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## An economic analysis of cost and return of goat rearing in tribal sub plan area of Rajasthan

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#### Abstract

The paper discusses the economic analysis of cost and return structure for goat rearing in Tribal Sub-Plan (TSP) area of Rajasthan. Goat farming serves as a form of insurance, and it is a very regular occurrence in tribal areas, providing tribal people with a steady source of income even when they are in need. The cost analysis showed that different costs incurred by the goat rearer in Tribal Sub-Plan (TSP) area of Rajasthan. Amongst fixed cost the CRC of goat accounts the major portion to the total fixed cost with Rs. 94184 for small category. The gross return which includes selling of milk and kids and goat manure for small category Rs. 59,473.95 per annum and the net income per goat was found Rs. 2976.19 per annum. The benefit to cost ratio was found to be 1.10. Amongst fixed cost the CRC of goat accounts the major portion to the total fixed cost with Rs. 296256 for medium category. The gross return which includes selling of milk and kids and goat manure for medium category Rs. 1211063 per annum and the net income per goat was found Rs. 4523.84. The benefit to cost ratio was found to be 1.141. Amongst fixed cost the CRC of goat accounts the major portion to the total fixed cost with Rs. 631652.80 for large category. The gross return which includes selling of milk and kids and goat manure of Rs. 2446440.00 per annum and the net income per goat was found Rs. 4497.70 per annum. The benefit to cost ratio was found to be 1.143.

**Keywords:** Economic analysis, cost and return, CRC, goat

#### Introduction

Goats were one of the first domesticated farm animals. They have been in a symbiotic connection with human for up to 10,000 years, according to archaeological data (Ensminger and Parker, 1986) [5]. Between the years 6000 and 7000 B.C., goats were first domesticated (Amills *et al.*, 2017; Aldridge *et al.*, 2018, and Mazinani and Rude, 2020) [2, 1, 7]. Goats have spread over the world due to their high tolerance to a variety of environmental circumstances and dietary regimes in which they were evolved and maintained. Because of their productivity, relatively small size, and lack of competition for food, they have been valuable to man throughout history. Goat farming is important especially in the dry and semi-arid regions of the country, where crop cultivation is unpredictable and large cattle rearing is limited by a lack of fodder and feed. According to 20<sup>th</sup> livestock census, goat population in the country is approximately 148.88 million, an increase of 10.14 percent over the 19<sup>th</sup> livestock census (2012), and goats contribute approximately 27.8 percent of total livestock. The total number of households and household enterprises that rear/own goats, both rural and urban, is 33,014,087. Similarly, there are 25,189 non-household enterprises and institutions that rear/own goats. In India's pastoral societies, goat farming provides additional income and insurance during crop failure. Furthermore, because goats are easily liquidated in times of distress, rural people cannot afford to keep a cow or buffalo as a backup source of income in the event of crop failure. Rajasthan is top in goat population, with 21.66 million (37.53 percent) of the state's overall livestock population concentrated primarily in tribal areas. Goats have long been regarded as the backbone of tribal economies. Goat farming is an excellent source of additional income and milk for tribal people, earning it the nickname "poor man's cow" or "mini cow."

Thus, the assessment of cost and returns in goat farming, and the percent share of respective inputs in the total cost. This helps in reduction unnecessary costs and remunerative price for the milk enables in making the goat farming economic viable aids in ensuring livelihood security.

## Methodology

Tribal Sub Plan (TSP) area consist of six districts namely Udaipur, Chittorgarh, Dungarpur, Banswara, Sirohi and Pratapgarh. These districts contribute about 19 percent of total goat population in the state. Tribal Sub Plan (TSP) area of the state has a rich livestock wealth of 128.10 lakh animals, of which, goat contribute maximum (30.34%) to total population followed by cattle population (22%) and buffaloes (17%) as per the 20<sup>th</sup> livestock census. The total milk production of TSP area is 1.632 million tonnes in Rajasthan. The share of goat milk in TSP area to total milk production of state was 11.23 percent. Thus, TSP area was purposively chosen for the present study

Out of 6 districts of TSP area, two districts, namely Udaipur and Chittorgarh have been selected purposively on the basis of maximum number of goats in TSP area. Depending upon number of tehsils in each of two districts, Gogunda and Mavli tehsils were selected from Udaipur district likewise Gangrar and Kalpasen tehsils from Chittorgarh district, was selected on the basis of maximum number of goat population. Out of four selected tehsils, two villages from each tehsil were selected on the basis of maximum number of goat population. A complete list of the entire goat rearing households (having at least five does) in the selected villages was prepared. Sample 20 households from each selected village was taken. The total 160 households were selected for the study.

The total costs incurred in goat farming operations consisted of cash costs, depreciation, interest on fixed capital and imputed values for farm-owned factors of production (family labour, own land, own capital in the form of fixed assets and equipment's). For the estimation and calculation of various costs, the following methodology was used.

### (A) Fixed Cost

The components of fixed cost are interest on fixed capital investment and depreciation cost (fixed capital, milch goat, goat shed and equipment)

For a goat enterprise, fixed costs specifically include depreciation on fixed assets like animals, goat sheds and stores and equipment and interest on fixed capital investment. In the study area rental value of land was zero.

Capital recovery cost (CRC) of civil structures, machinery, equipments and animals the following formula

$$R = Z \left[ \frac{(1+r)^n \cdot r}{(1+r)^n - 1} \right]$$

Where, R = Capital recovery cost, Z = Initial value of the capital asset; in case of milch goat it is net current value of the animal i.e., current value – salvage Value, r = Current interest rate, n = Useful life of the assets/animal, if the useful life of the feed manger is 10 years, then n =10

### (B) Variable Cost

- (i) Feed and fodder expenses
- (ii) Labour expenses

- (iii) Veterinary expenses
- (iii) Miscellaneous expenses

### Gross cost

The gross cost of goat was computed as the sum total of fixed costs and variable costs. It reflects the total implicit and explicit costs incurred in the goat rearing.

### Net cost of milk production

Net cost of milk production was obtained by subtracting the imputed value of pellets and value obtained by the selling of animals for further breeding purpose from the gross cost.

### Net cost of meat production

In case of the meat goat where live animal sale was the main source of income, it was obtained by subtracting the imputed value of pellets from the gross cost. Gross cost per Standard Animal Unit (SAU) and total cost per SAU for milk and meat production for each flock size category and overall was estimated as following ways:

Gross cost = Cost per household per day

Net cost = Gross cost– Imputed value of pellets and animal sale

Total cost (Milch goat) = Gross cost- Total cost (meat goat)

Net cost (Milch goat) = Total cost (Milch goat) – value of pellets and animal sale

Total cost (Meat goat) = Gross cost – Total cost (Milch goat)

Net cost (Meat goat) = Total cost (Meat goat)–Imputed value of pellets

$$\text{Cost of milk production} = \frac{\text{Net cost (Milch goat)}}{\text{Milk yield per animal}}$$

$$\text{Cost of meat production} = \frac{\text{Net cost (Meat goat)}}{\text{Average live weight gain per flock}}$$

### Return concepts

Return accruing to the goat keepers in goat milk production and meat production activities across flock size categories were worked out on per SAU basis as mentioned below:

Gross return (Milch goat) = (Milk yield \* Market price of goat milk) + value from pellet sale and animal sale.

Gross return (Meat goat) = Value of live goat sold + value from pellet sale of meat group

Gross return = Gross return (Milch goat) + Gross returns (Meat goat).

Net return from milch goat, meat goat and overall flock was calculated by subtracting net cost from gross returns as mentioned below:

Net return (Milch goat) = Gross return (Milch goat) – Net cost (Milch goat)

Net return (Meat goat) = Gross return (Meat goat) – Net cost (Meat goat)

Net return (Overall) = Gross return – Net cost.

## Analysis and Discussion

**Table 1:** Economics of goat farming for small category farmer in the study area

Particulars	Small	% to GC
Labour	16558.00	4.09
Feed and fodder	138056.00	34.09
veterinary expenses	254.00	0.06
Miscellaneous	154.00	0.04
Total variable cost	155022.10	38.28
Fixed cost		
CRC on goat animals	94184.00	23.25
CRC on shed	665.41	0.16
CRC on equipment's	115.90	0.03
Gross cost	405009.50	100.00
Gross income		
Sale of kids and culled animals	102375.00	
Sale of milk	242100.00	
Sale /use of manure	99225.00	
Gross income	443700.00	
Net income	38690.49	
NI/goat	2976.19	
Benefit to cost ratio	1.10	
Labour efficiency	26.79	

The cost and returns of the goat farming across the categories has been depicted in the table 1. The cost and returns for goat for small category the findings reveals that the total variable cost of about 38.28 per cent to the gross cost. Amongst the variable cost the feed and fodder cost accounts major portion to the gross cost with 34.09% to the gross cost followed by labor cost the fixed cost accounts about 24 per cent to the gross cost. However, in the present study small category farmers mostly preferred open grazing because land constraint due to this incur extra labor so cost as compared to its counterparts and also increased awareness among the farmer's significance of proper feed management. Amongst fixed cost the CRC of goat accounts the major portion to the total fixed cost with Rs. 94184. The gross return which includes selling of milk and kids and goat manure for small category Rs. 59,473.95 per annum and the net income per goat was found Rs. 2976.19 per annum mainly due to income received from milk and selling of kids and manure. The sell of manure was 22.36% to gross income.

The benefit to cost ratio was found to be 1.10. The labor efficiency 26.79 implies that output earnings per one rupee of expenditure was 26.79 indicates that marginal disguised unemployment where lab our productivity stands at near to

zero prevails in the goat farming since the B:C ratio and labor efficiency are indicative of the profitability of the goat enterprise in the study area.

**Table 2:** Economics of goat farming for medium category farmer in the study area

Particulars	Medium	% to GC
Labour	28766	2.71
Feed and fodder	350450.1	33.01
veterinary expenses	1120	0.11
Miscellaneous	425	0.04
Total variable cost	380761.1	35.86
Fixed cost		
CRC on goat animals	296256.5	27.90
CRC on shed	3646	0.34
CRC on equipment's	351.1	0.03
Gross cost	1061776	100
Gross income		
Sale of kids and culled animals	213750	
Sale of milk	737437.5	
Sale /use of manure	259875	
Gross income	1211063	
Net income	149286.7	
NI/goat	4523.84	
B : C ratio	1.141	
Labour efficiency	42.10	

The cost and returns for goat for medium category was depicted in the table 2. The finding reveals that the total variable cost of about 35.86 per cent to the gross cost. Amongst the variable cost the feed and fodder cost accounts major portion to the gross cost with 33.01 per cent to the gross cost followed by labor cost (2.71%) the fixed cost accounts about 24 per cent to the gross cost. farmers mostly preferred open grazing because land constraint. Amongst fixed cost the CRC of goat accounts the major portion to the total fixed cost with Rs. 296256. The gross return which includes selling of milk and kids and goat manure for small category Rs. 1211063 per annum and the net income per goat was found Rs. 4523.84 per annum mainly due to income received from milk and selling of kids and manure. The benefit to cost ratio was found to be 1.141. Labor efficiency 42.10 implies that output earnings per one rupee of expenditure was 42.10 indicates that disguised unemployment where lab our productivity stands at zero prevails in the goat farming since the B:C ratio and labor efficiency are indicative of the profitability of the goat enterprise in the study area.

**Table 3:** Economics of goat farming for large category farmer in the study area

Particulars	Large	% to GC
Labour	64500	2.99
Feed and fodder	690280.5	32.05
veterinary expenses	2465	0.11
Miscellaneous	652	0.03
Total variable cost	757897.5	35.18
Fixed cost		
CRC on goat animals	631652.80	29.32
CRC on shed	5763.50	0.27
CRC on equipment's	878.20	0.04
Gross cost	2154089.00	100.00
Gross income		
Sale of kids and culled animals	431460.00	
Sale of milk	1489455.00	
Sale /use of manure	525525.00	

Gross income	2446440.00	
Net income	292350.60	
NI/goat	4497.70	
B : C ratio	1.143	
Labour efficiency	37.92	

The cost and returns for goat for large category was depicted in the table 3. The findings reveal that the total variable cost of about 35.18 per cent to the gross cost. Amongst the variable cost the feed and fodder cost accounts major portion to the gross cost with 32.05 per cent to the gross cost followed by labor cost (2.99%). The fixed cost accounts about 30 per cent to the gross cost. Amongst fixed cost the CRC of goat accounts the major portion to the total fixed cost with Rs. 631652.80. The gross return which includes selling of milk and kids and goat manure of Rs. 2446440.00 per annum and the net income per goat was found Rs. 4497.70 per annum mainly due to income received from milk and selling of kids and manure. The benefit to cost ratio was found to be 1.143. The benefit to cost ratio was found to be 1.143. Labor efficiency 37.90 implies that output earnings per one rupee of expenditure was 37.90 indicates that disguised unemployment where labor productivity stands at zero prevails in the goat farming since the B:C ratio and labor efficiency are indicative of the profitability of the goat enterprise in the study area

### Conclusion

1. For large category of farmer, the benefit to cost ratio was found to be 1.143 which was highest among all categories.
2. Among the three categories, income per goat was highest for medium category of farmer was found Rs. 4523.84 per annum
3. It was found that comparatively goat rearing found more profitable in large categories of goat farmers than small and medium categories of farmers in selected Tribal Sub-Plan (TSP) area of Rajasthan.

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