as private farmers. Hence the development of such organizations will be in the interest of producers, consumers and the country as a whole.

AN ECONOMIC INVESTIGATION INTO THE PROBLEMS OF CO-OPERATIVE MILK BOARD, KANPUR

J. S. Garg and V. Prasad*

SUMMARY

This paper has made an attempt to investigate into the problems faced by the Co-operative Milk Board, Kanpur, responsible for its poor achievements. The twin objectives of the Milk Board were to enhance the milk yields of the adjoining villages of Kanpur city and other adjacent districts by giving incentives to the milk producers by purchasing their milk at a reasonable price and to distribute it to the consumers at Kanpur after pasteurisation, at a very reasonable rate and in adequate quantity. The normal capacity of the Kanpur milk processing plant is 50,000 litres per day

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against which only 12,500 litres of milk per day or 25 per cent of the normal capacity is made available. The under-utilization of milk processing plant, due to poor procurement of milk has led to higher cost of processing, sale and distribution of milk per litre. The total cost per 100 litres of standard milk borne by the Milk Board in 1973 came to Rs. 79.98. It included procurement cost of Rs. 15.17, processing cost of Rs. 24.13, administrative cost of Rs. 24.60 and selling and distribution cost of Rs. 16.08 per 100 litres of milk. When the total cost per litre is worked out, it came to 80 paise. The purchasing cost of standard milk per litre in 1973 was Rs. 1.40. Thus, the total cost per litre of standard milk to the Milk Board came to Rs. 2.20. This situation has emerged due to higher overhead cost of the Milk Board, which is neither advantageous to the producers nor to the consumers.

So far as the problems faced by the Milk Board in connection with its poor achievements are concerned, they are manifold. In the case of the producers, they do not show response to part with their produce to the Milk Board due to delay in payments. They prefer to sell their milk to the local milk hawkers who advance money to them and make a part payment for their milk supply frequently at the same or higher rate than the Milk Board. Further, the local milk hawkers and local *Gwalas* are in big competition with the Milk Board. In the peak period of production, when there is larger supply and fixed demand, the price of the milk should be reduced which is not possible for the Board to do so. The hawkers also do the malpractice of mixing water to milk or take out cream and sell the milk to the consumer at the same rate, while the Milk Board cannot adopt such malpractices. The consumers also feel that the quality of the milk supplied by the Board is not up to the mark. Their opinion is that the milk supply is neither certain nor punctual and is below standard. From the point of administration, the establishment cost in the Milk Board is extremely high. Mismanagement, mishandling and over-expenditure are some of the important issues which lead to the inefficiency in the organization of Milk Board. The cost of processing and distribution of milk is also very high which is due to poor procurement of milk and higher overhead costs.

Though the Milk Board tries to make up the losses in the sale of milk by supplying toned and double toned milk and by supplying cream, butter and ghee to the consumers, yet the whole concept of the Board needs to be modified. The payments to the producers should be made frequently. A part of the payment should be made in the form of concentrates for feeding their milch cattles. The producers should also be supplied with high-yielding breeds of buffaloes and credit for purchase of milch cattle should be arranged. It was observed that only a small number of milk producers (28 members per society) were taking the advantage of the Milk Board programme. The programme should be extended to cover a large number of members. Service, punctuality and certainty should be observed in the supply of milk to the consumers. The expenditure on the board of management and overhead costs should be reduced to the minimum.

ECONOMIC ANALYSIS OF GOVERNMENT MILK SUPPLY SCHEME IN JABALPUR

V. P. Shukla and S. V. Karanjkar†

SUMMARY

The purpose of the present study was to examine the working of Jabalpur Milk Supply Scheme and to inquire whether it has been able to fulfil its objectives. Specifically, an attempt was made to examine whether (*i*) the total volume of milk supplied to the scheme by the milk co-operatives affiliated to it had increased over the years, (*ii*) the increase, if any, was as a result of the increase in the number of milk suppliers and the extension of area from which milk was being collected, (*iii*) the increase had come about through increase in the production and supply of milk by the individual members, and (*iv*) the scheme had been successful in promoting dairy as a supplementary activity of its members in the rural areas. Since the processing and distribution of milk have less scope for effecting any economy once the investment in plant and other equipment is incurred, it is feasible to economise only by reducing the per unit cost of milk. Thus it is the efficiency in milk procurement which has to play an important role and as such the aspects of processing and distribution were not considered for the present. It appears that a large number of societies particularly those located relatively nearer to the scheme either ceased to function or showed a remarkable decline in milk supply to the scheme and that the scheme managed to maintain the overall increasing milk supply by opening newer centres in distant areas. A milk co-operative, namely, 'Mohania Milk Producer's Society' was selected keeping in view that it represented one of those societies that showed decline in milk supplies to the scheme over the years and is located nearer to the city of Jabalpur. It is in fact located

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at a distance of 20 km. from the Jabalpur city and receives milk from surrounding 15 villages located within a radious of 20 km. from the society's milk collecting centre. During the process of selecting the farm households for survey, a careful examination of the data showed that the pattern of milk supplies by the milk suppliers varied greatly, not only over the years, but also seasonally. It is observed that more than 80 per cent of the large size milk suppliers (more than 15 litres a day) were selling milk outside the society, while only small size milk producers continued to sell milk to the society. The results of the study suggest that a discriminatory price policy would enable the scheme to obtain larger milk supplies from its nearby milk-shed area.

A CASE STUDY OF A SUCCESSFUL DAIRY

P. V. Krishna and S. C. Bandyopadhyay*

SUMMARY

Since dairying is a profitable enterprise, in recent years many dairies are coming up in the co-operative, private and public sectors. In this paper an attempt was made to take up the case of Ahmedabad Municipal Dairy. The Government having failed in its attempts to start a milk supply scheme, had to request the municipal authorities to start a dairy and the request was readily accepted. In the early stages this dairy used to get milk from Anand. Encouraged by the success a pilot project with 5,000 litres/day was started in 1957-58. This capacity was raised to 10,000 litres/day later. However, in 1963, when the demand grew the municipal authorities in collaboration with UNICEF started a bigger plant. Though the present capacity is 1.20 lakh litres/day, it is handling 1.65 lakh litres/day. The capacity is expected to be increased to 2.5 lakh litres/day in the near future. At present milk is supplied both by the Federation (Sagar, Sabar and Banas dairies) and non-federation (Ahmedabad, Gopalak, and Gandhinagar Unions). The federation supplies pasteurised milk whereas the non-federation supplies raw milk only. Cow and buffalo milk is collected in the dairy. The Ahmedabad Municipal Dairy project stands fourth in India so far as handling of milk is concerned preceded by Delhi, Calcutta and Bombay.

The total sale of milk has increased by 29 per cent over a period of three years, *i.e.*, from 1971-72 to 1973-74. The share of higher fat toned milk has increased from 86 per cent in 1971-72 to 97 per cent in 1973-74. The share of whole milk and double toned milk has gone down from 8 per cent and 6 per cent to one and less than one per cent respectively during the same period. Purchases of milk varied between the years as the dairy has got a good storage capacity. A major share of expenditure (more than 80 per cent) was on raw materials, followed by establishment and commission charges (7 per cent). The expenditure pattern has not changed over the three years but the total expenditure has increased by nearly 42 per cent over the period under study.

The per litre cost was Re. 0.35 in 1971-72 and 1972-73 but it increased to Rs. 1.14 in 1973-74. The return however was Re. 0.40 per litre in 1971-72, Re. 0.41 in 1972-73 and it went up to Rs. 1.09 in 1973-74. Thus the per litre expenses exceeded those of per litre returns due mainly to rise in the prices of raw materials and also expansion in sale. The selling price however has not increased significantly. Following suggestions can be made for the dairy to improve its working. (*i*) Considering the rising demand for milk in Ahmedabad city, the capacity of the dairy should be doubled. (*ii*) Prices of the milk can be reduced if the milk could be made available at a cheaper rate. (*iii*) Major decisions should be taken at the dairy itself. (*iv*) Supervision work needs strengthening. Lastly, (*v*) some new schemes can be taken up by the dairy to include the huge number of milk producers in the city.

RESOURCE PRODUCTIVITY IN MILK PRODUCTION AND RETURNS FROM CATTLE, CROSS-BRED COW AND MURRAH BUFFALO

O. P. Chhikara and A. C. Gangwar†

SUMMARY

The present study was undertaken to study the relative efficiency of the different types of milch animals. The specific objectives of the study were (*i*) to study the marginal value products (MVP) of the resources for different types of milch animals, and (*ii*) to study the input-output details of different types of milch animals. The study was conducted in the hinterland area of Jind milch plant, from which four villages were randomly selected. From these villages 25 households were randomly selected.

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The data relating to the cross-bred cows were collected from the purposively selected villages and households. Survey method was used to collect the data. Information relates to the agricultural year 1974-75. To estimate the marginal value productivities of inputs and milk production function Cobb-Douglas production function was fitted. The results of the study revealed that (1) the use of green fodder, dry fodder, concentrates and human labour explained about 45, 93 and 90 per cent of the variation in the milk output of cow, Murrah buffalo and cross-bred cow respectively. The regression coefficients with respect to green fodder and concentrates in the case of cow milk, dry fodder and concentrates in the case of Murrah buffalo milk and green fodder in the case of cross-bred cow milk were found significant. (2) The marginal value productivities of green fodder, dry fodder, concentrates, and human labour were found as 8, 23, 46 and 4 paise in the case of cow milk; the MVP of green fodder was negative for Murrah buffalo. The MVPs of Murrah buffalo with respect to dry fodder, and concentrates were 41 and 46 paise respectively. The MVP of human labour was very low. In the case of cross-bred cow the MVPs of green fodder, dry fodder, concentrates and human labour were 46, 57, 89 and 27 paise respectively. The MVPs of feeds and fodder were highest in the case of cross-bred cow, compared to the cow and Murrah buffalo. (3) The total cost of milk production in a lactation was Rs. 1,795, Rs. 3,340 and Rs. 2,687 for the cow, Murrah buffalo and cross-bred cow respectively. (4) The cost of feeds per litre of cow, Murrah buffalo and cross-bred cow milk worked out to Re. 0.73, Rs. 1.13 and Re. 0.68 respectively. (5) The net return over the variable cost was highest for the cross-bred cow, followed by Murrah buffalo and cow. (6) The per litre cost of milk from cow, Murrah buffalo and cross-bred cow was Rs. 1.21, Rs. 1.52 and Re. 0.96, respectively.

ECONOMICS OF PRODUCTION OF MILK

B. B. Singh*

SUMMARY

The present study is concerned with the eastern region of Uttar Pradesh which is regarded as an agriculturally backward area with high pressure of population. The study sample consisted of 25 buffaloes spread over 15 farms and 10 cross-bred cows maintained on a farm. The reference period was 1973-74 and cost accounting method was followed for collection of data. To study the relationship of milk yield with different factors, Cobb-Douglas functions were fitted separately for buffaloes and cows. The comparative economics of buffalo and cross-bred cow shows that the latter is more profitable than the former. The magnitude of difference in the net profit amounted to Rs. 800.00 per animal. The cross-bred cows were yielding more milk at lesser cost per unit. The average cost of production per litre of milk was calculated to Rs. 1.55 and Rs. 1.99 for the buffalo and cross-bred cow respectively.

The estimated production functions of buffalo and cross-bred cow can be written as follows :

Type of animal	No. of observations	Regression coefficients					R^2
		X_1	X_2	X_3	X_4	X_5	
Buffalo ..	25	—0.0147**	0.5278*	0.4369**	—0.0102	0.3412**	.9131
		(0 0016)	(0.2832)	(0.0647)	(0.1342)	(0.1052)	
Cow ..	10	—0.0158**	0.9975*	0.3526**	—0.0031	0.2719**	.9377
		(0.0027)	(0.2373)	(0.0562)	(0.0987)	(0.0894)	

Figures in parentheses give the respective standard errors of the coefficients.
* Significant at 5 per cent level.
** Significant at 1 per cent level.

The regression coefficients of all inputs except labour were significant. The regression coefficients in the functions denote elasticities of production for the respective inputs concerned and indicate the percentage change in milk yield associated with one per cent change in the quantity of corresponding input. The sum of elasticities of milk production in both the equations of buffalo and cross-bred cow are 1.28 and 1.60 respectively indicating increasing returns to scale. This implies that there are possibilities of increasing milk yield and returns through more use of input factors. The marginal value productivities of major inputs worked out on the basis of estimated production function, are higher, indicating the potentialities of higher return with increased quantity of inputs in the region.

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AN ECONOMIC ANALYSIS OF MILK PRODUCTION IN KASHI VIDYAPEETH BLOCK, VARANASI DISTRICT

G. S. Lavania, B. D. Shukla and R. S. Dixit*

SUMMARY

The present study compares the economic aspects of milk production from cows and buffaloes in Kashi Vidyapeeth development block of Varanasi district in Uttar Pradesh. The study covers 60 farms having milch cattle spread over in five villages of the block. Of the total farms, 20 fall in the small size-group of below 1.50 hectares of operational area, 19 in the medium size-group with 1.50 to 3.00 hectares of operational land and 21 in the largest size-group having operational land above 3.00 hectares. In all, 227 milch cattle are maintained on the sample farms of which 146 are cows and 81 are buffaloes. The number of animals is maximum on the small farms (82) followed by the largest farms (79) and minimum (66) on the medium sized farms. The same trends were visible in the case of cows and buffaloes separately. The proportion of dry animals to the total milch animals is highest on the small farms and declines considerably on the larger farms, explaining the inefficiency of small farms to those of larger farms.

On an average, costs on feeds per cow and buffalo are estimated at Rs. 741 and Rs. 1,244 per annum respectively witnessing an increasing trend with an increase in the size of farms. Of the total feed value, dry fodders accounted for about 45 per cent followed by green fodders and concentrates on all farms. The proportion of green fodder to the total feed value declined with an increase in the size of farms while a reverse and increasing trend is observed in the case of dry fodder and concentrates. The break-up of maintenance cost of cows and buffaloes shows that the value of feeds alone accounted for 61 and 70 per cent of the total maintenance cost in the respective category of animals. The gross maintenance cost per animal exibited an increasing trend with an increase in the size of farms.

Milk production per day in the case of cows and buffaloes showed a positive and increasing relationship with an increase in the size of farms. This supports the trends of maintenance cost. The production of milk per day is estimated at 2.65 and 1.92 litres per buffalo and cow respectively. The corresponding estimates for the animals in lactation period are 3.25 and 3.02 litres respectively. The cost of production per litre of cow's and buffalo's milk is worked out at Rs. 1.47 and 1.54 respectively. It declined slightly from the smaller farms to the larger ones in the case of cows while no specific trend is observed for buffalo milk. The bulk line cost of production per litre of milk is estimated at Rs. 1.38 and Rs. 1.58 for cows and buffaloes when the production is taken at the bulk of 85 per cent. This cost covered nearly 80 per cent of animals and families.

The relationship between gross maintenance cost and milk yield per farm family has been studied with the help of correlation and regression analysis for all categories of farms. It is observed that the relationship is positive and significant at 1 per cent and 5 per cent level of significance on the medium and large farms explaining that the gross maintenance cost significantly affected the milk yield. It is not significant on the small farms suggesting that the cost does not have significant impact on yield on these farms. Considering the comparative cost of maintenance, yield per milch animal and cost of production per unit of milk it can very safely be concluded that the cows are superior to buffaloes in the area of study.

ECONOMICS OF MAINTENANCE OF COWS AND BUFFALOES AND THEIR MILK PRODUCTION

V. K. Madalia and A. S. Charan†

SUMMARY

For modernization of rural India, development of dairying and livestock has been given considerable importance as a complimentary instrument of social and economic change. In Gujarat, dairy development on co-operative basis has made tremendous progress during recent years. This has enabled many farmers to supplement their financial resources. However, livestock raising is still regarded as a mixed and small-scale enterprise by most of the farmers. In the absence of large sized dairy enterprise, the livestock economy is studied mostly according to the size of land holding. This

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paper is an attempt in this direction. The main conclusions of the study are as follows : The cost of maintenance of buffalo calf increased with an increase in the size of land holding, while for cow calf, excluding landless group, it showed a decreasing tendency. In the case of dry cows the cost of maintenance increased with an increase in the size of land holding, but for dry buffaloes it increased upto the medium sized farms only. Regarding the milking animals, the cost of maintenance was lowest for the landless group and highest for the medium sized farms. The major item of cost structure was feeds accounting for more than three-fourths of the total cost, followed by labour. The cost of maintenance of animals in milk was invariably higher than that of dry stock on various sized farms. The cost of maintenance of various categories of buffalo was also more than that of various categories of cow. The cost of maintenance of animals in milk was largely associated with milk yield except for the medium sized farms. The net income per dry animal was highest in the case of medium sized farms, followed by landless group. Both these groups proved more efficient in producing one litre of milk.

ECONOMICS OF MILK PRODUCTION ON FARMS IN ALIGARH DISTRICT—U.P.- (A CASE STUDY)

R. I. Singh, G. N. Singh and R. K. Singh*

SUMMARY

Keeping in view the important role played by the milch cattle in the farm economy of the State as well as the country, an attempt has been made in this paper to work out the economics of milk production on the farms in the rural areas of Aligarh district in Uttar Pradesh. The results are based on an intensive enquiry of 140 cultivators selected randomly grouped under six size classes, *viz.*, 0.0-1.5, 1.5-3.0, 3.0-4.50, 4.50-6.0 and 6.0 hectares and above from five villages of Dhanipur block in Aligarh district. The study was conducted by survey method covering the five-year period 1966-67 to 1970-71. The study revealed that a net income of Rs. 105.12 per hectare was obtained from milk production on the sample farms which varied from Rs. 84 on the largest size-group to Rs. 138.63 on the smallest one. The lower net income per hectare on the larger farms (4.5-6 hectares) was due to the fact that the farmers of larger holdings did not maintain sufficient number of milch cattle in proportion to the size of their farms. The overall input-output ratio came to 1 : 1 .31 which varied from 1 : 1.22 on the smallest size-group to 1 : 1.35 on the size-group of 4.5-6.0 hectares. This increasing trend in the input-output ratio on the larger holdings was due to the fact that the farmers of this size-group maintained milch cattle of relatively good breed and fed them properly. Crop and milk enterprises taken together yielded a net income of Rs. 1,712.33 per hectare on the sample holdings which showed an increasing trend with an increase in the size of farm. The average values of input and output were worked at Rs. 1,789.81 and Rs. 3,502.14 per hectare respectively. The average input-output ratio came to 1 : 2.03 which showed an increasing trend with an increase in the size of farm. The milk production contributed 11.56 per cent to the total output of the entire farm business as against 88.44 per cent contributed by crop production. The respective shares in the farm input of crop and milk production came to 81.51 per cent and 18.49 per cent.

It is found that the average yield of the cow and buffalo per lactation was 926.35 litres and 1,201.72 litres respectively. An average net income of Rs. 267.98 per cow and Rs. 389.11 per buffalo was obtained during a lactation. The average cost of production of milk per litre worked out to Re. 0.71 per litre for the cow and Re. 0.68 for the buffalo. The average input-output ratio was higher in the case of buffalo compared to the cow and it is estimated at 1 : 1.40 for the cow and 1 : 1.46 for the buffalo, which showed an increasing trend with an increase in the size of farms. The lower cost of production and higher input-output ratio on the larger farms were generally associated with higher yields per cow and buffalo, maintenance of relatively good breeds of buffaloes on these farms and better feeding practices. The average cost of maintenance during a lactation period after deducting the income from dung, etc., came to Rs. 703.81 per cow and Rs. 860.08 per buffalo, the latter being higher than the former by 22.70 per cent. The net maintenance cost per cow and per buffalo varied from Rs. 568.97 and Rs. 660 in the smallest size-group to Rs. 690 and Rs. 862.87 in the size-group of 4.5-6.0 hectares respectively. The increased net maintenance cost on the larger farms was due to the fact that the farmers in this size-group maintained relatively good breeds of cows and buffaloes and made higher investments on concentrates, green fodder, etc. In the case of both the cow and buffalo, fodder cost accounted for 46 and 43 per cent of the total maintenance cost respectively followed by concentrates (29 and 32 per cent), overhead charges (11.4 and 13 per cent) and labour charges (11 and 10 per cent).

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The production function analysis was done to work out the marginal value productivities of different inputs used in milk production. The Cobb-Douglas type of production function was used for final analysis as it gave the best fit. The marginal value productivities of variable inputs were estimated by partial deviation of returns with respect to the input concerned at the geometric mean level of input. The highest marginal value productivity was worked out for concentrates being 3.47, followed by fodder (1.326) and human labour (0.845) in milk production, indicating thereby that ways and means should be found to augment the use of production process of all the variables listed in it and specially in order of importance of concentrates, fodder and human labour.

ECONOMICS OF MILK PRODUCTION AND TRADE AROUND VIJAYAWADA, KRISHNA DISTRICT, ANDHRA PRADESH

I. V. Parthasarathy*

SUMMARY

The primary milk producers around Vijayawada do not realise adequate economic returns for their milk production and trade. The study of the economics of milk production and trade covered one hundred dairy farmers supplying milk to the Integrated Milk Project (I.M.P.), Vijayawada, Krishna District, A.P. Their input-output ratios, involving 434 animals, grouped in eight herd sizes are worked out. The cost components are analysed. The trade in milk is described. The procurement and sale prices are compared, towards finding margins. The analysis revealed that the average input-output ratio was 1.31 per animal and the average yield 2,024 litres per lactation and the total cost of maintenance was Rs. 3,112 and 85 per cent of it was on feeds. The cost of production of a litre of milk was Rs. 1.48 and the net returns Rs. 1,038. The most economic size was 5 animals, with site specific. Most of the milk trade was with private agencies and only a fourth with the I.M.P. The procurement price of Rs. 1.75 per litre and the sale price of Rs. 2.10 per litre did not leave adequate margins. Measures towards improved margins should be extended towards pedigree breeding, scientific maintenance through balanced feed and supply of feed-mix and fodder at subsidised rates to enable the I.M.P. to procure the entire bulk of their milk production.

ECONOMICS OF A CROSS-BRED COW (A CASE STUDY)

J. S. Garg and M. P. Azad†

SUMMARY

The objectives of this study were : (1) to work out the cost of raising a cross-bred calf upto the age of calving and compare it with the calf of an existing breed (Sahiwal), (2) to analyse the cost and returns from a cross-bred cow, (3) to find out the problems associated with a cross-bred cow, restricting its acceptance by the farmers, in general and the small farmers in particular, and (4) to suggest measures to overcome the problems. The data were collected from the records maintained by the Division of Animal Husbandry and Dairying of C. S. Azad University of Agriculture and Technology, Kanpur, for the period from December 27, 1972—the date of birth of a cross-bred calf and Sahiwal—to date.

It is observed that a farmer invested a sum of Rs. 1,898.65 upto the date of conception in raising a cross-bred calf which took 16 months to attain this age. As against it, the corresponding investment on a Sahiwal female calf on the same date came to Rs. 3,456.75 which took 31 months to attain this age. The maintenance cost of a cross-bred calf was just half of the Sahiwal female calf. The cost incurred on a cross-bred heifer during the gestation period came to Rs. 1,410.45. Thus

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the total cost of a cross-bred cow upto the first calving worked out to Rs. 3,253.10. If the cost incurred on cross-bred female heifer upto the date of first calving is taken to be the same for the Sahiwal female heifer as well, the total cost of a Sahiwal cow at the age of first calving would come to Rs. 4,811.19 which is higher by 33 per cent over that of the cross-bred cow.

As regards the cost and returns from a cross-bred cow per lactation, the study revealed that the net cost during a lactation and dry period of 390 days was Rs. 3,613.76, out of which the cost of feed and fodder accounted for 77.98 per cent. The cost of production per litre of milk came to Rs. 1.01. The total production of milk in a lactation period came to 3,590 litres. If it is priced at Rs. 2 per litre, the net profit per lactation of a cow would be Rs. 3,566.24 in a cross-bred cow. It is also concluded from the study that a cross-bred female calf born on December 27, 1972 is expected for second calving in March, 1976 after 38 months of the date of birth, while the Sahiwal female calf which was also born on the same date, will come into first calving after 41 months of its date of birth. By this time, the cross-bred cow will be in the second calving. This is a distinct advantage of a cross-bred calf over a Sahiwal calf. An owner of a cross-bred cow will not only get the advantage of full quantity of milk of the first lactation amounting to Rs. 3,566.24, but will also be benefited by having one more cross-bred animal, ready for conception, whose market value would be much higher than its cost of maintenance.

In spite of the fact that the cross-bred cows have distinct economic advantages, it could not be accepted by the farmers in general and small farmers in particular for many reasons. These cattle cannot be easily maintained by the small farmers having limited resources and know-how. Green fodder and milk are the two most essential items of its feed, which are hardly available with the small farmers. In spite of these problems and difficulties, the cross-breeding programmes have a greater potential for increasing the availability of milk for the nation as a whole. In this context, following suggestions may be considered. The whole cross-breeding programme should be taken up in three stages. In the first stage, the cross-breeding programme should be confined only to those indigenous cows which have 1,500-2,000 litres of milk capacity per lactation with the sire of exotic breed having milk index of 6,000-8,000 litres. In the first generation of the cross-breed, the approximate yield of the progeny would be around 4,750 litres per lactation having 50 per cent of the foreign blood. The cross-bred sires of the first generation whose number would be about 50,000, should be allowed to cross the indigenous cow of medium productivity in the intensive cattle development areas. The progeny of this cross-bred is expected to yield about 2,700 litres of milk per lactation with 25 per cent of foreign blood. In the third stage, the sires of the second generation numbering 25 lakhs should be allowed to cross the non-descript *desi* cows whose number at present is 3 crores. Their progeny cows will have at least 1,350 litres of milk production per lactation with 12.5 per cent of foreign blood, whereas their mothers so far were producing hardly 200-500 litres of milk per lactation. The whole process would take about 10-12 years within which about 5 crores of cows will become cross-bred. It will not only increase the income and productivity of an individual farmer, but will also add to the availability of milk to the nation as a whole.

ECONOMICS OF MILK PRODUCTION IN RURAL AREAS OF KANPUR DISTRICT (A CASE STUDY)

H. L. Srivastava and G. N. Singh*

SUMMARY

Observing the important role played by the milch cattle in the economy of the farming community, an attempt is made in the present study to work out the cost of maintenance of cow and buffalo separately per inter-calving period and to find out the input-output relationship in milk production. The findings are based on an intensive enquiry of 30 farmers, having milch cattle, selected purposively from five villages of Kalyanpur block, district Kanpur, Uttar Pradesh. The findings of the study revealed that the average net maintenance cost for the cow was Rs. 1,079.46 as against Rs. 1,351.44 per inter-calving for the buffalo. The inter-calving period for the cow and buffalo came to 404 and 437 days, respectively. The total milk production per lactation for the cow was 740 litres as against 988 litres for the buffalo. Although, the lactation days of the buffalo is higher by only 24 days compared to that of the cow, the buffalo produced 248 litres of milk more than the cow. The milk yield for the cow and buffalo, on a average, came to 2.89 and 3.53 litres per day respectively. The cost of production of milk for the cow worked out at Rs. 1.64 as against Rs. 1.37 per litre for the buffalo. An interesting picture that emerged from the study was that although the net maintenance cost was higher in the case of the buffalo, the cost of production per litre of the buffalo milk was lower than that of the cow milk because of relatively higher milk yield produced by the baffalo.

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The input, output and net income per cow came to Rs. 1,079.46, Rs. 1,295 and Rs. 215.54 per inter-calving respectively. The respective values for the buffalo came to Rs. 1,351.44, Rs. 1,729.00 and Rs. 377.56. An additional expenditure of Rs. 271.98 on the maintenance of buffalo resulted in an additional output of Rs. 434 and net income of Rs. 162.02 per inter-calving, compared to that of the cow. The average input-output ratio came to 1 : 1.20 and 1 : 1.28 for the cow's and buffalo's milk, respectively. The low productivity and earnings from the milch cattle in the study area was due to the poor breed of the animal, inadequate feeding and poor management. Therefore, to raise the level of productivity and income per milch cattle, proper breeding, feeding and management is essential.

COMPARATIVE ECONOMICS OF CROSS-BRED AND PURE BRED ZEBU COWS IN MILK PRODUCTION

Kuber Ram and Kulwant Singh†

SUMMARY

The Indian dairy industry is characterized by low productivity of cattle, high cost of milk production and low margin of profit. Cross-bred cows are an effective measure for increasing milk production and reducing the cost. To compare the economics of cross-bred (Karan Swiss) and best pure bred (Red Sindhi, Tharparkar, Sahiwal) Zebu cows, a study was conducted at the National Dairy Research Institute, Karnal for the year 1973-74. The study revealed that the cross-bred calved early (831 days) compared to the pure breds (1,077 days). The cost of calf rearing was lower in the cross-bred (Rs. 2,435) than in the pure bred (Rs. 3,132). Feed cost was observed to be the most important component accounting for about 76 per cent of the total cost. The components of the feed cost were 21 per cent milk, 51 per cent fodder and 28 per cent concentrate including 3 per cent calf starter. Any attempt to reduce the cost of nutrients will bring down the cost of calf rearing. The lactation length, dry period and the inter-calving period were lower in the cross-bred and the milk production was much higher. The average yield in the cross-bred was 9.83 litres compared to 5.92 litres in the pure bred. The cost of milk production was 95 paise per litre in the cross-bred compared to 148 paise in the pure bred. Feed cost was the most important component followed by labour and replacement cost. Replacement cost in the cross-breds was just 50 per cent of the replacement cost in the pure breds. In the case of pure bred cows the per litre cost of milk production tended to increase after the third lactation, while in the cross-breds, the per litre cost continued to fall even upto the seventh lactation. The study further revealed that the per litre cost decreased with the increase in the level of production. About 50 per cent of the pure bred cows were producing less than 2,000 litres of milk in a lactation while only 10 per cent produced more than 3,201 litres. In the case of cross-breds 50 per cent of the cows yielded more than 3,600 litres of milk. The study pointed out that both the pure bred and cross-bred cows yielding less than 2,400 litres of milk in a lactation were unprofitable. The overall profit per day in a cross-bred cow was Rs. 5.29, while it was Re. 0.19 in the pure bred. The optimal level at which the per litre cost was minimum was found to be 13.07 litres in the cross-breds and 8.40 litres in the pure breds. The high proportion of fixed cost in the maintenance of cattle was also observed. All these results of the research demonstrate the economic superiority of the cross-bred over the best pure bred Zebu cattle.

ECONOMICS OF CROSS-BRED COWS

P. N. Kuwar*

SUMMARY

The twin objectives of a sharp and quick increase in milk production and mitigating the rural poverty through the implementation of a programme of cross-bred cows are generally conceded. However, to formulate a viable programme of cross-bred cows, it is necessary to have data on the economics of cross-bred cows. In the past one decade, the National Dairy Research Institute, (NDRI), Karnal, is the only institute at the national level which has undertaken the cost studies of milk production. Unfortunately, no fuller data on costs of milk production are available. Most of the cost studies suffer from certain serious flaws. A number of cost studies confine themselves to the variable costs and hence capital costs are ignored. What is more, these studies relate to one or two

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specific years and hence do not cover the entire life cycle of the milch animal. The cost of milk production varies from lactation to lactation. A study conducted in 1970 at the Bangalore Station of the NDRI showed that the cross-bred cows gave better performance in the second lactation. It was concluded that cross-bred cows can be maintained at the farm upto the eighth lactation. The average cost of milk production per litre in respect of the cross-bred cow was Re. 0.72 as compared to between Rs. 1.11 and Rs. 1.24 in the case of pure breeds of Indian cows. It may be interesting to know that the feed cost of the cross-bred cow alone accounted for 55 per cent of the total cost. Nevertheless, the cost of milk per litre is the cheapest in respect of the cross-bred cow as compared to the pure breeds of the Indian cows and buffaloes. The National Commission on Agriculture in its Interim Report has thrown up some comparative data on the economics of milk production in respect of a buffalo, cross-bred cow and indigenous cow. According to the findings of the Report, the total cost of milk production in the case of cross-bred cow was Re. 0.44 per litre (exclusive of labour cost) as compared to Rs. 1.04 and Re. 0.62 per litre in respect of a buffalo and indigenous cow respectively. A study entitled "Intensified Cropping and Milk Production," which was conducted in Ludhiana by the Punjab Agricultural University in collaboration with the Ford Foundation and others revealed that dairying is more paying than general cropping of bullock operated as well as mechanized farm. The study showed that the milk production is comparatively much paying with cross-bred cows than the buffaloes. Most of the cost studies on the economics of milk production are conducted in a rather unscientific manner. So no valid inferences can be drawn. It is, therefore, suggested that the Department of Agriculture of the Ministry of Agriculture and Irrigation should prepare a proper proforma for the scientific collection of cost data on milk production. For this purpose, the authorities should also issue detailed guidelines to the Research Stations of the National Dairy Research Institute.

ECONOMICS OF MILK PRODUCTION IN KONKAN REGION OF MAHARASHTRA

R. E. Waghmare and P. D. Diskalkar*

SUMMARY

The Government of Maharashtra have started milk schemes at 22 centres in the State, wherein the milk is procured from the farmers. Out of these 22 centres, one centre, *viz.*, Mahad situated in Konkan region of Maharashtra was selected for studying the economics of milk production. Mahad tahsil is an under-developed area. A sample of 5 villages out of 36 villages covered in the milk scheme was selected randomly. From each of the villages a sample of 12 milk producers was further selected. Thus the total sample consisted of 60 farmers. The data were collected by survey method and refer to the period 1970-71. Farming is the main occupation of the sample farmers while milk production is a subsidiary occupation. The total sample of cultivators was further categorized into three size-groups, *viz.*, very small, small and medium, having their holdings below 0.81, 0.82 to 1.62 and 1.63 to 3.54 hectares respectively. The number of farmers analysed under the three size-groups was 11, 25, and 20 respectively. The cows were of local breed while in the case of buffaloes, 46 were of Mehsana breed and the remaining 72 were of local breed. The average cost of maintaining a buffalo was observed to be Rs. 592.67 per annum. The highest cost (Rs. 1,718.51) was observed in the case of very small farmers. On examining the itemwise cost of maintaining the buffalo, it is observed that on an average, concentrates accounted for 31.95 per cent of the total cost, followed by family labour (27.42 per cent), and depreciation and interest on fixed capital which together accounted for 21.64 per cent. The average income per year from a buffalo was Rs. 468.30. On the basis of cost 'C', there was a loss of Rs. 124.37. However, at cost 'A', one buffalo gave a profit of Rs. 109.37. The per litre cost of production of milk at cost 'A' basis was Re. 0.74 while at cost 'C' basis it was Rs. 1.25. The price received by the farmers was Rs. 1.00 per litre.

The cultivators under study had also maintained 54 cows. The average number of cows maintained by them was (0.90) nearly 1.00. On an average, the total cost of (cost 'C') maintaining a cow per year amounted to Rs. 255.36, and at cost 'A' basis it amounted to Rs. 47.92. The milk yield from a cow was 135.19 litres during a year. The per litre cost of production of cow milk on cost 'A' and 'C' basis was Re. 0.77 and 1.75 respectively. On an average, the per farm annual expenditure on milk production on cost 'A' and 'C' basis was Rs. 867.62 and Rs. 1,484.52 and the annual income from the milch animals was Rs. 1,131.47 thus yielding a profit of Rs.263.85 respectively and (—) Rs. 353.05 respectively at cost 'A' and cost 'C' basis respectively.

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AN INVESTIGATION INTO THE ECONOMICS OF MILK PRODUCTION ON A NEWLY ESTABLISHED DAIRY FARM

D. G. Parkale, D. V. Kasar and D. R. Pise†

SUMMARY

An attempt has been made in this paper to examine the costs and returns structure and thereby the profitability of the newly established dairy project at the Mahatma Phule Krishi Vidyapeeth, Rahuri by way of a case study. All the milch animals formed the population of the study and information was obtained from the records maintained by the dairy farm for a period of three years, *i.e.*, from April, 1971 to March, 1974. The average number of milch cows ranged from 84.5 to 123.7 during the period of study. The dairy herd is of Gir breed. The study showed that the share of working cost and fixed cost in the total cost at the overall level worked out to 73.38 per cent and 26.62 per cent respectively. Of the total cost, feed cost accounted for the largest share, followed by herd replacement cost, labour cost and interest on the value of dairy farm structures. Among different feeds, the cost of green fodder was the highest followed by the cost of ration and concentrates and dry fodder. It is observed that the annual gross income per cow on the dairy farm amounted to Rs. 2,238.04, of which 74.65 per cent was derived from milk, 12.93 per cent from manure and 12.42 per cent from calf-rearing and sale of surplus animals. The annual average total cost and net income per cow worked out to Rs. 1,961.90 and Rs. 276.14 respectively. The study also revealed that the per litre net cost and net income of milk production on the dairy farm during the period of investigation was Rs 1.53 and Re. 0.30 respectively.

COMPARATIVE ECONOMICS OF COWS AND BUFFALOES IN MILK PRODUCTION IN THE WESTERN RAJASTHAN

D. L. Sardiwal and J. C. Kalla*

SUMMARY

A study of comparative economics of different breeds in milk production was taken up from 1969 to 1971 for two cow breeds, *viz.*, Haryana and Rathi and Murrah buffalo maintained at the S. K. N. College of Agriculture, Jobner (Rajasthan) Dairy Farm. The net cost per litre of milk production on the basis of net quantity of milk varied from Rs. 1.68 to Rs. 1.83 in Haryana cows, Rs. 1.43 to Rs. 1.88 in Rathi cows and Rs. 1.13 to Rs. 1.70 in Murrah buffaloes during the year 1969, 1970 and 1971. On the basis of gross quantity of milk (net quantity of milk plus quantity of milk suckled by calves), the cost varied from Rs. 1.45 to Rs. 1.58 in Haryana cows, from Rs. 1.27 to Rs. 1.60 in Rathi cows and Rs. 1.02 in Murrah buffaloes. It was found lowest (Rs. 1.40) in the sixth lactation of Haryana cows, fifth lactation (Rs. 1.42) of Rathi cows and sixth lactation (Rs. 1.32) of Murrah buffaloes. The minimum net cost per litre of milk was about Rs. 1.25 in Haryana cows at the level of 1,801 to 2,100 litres, Rs. 1.16 in Rathi cows at the level of 2,101 to 2,400 litres and only Re. 1.00 in Murrah buffaloes at the level of 2,100 to 2,400 litres. The average maintenance cost per animal per day is estimated to be the highest (Rs. 4.40) in Murrah buffaloes followed by Rathi cows (Rs. 4.02) and lowest (Rs. 3.60) in the case of Haryana cows. The major items of gross cost were feeds and fodders, labour, interest on capital investment, depreciation and upkeep of bulls which accounted for about 40, 17, 15, 9 and 7 per cent of the gross cost respectively. The total cost of feeds and fodders was composed of about 60 to 70 per cent of dry fodder, 21 to 26 per cent of green fodder, 3 to 7 per cent of concentrate ration and 5 to 10 per cent of other supplements.

The Murrah buffaloe produced the highest lactation yield of 1,372 litres in 267 days followed by Rathi cows which produced 1,223 litres in 373 days whereas Haryana cows produced only 964 litres in 268 days. The average daily milk yield per lactating animal was highest (5.14 litres) in Murrah buffaloes. There was not much difference in the average daily milk yield in the case of Haryana and Rathi cows. The age at first calving was found to be minimum (1361 days) in Haryana cows and maximum (1834 days) in Rathi cows whereas in Murrah buffaloes it was 1525 days. Among the three breeds, the maximum dry period (207 days) was observed in Murrah buffa-

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loes followed by Rathi cows (172 days) and it was minimum (151 days) in Haryana cows. The maximum annual gross income per animal (Rs. 1,261) was found in Murrah buffaloes. Among cows, the maximum annual gross income (Rs. 476) per animal was contributed by the Rathi cows. The net income, return to labour, return to fixed farm resources and return to capital investment per animal per annum were found negative in all the three breeds. It can be concluded from this study that the Murrah buffaloes are found economically suitable in milk production as compared to the Haryana and Rathi cows. Among cows, Rathi cows are more efficient in milk production as compared to the Haryana cows.

ECONOMICS OF DAIRY FARMS (A COMPARATIVE STUDY OF THREE PRIVATE DAIRY FARMS IN U.P.)

R. B. Singh and P. V. Krishna†

SUMMARY

An attempt is made in this paper to study the comparative economics of three private dairies in Meerut (Uttar Pradesh) based on analysis of data for one month. The number of milch animals maintained in the three dairies was 12, 20 and 25 respectively. The quantity of milk produced and sold locally in each of them was 2,860 litres, 5,550 litres and 7,290 litres respectively and the sale price of milk was Rs. 2.25 per litre. The cost of maintenance of milch animals including fodder and concentrates in the three dairies amounted to Rs. 3,600, Rs. 6,000 and Rs. 7,500 respectively. Other expenses such as servant's pay, rent, water charges, electricity, veterinary charges, etc., amounted to Rs. 405, Rs. 763 and Rs. 1,155 in the three dairies respectively. The total returns from the sale of milk and milk products amounted to Rs. 6,585, Rs. 12,487 and Rs. 16,502 and the net returns worked out to Rs. 2,580, Rs. 5,724 and Rs. 7,847 in the three dairies respectively. The net returns per litre of milk produced came to Re. 0.90 in the first, Rs. 1.03 in the second and Rs. 1.08 in the third dairy. The conclusions of this study are that the maintenance cost of milch animals formed the major item of expenditure in all the dairies accounting for 87 to 90 per cent and the remaining expenses formed only 10 to 13 per cent of the total expenditure. The net returns per litre of milk produced showed an increase with an increase in the number of milch animals in the dairies. More and more dairies can be opened particularly in the co-operative or public sectors to enable the producers to benefit more.

ECONOMICS OF MILK PRODUCTION UNDER SPECIALISED DAIRY FARMING WITH BUFFALOES

R. N. Pal, A. S. Faroda, N. S. R. Sastry and R. S. Yadav*

SUMMARY

An attempt is made in this paper to study the economics of milk production under specialised dairy farming with eight Murrah buffaloes at the Haryana Agricultural University, Hissar during 1972-73 to 1974-75. The buffaloes were in the second and third lactation. The results of the study pointed out that more than eight buffaloes (about ten) and their followers can be maintained on two hectares of land having cropping intensity of about 260 per cent and with assured irrigation. If green and dry fodder is made available *ad lib.*, the animals can be maintained in condition on the fodder alone at the present level of milk production, *i.e.*, upto about 1,500 litres per annum per animal. Such scheduling will result in low cost of milk production which on the average comes to Rs. 1.24 per litre. The cost of milk production can be reduced to as low as Rs. 1.04 per litre if the milk yield per animal is better. The net returns from specialised dairy farming are in certain years better than that from mixed and arable farming. The returns will be still more if cross-bred cows are kept as dairy animals instead of buffaloes because the cross-bred cows are heavy yielders than the buffaloes. Even if the returns are equal from different types of farming, dairy farming will be better particularly for the small farmers because it will provide employment throughout the year, there will be regular cash income and the soil fertility will be improved with the addition of excreta. Dairy farming will be more advantageous particularly near the cities where ready market for milk is available.

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MILK PRODUCTION AND ITS UTILIZATION AROUND KARNAL (HARYANA)

K. N. S. Sharma, S. B. Agarwal and R. K. Patel*

SUMMARY

This study has made an attempt to estimate the milk production and its utilization among different categories of milk producers. The data for the investigation were obtained from the survey conducted to study the bovine development and milk production around Karnal during 1972-74. In all 1,807 milk producers were included in the sample. Of these, 825 were landless labourers, 63 marginal farmers, 254 small farmers, 570 medium and 95 were large farmers. It was observed that Murrah buffaloes and Haryana cows were the two major milch breeds accounting for more than 95 per cent of the milch animals. About 63 per cent of the milk producers belonged to the category of small and marginal farmers and landless producers. These categories of producers owned 59 per cent of the total cows and 41 per cent of the total milch buffaloes. Fifty per cent of the cows and 56 per cent of the buffaloes were in milk. Though no definite trend was observed, the number of animals in milk was slightly higher among the marginal and small farmers and landless labourers. The average milk yield per cow per day was 2.41 kg. and that of buffalo was 3.96 kg. when in milk. The overall average milk yield per animal per day was 1.20 kg. for the cow and 2.20 kg. for the buffalo. The milk yield in general increased with an increase in the land holding. The per capita consumption also increased with the farm size. Thirty per cent of the milk produced was consumed as fluid milk, 43 per cent in the form of products and the rest 27 per cent was available for sale. The marginal and small farmers and landless labourers contributed 41 per cent of the total quantity of milk sold. The buffaloes were observed to be more efficient converters of fodders and feeds into milk than the cows. 18-20 per cent of the cropped area was observed to be devoted for fodder crops. Jowar, maize and *guar* were the principal crops in the *kharif* season and berseem was the only major crop in the *rabi* season. It was observed that any programme to develop dairy farming to increase the milk production in the area should give due emphasis on the marginal and small farmers and the landless producers.

ECONOMICS OF A HECTARE OF LAND UNDER DAIRY AND CROP ENTERPRISES IN WESTERN UTTAR PRADESH (A CASE STUDY)

J. S. Garg and M.P. Azad †

SUMMARY

With a view to finding out the comparative profitability of dairy on self-grown fodder and crop enterprise on a hectare of land, a study was undertaken by the Division of Agricultural Economics and Statistics, C. S. Azad University of Agriculture and Technology, Kanpur with the following objectives: (1) to work out the cost of production of green fodder per quintal, (2) to estimate the cost of maintenance of a buffalo per day, per inter-calving period, (3) to determine the profit or loss of maintaining a herd of buffaloes whose fodder requirement can easily be met by one hectare of land, and (4) to analyse the comparative profitability of one hectare land under milk and crop enterprises.

The study relates to ten progressive farmers of Sikandrabad and Bulandshahar blocks of Bulandshahar district, who have been maintaining buffaloes on self-grown fodder and supply milk either to the Delhi Milk Board or to local milk vendors. The farmers are simultaneously having the crop enterprise. The study relates to the period 1974-75. The data were collected by survey method on personal interview basis. It is observed from the study that one hectare of high fertility land producing about 1,210 quintals of green fodder was enough to maintain at least seven buffaloes. The important fodder rotation followed in the locality was bajra+ lobia (giant) or maize+ lobia in the *zaid* (March to June), followed by *chari* + *guar* in *kharif* (July to October), followed by berseem in the *rabi* (October to March). The cost of cultivation per hectare of green fodder of three crops (300 per cent intensity of cropping) came to Rs. 4,008.08. The cost of production of green fodder per quintal worked out to Rs. 3.31 It is also observed from the study that the total and net maintenance cost of seven buffaloes in the dairy came to Rs. 26,027.73 and Rs. 23,227.73 respectively. The net cost of maintenance per

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buffalo per inter-calving period of 390 days and per buffalo per day came to Rs. 3,318.25 and Rs. 8.51 respectively. The study also showed that the total production of milk in a lactation period of 299 days was 16,953 litres, resulting in an average yield of milk per buffalo per day at 8.1 litres. The cost of production of milk per litre was calculated at Rs. 1.37. At a sale price of Rs. 1.80, the gross return per dairy enterprise and per buffalo came to Rs. 30,515.40 and Rs. 4,359.34 respectively. The gross return per buffalo per day was Rs. 11.17. The net return of the dairy enterprise per buffalo, per inter-calving period and per day came to Rs. 7,287.67, Rs. 1,041.09 and Rs. 2.67 respectively.

As regards the crop enterprise, the important crop rotations followed in the locality were: (1) sugarcane, (2) cotton—wheat, (3) maize—wheat, (4) paddy—wheat, (5) maize—potato —wheat.

It is observed that maize-potato-wheat was a most intensive crop rotation in the locality, yielding a net return of Rs. 6,593.16 per hectare. As compared to it, the net return from dairy enterprise was as high as Rs. 7,287.67 on an investment of Rs. 23,227.73 per hectare. The net return in the case of other crop rotations varied between Rs. 2,222.45 to Rs. 2,837.76. Thus it is concluded that the net return from the dairy enterprise was much higher than the highest paid crop enterprise in the locality. The hurdles and problems which come in the way of adoption of dairy enterprise by the small farmers are many but most important are the lack of credit facilities, perishable nature of product, absence of proper and adequate marketing facilities, inadequate supply of input like concentrates at a reasonable rate and poor availability of veterinary aids. To overcome these problems and difficulties of the dairy man, it is suggested that besides providing marketing facilities, adequate credit facilities and veterinary aids, there should be a scheme of cattle insurance and a campaign "To Grow more Fodder and get more Income" should be undertaken by the animal husbandry departments of the States to create awareness and interest of the dairy man, in growing green fodder for maintaining milch cattle. Seeds of HYV of fodder should be made available to them at cheaper rates and in abundant quantity. The fodder farms should be developed by the Government particularly in the locality where the cross-breeding programme is in progress. Small and marginal farmers and landless labourers who maintain milch cattle as an occupation, but cannot afford to grow fodder, should be supplied with fodder on no profit no loss basis.

STUDIES ON THE ECONOMICS OF MILK PRODUCTION

Y. V. R. Reddy, S. R. Jayashankar and S. R. Sampath*

SUMMARY

The study on the economics of milk production was taken up for Jerthar cross-bred cows, triple cross cows and buffaloes maintained at the Southern Regional Station of National Dairy Research Institute, Bangalore. The gross cost of production of one kg. of milk for the individual breeds was found to be 99.3 paise, 80.1 paise and 177.6 paise respectively and net cost 94.2 paise, 76.1 paise and 169.5 paise respectively for Jerthar cows, triple cross cows and buffaloes; average daily milk yield being 6.7 kg. 8.7 kg. and 3.7 kg. respectively. When the net cost based on Fat Corrected Milk was worked out, it was found to be 84.1, 70.4 and 110.0 paise respectively. Of the gross cost, more than 54 per cent was the cost on feed, being 54.5, 54.7 and 105.4 paise respectively for the three breeds. The feed cost was seen to be highly correlated with total lactation yield, number of days in milk and dry days. The regression equations to predict the feed cost per kg. of milk on the basis of these characters for the three breeds were fitted and it was found that the cost on feed could be reduced by one paise for Jerthar if the milk yield could be increased by 88 kg. per lactation, or days in milk decreased by 15 days or dry days reduced by 24 without affecting the milk yield or lactation length. Similar figures for triple cross and buffaloes are 139 kg. and 43 kg. of milk or about 16 and 12 days in milk or 24 and 17 dry days. Among the feeds fed, concentrate feed was found to be the most costly item being above 60 per cent of the feed cost. If this can be reduced by improving the quality of green fodder without affecting the milk yield, the cost can be lowered substantially. The dry days could be reduced by avoiding the heat-missings and milking days could be reduced by good management in milking. The cost of herd replacement could be brought down by taking better care for making the calves to mature early. It can be concluded that the milk production can be maximized at a minimum cost by better breeding (cross-breeding) policy, improved methods of feeding and good management and prevention and control of disease. When market rates are considered, it could be found that there would be a profit of Rs. 2,460 in the case of Jerthar, Rs. 4,000 in the case of triple cross and Rs. 1,100 in the case of buffaloes per year from the sale of milk. The triple cross cow showed better performance as compared to other breeds.

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INSTITUTIONAL FINANCE FOR DAIRY DEVELOPMENT IN AKOLA DISTRICT

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SUMMARY

The Akola Milk Scheme is leading the district in laying the foundation of milk industry in the district, since its establishment in the year 1961. The district has a livestock population of 8,59,994 but when the milch animals are considered, it is found that the number of such animals is on the decline. Along with the milk scheme, the Akola Milk Federation was also established, which presently co-ordinates the working of 62 milk societies in the district. The State Government through the Akola Milk Scheme initiated a programme of giving advances for the purchase of buffaloes from the year 1961-62 and till 1970-71 loans to the tune of Rs. 8.54 lakhs were advanced for 838 buffaloes, which works out to a little over Rs. 1,000 per buffalo. During this period loans for the purchase of transport were also advanced to two societies and one society received a loan for the purpose of construction of milking-shed. All these loans were without any subsidy. Other financial institutions like the District Central Co-operative Bank and the Commercial Banks took over this work from 1970-71 and till 1974-75 about ten lakhs of rupees have been advanced for the purchase of 788 buffaloes. The bulk of this amount came fron the District Central Co-operative Bank and the State Bank of India. There is no linking of credit with marketing in respect of the loans given. However, the financial assistance rendered thus far had a great impact as is seen from the milk procurement data of the milk scheme, their procurement has gone up by about 14 times. For augmenting the milk supply in the district it appears necessary that cows particularly of cross-bred type or of other high-yielding breeds are brought in the fold of financial assistance, loans are given for feeding of animals at least for some period, cold storage facilities at the collection centres are created, advantage of differential rate of interest is given to the small or marginal farmers or landless labourers, the activities are spread in Washim and Mangrilpir tahsils which have got better potential and infrastructure facilities in the shape of good roads in the interior are created. In addition to all these, it is necessary that linking of credit with marketing will go a long way in encouraging the Commercial Banks in particular to come out in a big way in making financial assistance available for the purpose.

ECONOMICS OF MILK PRODUCTION OF DIFFERENT DAIRY FARMS IN AMRITSAR CITY

T. S. Chahal and J. S. Chawla†

SUMMARY

This study has made an attempt to examine the economics of the milk production and to estimate the short-term capital and credit requirements on four different size-groups of dairy farms in Amritsar city. Ten per cent of the dairy units were randomly selected with probability proportional to the milk animals kept. Synthetic dairy farm situations were developed and budgeting technique was used for analysis. The per animal yield, gross returns and net returns increased with the size of dairy farms upto the large farms and then decreased on the big farms, while the total costs of production decreased upto the large size farms and moved up for the big dairy units. This was due to over-crowding of animals and shortage of space at the big dairy units. The net returns per farm stood at Rs. 6,962.72, Rs. 16,262.72, Rs. 35,213.94 and Rs. 55,820.16 on the small, medium, large and big farms respectively. The scope existed for expanding the units through better use of fixed inputs on the small, medium and large farms and investing more in operating capital on all sizes of dairy farms. Short-term loan may be recommended for these units while long-term loan for the construction of buildings could be advanced to the big dairy farms. Short-term credit requirements at the existing level of technology varied from Rs. 10,288.72 to Rs. 84,671.04 for different sized dairy farms. Under the prevailing prices the profits per litre if milk varied from 20.88 to 34.15 per cent which gave considerable margin of profits. The profits were considered normal for these units even with the price fixed by the local authorities.

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IMPACT OF THE OPERATION FLOOD PROJECT ON DAIRY DEVELOPMENT OF INDIA

Dilip R. Shah*

SUMMARY

In this paper an attempt has been made to provide a critical appraisal of the operation flood project—a project of immense magnitude in physical and financial terms. It is capable of changing the structure and base of Indian dairy industry. This project works at two levels, through two channels, first at the level of four metropolitan city dairy schemes, *i.e.*, Bombay, Calcutta, Madras and New Delhi, through sales of skimmed powder and butter oil, donated by the World Food Project to support the project, and second, by the allocation of generated funds at the level of 59 districts of 10 States, for the Integrated Development of Dairying. Hence the approach of the present study is to analyse and assess the impact on urban dairy sector in the four cities by evaluating the operation of the project in terms of its objects and similarly assessment of the magnitude of achievements of the project and their impact on the dairy development on the benefiting States, aggregate impact on dairy development could finally be possible.

We find the project has made a favourable impact on the industry in certain areas. In raising the yields per animal the results in Gujarat are a pointer that the project is strategically sound, procurement and use of recombined milk in major cities also seem to be on anticipated and satisfactory lines. The creation of plant capacity, chilling and milk collection have not only been on progressive line but also they help the creation of a base. However, the priorities seem to have been shifted in a manner to prove a wrong emphasis. The creation of plant capacity is desirable but if technical inputs production is not expedited and if all the other States (than the Gujarat alone) do not develop, this could lead to undesirable results, either the plant capacity will remain idle or the country will have to, for a long time, depend on imports to feed the plant capacity. None of this is a good choice.

ECONOMIC IMPACT OF DAIRY DEVELOPMENT PROJECT, ALIGARH

R. N. Pandey, T. S. Bhogal and M. L. Verma†

SUMMARY

The Dairy Development Project, Aligarh is a co-ordinated venture of three agencies, the Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, Glaxo Laboratories and the *Dugdha Utpadak Sahakari Sangh*, Aligarh. The project activities were started in 1969-70 by opening three centres, *viz.*, Narona, Sofa and Chandhera in the milk-shed area of Glaxo Laboratories, Aligarh. Each centre comprises of a cluster of five villages within a radius of about 8 kilometres. The main objective underlying the initiation of the project is to help the farmers to step up the milk production in the project villages. To attain this objective a number of programmes were initiated under major heads of animal breeding, disease control, animal nutrition and fodder development and introduction of high yielder milch animals in the project villages. The project is being financed by Glaxo Laboratories and the *Dugdha Utpadak Sahakari Sangh*, Aligarh. The technical staff to implement various developmental programmes is provided by the University, Pantnagar. To perform the dairy development programmes smoothly and effectively, a team of three extension specialists in animal breeding, disease control and animal nutrition is stationed at each centre of the project. Frequent visits to project centres are made by the concerned experts of the University for technical guidance and supervision of various programmes of the project. In this paper an attempt is made to evaluate the economic impact of the project activities on milk production, the number and composition of milch animals, the area under fodder crops, incidence of diseases and the attitude and awareness of the farmers towards various dairy development programmes. Significant achievements have been made in animal breeding, disease control and nutrition and fodder development programmes of the project in the last five years. The buffalo population and milk production in the project villages increased by 28 per cent and 33 per cent respectively in 1974-75 over 1970-71. The number of heifers and young calves per hundred of adult buffaloes has increased over the last five years which reflects the low mortality in young ones. The number of dry and non-pregnant animals has been

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stabilised at a relatively very low level. The incidence of diseases has been reduced to a very low level in the project villages. The area under fodder crops has increased considerably and particularly in the *rabi* and summer season. The number of high yielder animals is gradually increasing in the buffalo herd. The production efficiency of low yielder buffaloes has increased by 9 per cent in the last five years. The production efficiency of high yielder buffaloes was higher by 21 per cent as compared to the production efficiency of the low yielders. The average gross income per farm family has increased by about 10 per cent during the last five years. The contribution of milk production enterprise in the total farm income has increased from 13 per cent in 1970-71 to 18 per cent in 1974-75. The gross income from milk production has increased by 46 per cent in 1974-75 over 1970-71 while the income from the crops remained practically unchanged.

DAIRYING AS A SUBSIDIARY ENTERPRISE IN FARMS— A MICRO LEVEL ANALYSIS

S. A. Radhakrishnan and M. Sivanandham†

SUMMARY

The objective of this paper was to explore the possibilities of maintaining the milch animals within the availability of fodder, labour, and other resources in a sample of 90 farms situated in Sarkarsamakulam block in Coimbatore taluk in Tamil Nadu, without making any purchases from outside. Linear programming model is used to arrive at optimum cropping pattern and livestock combination that can be practised on the farms. (1) Agricultural land, (2) agricultural labour, (3) irrigation water, and (4) fodder requirements are considered to be the constraints that limit the enterprise levels. The activity set is formed of only crop activities in one programme and crop activities and livestock activities in another programme. The results indicate that it is possible for the farmers to adjust their cropping pattern to suit the mixed farming situation and earn about 44.21 per cent additional income. The maximum number of milch animals that a farmer can maintain without reducing his income from crops will be five. It is felt that given the facilities like medical services, marketing of products, etc., all the farmers will take up dairying as a subsidiary occupation on their farms. In such a contingency there is scope for solving the country's milk problem.

IMPACT OF DAIRY ENTERPRISE ON FARM INCOMES IN PUNJAB

Amrik Singh Saini*

SUMMARY

The main objective of this study was to examine the impact of dairy enterprise on farm incomes. This study was located in Malerkotla development block of Sangrur district. Detailed information on crop-mix, farm resources, resource restrictions, input-output coefficients, etc., for the year 1973-74 were collected through survey method on a specially designed schedule. The linear programming technique was employed to find out the normative solutions incorporating dairy enterprise in the general farming. The percentage increases in the returns to fixed farm resources with the incorporation of dairy enterprise in the general farming were 61.14, 55.76 and 68.22 on the small, medium and large farm situations in the optimized plans. It is concluded that dairy being a profitable enterprise must be encouraged so as to diversify the farm business and to have more and stable income.

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DAIRY FARMING IN THE BRAHMAPUTRA VALLEY OF ASSAM : A CASE STUDY

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SUMMARY

The purpose of the paper is to examine the nature of dairy farming in the Brahmaputra valley of Assam and to examine the part played by two categories of dairy farmers, namely, the agricultural-cum-dairying households and the primarily dairying households. The study is based on data collected from 100 agricultural-cum-dairy farmers and 50 dairy farmers selected on the basis of multi-stage stratified random sampling design. Dairying as a commercial proposition is in a very nascent stage and primarily dairy farmers are few in numbers. They are mostly located in the *char* (small river islands) areas of the Brahmaputra river and its banks where natural pasturing facilities are available. Some dairy farms are also located in the fringes of the urban areas. Agricultural households owned on an average 16 head of animals (cows and buffaloes including young stock and males) while the dairy farmers owned on an average 25.5 head of animals. The number of dairy animals of productive age (cows and she-buffaloes) owned by agricultural-cum-dairy farmers and dairy farmers was 7.6 and 15.3 respectively. The production of milk per cow and per she-buffalo per day was 0·65 and 1.08 litres respectively for the agricultural-cum-dairy farmers and 4.49 and 1.65 litres respectively for the dairy farmers. The dairy farmers had more of cows of improved breeds and many of them looked after the animals better. The agricultural-cum-dairy households sold only a part of their milk production (about 400 litres per year per farm) while the dairy farmers marketed about 85 per cent of their production (4,164 litres per farm per year). The income from dairying was Rs. 3,630 per farm in the case of the dairy farmers while the total income (including other sources) was Rs. 4,045 per farm per year. The agricultural-cum-dairy farmers had a total income of Rs. 3,557.00 per farm per year, on an average. The study concludes that the Brahmaputra valley has a vast potentiality for dairy farming on commercial lines. This potentiality must be exploited by providing improved breeds of cows and by better management. The optimum size of household dairy farms appears to be around 10 to 15 animals per farm. This size gives a net return of about Rs. 5,000 annually. Such commercialised dairy farms would be able to contribute towards greater milk supply to the urban areas.

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