

## ECONOMICS OF MILK PRODUCTION IN DIFFERENT SEASONS UNDER PASTURE BASED DAIRY PRODUCTION SYSTEM IN KASHMIR REGION

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### ABSTRACT

The present study was carried out to analyze effect of different seasons on the economics of milk production under pasture-based dairy production system in Kashmir region. In Jammu and Kashmir most rural dairy farmers keep 2 to 3 dairy animals which are reared under pasture based rearing system of management. Six years data related to the economics of milk production in different seasons was collected from dairy unit of Division LPM from 2016 to 2021. Dairy animals (2 to 3 cows along with its followers) were maintained under pasture based production system. It was observed that when dairy animals were reared under pasture based production system average total expenditure cost was highest in winter as Rs. 31394.03/- followed by spring at Rs. 22107.77/- then autumn as Rs. 21153.27/- and least in summer as Rs. 17688.73/- when lush pasture are available. Average net return per annum per animal was negative during winter as Rs. 10587.77/- while as highest net returns was observed in spring at Rs. 4742.83/- followed by summer as Rs. 4433.77/- and autumn season at Rs. 4151.80/-. Benefit-cost ratio was negative as -0.31 during winter season while as it was highest as 0.29 during the summer season. Cost of production was highest during winter as Rs. 36.21/- and lowest during the summer season as Rs. 17.59/-. The cost of production after deduction of labour cost was reduced with lowest in summer as Rs. 9.22/- and highest as Rs. 25.92/- in winter season. It can be concluded from the study that utilization of local pasture/common property resources for grazing and family labour helps to increase the profitability of dairy animals when reared under pasture based production system.

**Keywords:** Economics, Kashmir, Milk production, Pasture, Season

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Owing to highland pasture and meadows, livestock sector has emerged as an important sector in the economy of Jammu and Kashmir. Among the livestock, dairying is a source of supplementary income and means for upliftment of rural farmers. It provides employment opportunities and contributes to the welfare of the local population. With increasing demand for milk products and per capita availability of milk, the dairy sector is poised for significant growth in Jammu and Kashmir in the coming years. The total bovine population of Jammu and Kashmir is 32.56 lakh, among this cattle population is 25.32 lakh and buffalo population is 6.90 lakh. Total milk production in the UT is 2726.79 thousand tonnes and per capita availability of milk is 597 gram for the year 2021-22. Share of milk production of the UT is 1.23 per cent of the total milk population of India. The value of milk economy in Jammu and Kashmir is Rs. 9080 crore which plays an important role in the agricultural economy of UT (Anonymous, 2022).

Milk production in India is dominated by small holder farmers including landless agricultural workers. In Jammu and Kashmir most rural dairy farmers keep 2 to 3 dairy animals which are reared under pasture based rearing system of management. In pasture based dairy production system grazing pasture like meadows, high land pasture (alpines and sub alpines) and common property resources

are utilized to meet nutrient requirement of dairy animals (Farooq, 2016). Pasture-based production systems are considered more environmentally and animal welfare friendly. This system of dairy production is also known as lower-input low output systems will have a lower reliance on concentrates and fertilizers used for fodder production and an increased reliance on extended grazing seasons and high quality forage (Delaby *et al.*, 2020). Cost of milk production depends upon number of factors like herd size, system of rearing of dairy animals farming, season, farming experiences and knowledge level of farmers regarding animal husbandry practices etc. Nutritive quality of pasture is influenced by different seasons which in turn affect productivity and profitability of dairy animals reared under semi-intensive system (Joubran *et al.*, 2021). Further dairy animals are exclusively reared under intensive system during winter season in Kashmir valley which further affects the economics of dairy production.

Keeping in view the prevailing dairy production system in Jammu and Kashmir, the present study was carried out to work out the economics of milk production from dairy cow reared under pasture based production system in different seasons.

### MATERIALS AND METHODS

Data for this study was collected from dairy unit of Division of Livestock Production and Management FVSc

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and AH Shuhama SKUAST-Kashmir. Year wise data for six years from 2016 to 2021 related to fixed, labour, feeding and veterinary medicine cost, milk production and revenue output was recorded in different seasons.

### **Production system followed in different season**

Dairy animals (2 to 3 cows along with its followers) were maintained under pasture based production system. Under pasture based dairy production system animals were allowed for 5 to 6 hours of grazing during late spring, summer and early autumn (April to Oct.) while as in winter season (Nov. to March) intensive system of feeding was followed as per ICAR feeding standard (hay, succulent fodder and compound cattle pellet type II). Moreover, compound cattle pellet type II was fed to dairy animals as per their production level (i.e. 1 kg of compound cattle pellet for every 2.5 litres of milk produced) in all the seasons.

### **Analytical techniques**

#### **Estimation of cost of milk production**

The Economics of dairy farms reared under pasture based production was calculated on a per annum basis for six year per animals in different seasons. Total expenditure cost per year included fixed cost, feeding cost, labour cost, veterinary medicine cost. The fixed costs include depreciation charges of cow shed @ 2.5% per year and milch animals @ 5.5 % after 3<sup>rd</sup> lactation (Hussain *et al.*, 2014). Labour cost was calculated @ Rs 225/- per 24 hours per person. Variable costs include feeding cost, hired labour cost, veterinary medicine cost including feed supplements. Gross returns per year included returns from sale of raw milk, farmyard manure and surplus male calf. Net returns were calculated by subtraction of total expenditure cost from gross returns. The cost of milk production was calculated by dividing total expenditure divided by total milk yield. Benefit cost ratio was calculated by dividing net returns by total expenditure cost per year. The data were tabulated, analysed and averages were worked out.

## **RESULTS AND DISCUSSION**

### **Economics of milk production**

Details of economics of milk production in different seasons under pasture based dairy production system are given in table no 1 and 2. It was observed that when dairy animals were reared under pasture based production system average total feed cost per annum per animal was highest in winter as Rs. 22574.03/- followed by spring as Rs. 13287.77/- then autumn as Rs. 12333.27/- and least in summer season as Rs. 8868.73/-. Fodder (dry and succulent) cost was major portion of total feed cost during winter season followed by spring and autumn season. While as no fodder cost was incurred during summer season under pasture based dairy production system. Average total

expenditure cost also showed similar trend with highest in winter as Rs. 31394.03/- followed by spring as Rs. 22107.77/- then autumn as Rs. 21153.27/- and least in summer as Rs. 17688.73/- when lush pasture is available. Average net returns per annum per animal was negative during winter as Rs. 10587.77/- while as highest net returns were observed in spring as Rs. 4742.83/- followed by summer as Rs. 4433.77/- and autumn season as Rs. 4151.80/-. Benefit cost ratio was negative as -0.31 during winter season while as it was highest as 0.29 during the summer season. Cost of production was highest during winter as Rs. 36.21/- and lowest during summer season as Rs. 17.59/-. Similar results were reported by Feroze *et al.*, 2019 that net maintenance cost was highest in winter for local cows. Different authors reported in their dairy economics studies that feed and labour costs were the major cost components in total cost of maintenance of dairy animals (Lone *et al.*, 2022, Hamadani *et al.*, 2020, Umamageswari *et al.*, 2017, Dhas and Nadarajan 2017). Hanrahan *et al.*, 2018 reported that profitability of pasture-based dairy systems is closely linked to the percentage of pasture utilized on farms, considering the amounts of feed purchased. Yada *et al.*, 2020 reported that net maintenance cost per milch buffalo per day was higher in winter season followed by summer and rainy season on all the herd size groups. Also net profit of milk production per milch buffalo per day was highest in rainy season followed by summer and winter seasons on all the herd size groups.

Average net return per annum per animal after deducting the labour cost was highest in spring as Rs. 12842.83/- followed by summer as Rs. 12533.77/- and autumn season as Rs. 12251.80/-. The Cost of production was also reduced with the lowest in summer as Rs. 9.22/- and the highest as Rs. 25.92/- in winter season. Also Benefit-cost ratio increased when labour cost was deduced from total expenditure cost. This indicates that including family labour is more profitable when 2 to 3 dairy animals are reared under pasture system. Sabin *et al.*, 2021 reported similar values for average cost per litre of milk after deduction of imputed family labour cost in dairy farm. Similarly, George *et al.*, 2020 reported that cost after deduction of imputed labour was much better and was lower in small farms signalling the major contribution of family labour in small or subsistence farms (1-3 cows).

## **CONCLUSION**

It can be concluded from the present study that the average total when 2 to 3 dairy cows were reared under a pasture production system average fodder cost was highest in winter season and zero in summer season. Also, the average total expenditure cost was highest in the winter season and lowest in the summer season. Average net

**Table 1. Mean economics of dairy animals reared under pasture based production system in different season**

Parameters/animal/year	Different season			
	Winter	Spring	Summer	Autumn
Dry Fodder (Rs)	10987.67	2973.73	0.00	2352.00
Succulent Fodder (Rs)	1265.73	207.07	0.00	20.53
Concentrate (Rs)	10320.63	10106.97	8868.73	9960.73
Total Feed Cost (Rs)	22574.03	13287.77	8868.73	12333.27
Labour Cost (Rs)	8100.00	8100.00	8100.00	8100.00
Fixed Cost (Rs)	720.00	720.00	720.00	720.00
Total Expenditure Cost (Rs)	31394.03	22107.77	17688.73	21153.27
Total Milk production	5681.83	6877.23	5695.13	4929.37
Gross Returns (Rs)	20806.27	26850.60	22122.50	25305.07
Net Returns (Rs)	-10587.77	4742.83	4433.77	4151.80
Cost of Production (Rs/L)	36.21	20.01	17.59	19.27
Benefit-Cost Ratio	-0.31	0.24	0.29	0.25

**Table 2. Mean economics of dairy animals reared under pasture based production system in different season without including labour cost**

Parameters/animal/year	Different season			
	Winter	Spring	Summer	Autumn
Total Expenditure Cost (Rs)	23294.03	14007.77	9588.73	13053.27
Gross Return (Rs)	20806.27	26850.60	22122.50	25305.07
Net Returns (Rs)	-2487.77	12842.83	12533.77	12251.80
Cost of Milk Production (Rs/L)	25.92	12.28	9.22	11.47
Benefit-Cost Ratio	-0.05	1.01	1.57	1.25

returns were in negative side in winter season and positive returns were observed in other seasons. The cost of production was highest in the winter season and lowest in summer season. After deduction of labour cost the average net returns was increased and the cost of production was decreased. These findings show that, when dairy animals are raised under pasture based production systems, using local pasture /common land resources for grazing and family labour has increased the profitability of the dairy farm.

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