

International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
IJABR 2024; 8(10): 1373-1376
www.biochemjournal.com
Received: 20-07-2024
Accepted: 23-08-2024

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Comparative economics with different feeding frequency in Sirohi goat of Rajasthan

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DOI: <https://doi.org/10.33545/26174693.2024.v8.i10r.2769>

Abstract

The study was conducted to evaluate “the comparative economical study on Sirohi goat kids with different feeding frequency of concentrate ration” at the Livestock Research Station (LRS), Boujunda, Chittorgarh, Rajasthan. The objective was to investigate the effect of different concentrate feeding frequencies on the economics of *Sirohi* goat kids rearing farmers. Twenty-one female *Sirohi* goat kids, aged 5-6 months, and weighing 13-14 kg, were randomly assigned to three groups (T₁, T₂, and T₃) with different feeding frequencies of concentrate: once, twice, and thrice a day. The experiment was carried out over 90 days period. Uniform management practices were maintained throughout the 90-day experimental period. Economic analysis showed comparable cost-benefit ratios across all groups, emphasizing the viability of different feeding frequencies. The slightly higher net income (1951.22) in the thrice-a-day feeding group compared to twice (1931) and once-a-day (1884.48) feeding frequency of concentrate. Recommendations include further research to explore optimal feeding strategies under various environmental conditions and management practices for considering the economic benefits of comprehensive goat farming practices.

Keywords: Feeding frequency, Sirohi kids, net income, and economics

Introduction

Animal husbandry has been the backbone of Indian agriculture and a source of employment in rural areas for centuries. Livestock provides a livelihood for about 2.05 crore people. Compared to the average of 14 percent for all rural households, livestock generated 16 percent of the revenue of small farm households. The livestock sector contributes 5.73 percent of the total GDP and 30.19 percent of the Agriculture GDP (National Accounts Statistical-2022-23) [10]. Goats provide a substantial economic contribution to India (Kumar *et al.*, 2014, Kamboj *et al.*, 2015, Lata *et al.*, 2021) [1, 2, 3].

In India, the current goat population is 148.88 million which is a 27.8 percent contribution to the total livestock population (20th Livestock Census, 2019). India has 39 recognized breeds of goat distributed over the entire 15 agro-climatic zones (NBAGR-2023). In India, goat meat contributes 14.47 percent of the total meat production of the country. Goat milk contributes 3.3 percent of the total milk production of the country (BAHS, 2022-23) [9]. Rajasthan ranks first in goat population with 20.8 million which accounts for 16.03 percent of India's total goat population (Animal Husbandry Department Rajasthan, 2019) [7, 8]. The total goat population in Chittorgarh is 488760 with 77178 male goats and 411582 female goats (Animal Husbandry Department Rajasthan, 2019) [7, 8].

Animal farming is a high-investment business. Expenditure in goat farming is divided into two categories i.e. fixed and variable costs. Cost of animals, buildings, equipment, fences, land, and other property items included in non-recurring cost. Recurring cost is also divided into fixed or variable costs. Depreciation of livestock, buildings, and equipment, and interest on fixed capital are considered fixed costs. Similarly, feed cost, wages of labor, salary of staff, and repairing cost are involved in variable costs. The variable cost, expenditure on labor was the major component of cost and was 81% under goat farming (Oberoi *et al.*, 1992) [4]. The most crucial factor in goat farming is economic consideration. The evaluation of expenses and profits in goat husbandry, together with the percentage contribution of each

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input to the overall cost. This minimizes unnecessary costs and makes goat husbandry profitable, which contributes to the security of livelihood. According to Sahoo *et al.* (2015)^[15], 70–80 percent of the entire revenue from small ruminant farming comes from meat production. Feed and fodder costs have been reported to be the highest in the raising of sheep and goats, followed by veterinary care, labor costs, and capital interest. In sheep and goat rearing, the cost of feed and fodder has been found maximum, followed by veterinary care, hired labour, and interest on capital (Suresh *et al.* 2008)^[15].

Material and Methods

The experiment was conducted at Livestock Research Station (LRS), Boujunda, Chittorgarh, Rajasthan, to investigate the effect of different feeding frequencies of concentrate on the growth performance as well as the economic status of female *Sirohi* goat kids. Twenty-one weaned *Sirohi* kids of nearly the same age (170–185 days) and nearly the same weight (13–14 kg) were selected from available flocks at LRS.

The kids were vaccinated and ear-tagged for identification. The kids were randomly allocated into three groups (T₁, T₂, and T₃), with seven kids in each group. The kids of all groups were offered berseem (*Trifolium alexandrinum*) as green fodder ad-libitum, gram straw as dry fodder, and concentrate @ 1% of their body weight once (9 A.M.), twice (9 A.M. and 12 P.M.), and three times daily (9 A.M., 12 P.M., and 6 P.M.), respectively.

A) Collection of Data

The measured quantity of green fodder, roughage, and concentrate was placed in the feeder of each kid of the T₁, T₂, and T₃ groups. Daily feed consumed in each container/tub was weighed starting from zero day to the end of 90 days of the experiment. The refusal quantity of feed in all treatment groups was measured the next day before placing feed. Feed was given to the kids and refusals were recorded daily in each group kid by using of weighing machine throughout the experimental period.

B) Comparative economics

After the ninety-day trial period, a cost-benefit analysis was calculated. The cost of feed was computed using the real cost of feed and fodder at Livestock Research Station, Boujunda, Chittorgarh, Rajasthan, and Department of Livestock Production and Management, College of Veterinary and Animal Science, Navania, Udaipur, Rajasthan.

Based on daily man-hours and 210 Rs. per day, one laborer was used for feeding and managing all twenty-one kids in

three groups. Green fodder (Berseem), dry fodder (Gram straw), and readymade concentrate feed cost 2 Rs. /Kg, 6 Rs. /Kg and 30 Rs. /Kg, respectively. With the current sale prices provided by dealers taken into account, the market price per kilogram live weight was calculated to be 350 Rs. The total income based on live body weight gain was determined using the market rate of goat and the cost of all feed consumed.

Results and Discussion

The data collected during the experiment was used in the current study to analyze the economics of female *Sirohi* goats across all treatment groups. All groups had identical criteria, except for dietary differences. The details of economics are given below in Table 1.

The total feed cost was 3779.24, 3907.00, and 4075.78 Rs. consumed by experimental kids and income from live body weight was 5663, 5838, and 6027 Rs. for groups T₁, T₂, and T₃, respectively. The net income was 1884.48, 1931.00, and 1951.22 Rs. for groups T₁, T₂, and T₃, respectively (Figure 1). The comparison of total income across the treatment groups suggests that there were marginal variations in income levels. Although the T₃ group exhibited slightly higher total income compared to the T₁ and T₂ groups. This indicates that the frequency of concentrate feeding may have a substantial impact on total income in goat farming.

The analysis of the Cost-benefit ratio across the treatment groups indicates consistent trends. All treatment groups demonstrated ratios close to 1.49, with the T₃ group slightly lower at 1.47 (Figure 2). This suggests that regardless of the feeding frequency, the cost-benefit ratios remained relatively stable, indicating efficient resource utilization and management across the different feeding regimes.

Similarly, Bhandwalkar *et al.*, 2021^[3], obtained the highest additional income and profit in thrice feeding group compared to twice and once-feeding of Osmanabadi goat kids. Oppositely, Yashim, 2016^[11], found that significant decline in cost per kg feed as the daily feeding (62.21/kg feed) to skip two days of supplementation (52.11/kg feed). Khan *et al.*, 2023, observed the highest return on investment (26%) for animals fed on a diet comprising 33% concentrate compared with 67% concentrate diet.

The findings of this study provide insights into the economic implications of the feeding frequency of concentrates in *Sirohi* goat kids. While there were slight variations in total income and cost-benefit ratios among the treatment groups. This suggests that factors beyond feeding frequency, such as overall herd management practices, breed selection, and environmental conditions, may have more substantial influences on economic outcomes in goat farming.

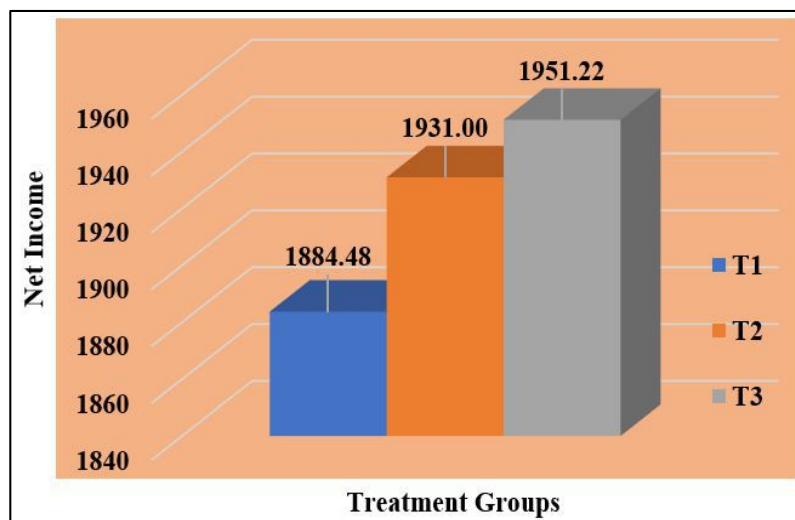


Fig 1: Overall Total Income (Rs.) of Sirohi kids in different experimental groups

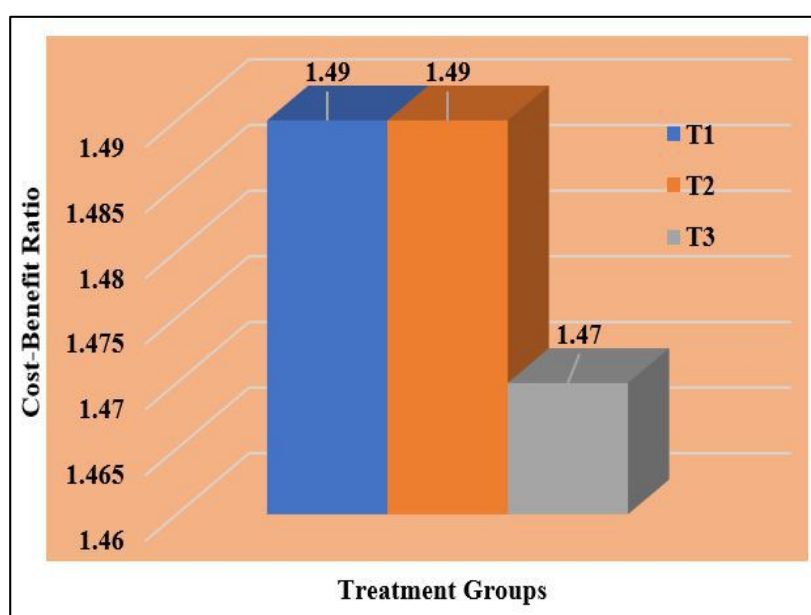


Fig 2: Overall Cost-Benefit Analysis of Sirohi kids in different experimental groups

Table 1: Comparative Economics of different groups of experiment

S. No.	Particulars	Treatments		
		T ₁	T ₂	T ₃
Feed Consumed (Kg)				
1.	Total green fodder consumed by experimental goat kids (Kg)	286.62	322.66	385.22
2.	Total dry fodder consumed by experimental goat kids (Kg)	61.83	71.1	78.39
3.	Total concentrate consumed by experimental goat kids (Kg)	94.50	94.50	94.50
4.	Total feed consumed by experimental goat kids (Kg)	442.95	488.26	558.11
Cost of Consumed Feed (Rs.)				
5.	¹ Cost of green fodder @ 2 Rs. /Kg	572.52	645.32	770.44
6.	¹ Cost of dry fodder @ 6 Rs. /Kg	371.00	426.60	470.34
7.	¹ Cost of concentrate @ 30 Rs. /Kg	2835	2835	2835
8.	Total feed cost (Rs.)	3778.52	3907.00	4075.78
Changes In Body Weight				
9.	Initial body weight (Kg)	13.24	13.25	13.25
10.	Final body weight (Kg)	16.18	16.68	17.22
11.	Body weight gain (kg)	2.94	3.43	3.97
Output (Rs.)				
12.	² The sale price of live kids @ 350 Rs. /Kg	5663	5838	6027
Income (Rs.)				
13.	Net income (Rs.)	1884.48	1931.00	1951.22
14.	Cost-Benefit Ratio	1.49	1.49	1.47

¹Cost of feed and fodder based on LRS, Boujunda, CVAS, Navania.

²Cost of live kids provided by dealer's rate.

Conclusion

This study highlights the economic impact of different feeding frequencies on the growth performance and profitability of female Sirohi goat kids. While the group receiving concentrate feed three times a day showed marginally higher income, the overall cost-benefit ratios across all groups remained consistent, indicating efficient management. These findings suggest that feeding frequency alone may not be the most significant factor in determining profitability. Other factors, such as herd management, breed selection, and environmental conditions, could play a larger role in ensuring sustainable economic returns in goat farming.

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