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Contribution of sheep in overall economy of sheep farmer in hyper arid partially irrigated western zone (Ic) of Rajasthan

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ABSTRACT

The research investigation was carried out in a hyper-arid partially irrigated western plain zone (Ic) of Rajasthan. Selected zone covered viz. Jaisalmer, Bikaner and some parts of Churu districts. On the basis of the highest sheep population, Jaisalmer and Bikaner district were selected for this research study. 150 sheep farmers were chosen from each district and 10 sheep farmers from each village were included in the proportional random sample used to choose the respondents. With the use of a structured questionnaire, 300 sheep, a mix of small, medium, and large sheep farmers were questioned. Under the objective ' measure the contribution of sheep in the economy of sheep farmers ' the findings showed that the cost of feed and fodders, concentrates, salt and mineral mixture, labor costs, veterinary expenses, and other miscellaneous costs, as well as interest on fixed capital and capital depreciation, were all used to help with the economic analysis. The total returns from sheep rearing, including wool, manure, milk and sales of animals (lambs, ewes, rams, etc.) were also included. Results show that the overall economic contribution from sheep rearing, as perceived by respondents was 43.00 per cent in Jaisalmer and 42.07 per cent in Bikaner for small sheep farmers. For medium and large sheep farmers, the contributions were higher, with medium farmers reporting 49.54 per cent in Jaisalmer and 47.36 per cent in Bikaner. Large farmers reported 58.49 per-cent in Jaisalmer and 56.98 per cent in Bikaner districts. Thus, it could be inferred that sheep enterprise contributes about 42.07 to 58.49 per-cent to the economy of sheep farmers in the hyper-arid partially irrigated western plain zone (Ic) of Rajasthan.

Keywords: *Sheep farmers, economy and improved practices*

INTRODUCTION

Sheep are important to rural Indian households' socio-economic and cultural livelihoods since they are small ruminants. Sheep farming has been done since ancient times and is seen as a promising commercial potential. Because of its small size, easy handling, high production rate, early sexual maturity, cheap input needs, inexpensive initial investment, and relatively simple marketing, this profession is widely practiced globally. For rural populations, raising sheep has greater benefits than raising cattle or buffaloes because of these features.

In India, sheep rearing is an essential component of the mixed integrated farming system, combining crop and livestock farming, and uses the products of one business as inputs for another. The total world livestock population in 2014 was 3.6 billion, including 1.494 billion cattle, 0.2 billion buffalo, 1.173 billion sheep, and 1.006 billion goats (Zoupanidou, E. 2019). The global sheep population increased by 6.22 percent from 1961 to 2000 and by 10.7 percent from 2000 to 2013. India holds the second-largest sheep population in the world, contributing 4.03 percent to the global sheep population (Anonymous, 2020).

Sheep farming has a long history in Rajasthan, India's largest state, which is predominantly arid or semi-arid, including a portion of the Thar Desert. In Rajasthan, more than 80 per cent of rural households raise animals. The state has a significant animal wealth of 56.8 million, comprising 11.27 per cent of India's total animal population (535.78 million), ranking second in the country. The livestock sector contributes 10.21 per cent to the state's G.D.P. In Rajasthan, the number of sheep increased by 14.13 per cent from the 2012 livestock census., accounting for almost 13.8 per cent of all livestock (Anonymous, 2021). Rajasthan is the most populous state in terms of camels and goats, second in terms of buffalo and other animals, third in terms of horses, and fourth in terms of sheep. According to the results of the 20th livestock census, there were 74.26 million sheep in India as of 2019, with Rajasthan having 7.9 million of them, the most after Telangana, Andhra Pradesh, and Karnataka.

MATERIAL AND METHODS

Due to the vast diversity in Rajasthan agro- climatic conditions and in order to cater to location-specific need of agricultural research, Rajasthan state has been classified into ten agro-climatic zones. The Hyper Arid Partial Irrigated Western Plain Zone (Ic) was chosen for the research study out of the ten agroclimatic zones in Rajasthan. Three districts-Bikaner, Jaisalmer, and portions of Churu are included in the zone Ic that was chosen. Of these, the districts of Bikaner and Jaisalmer were purposely selected for the research study due to their biggest sheep population inside this agroclimatic zone. For the research study, three tehsils from each district were purposely selected based on having the largest number of sheep. As a result, six tehsils from each of the two districts were chosen. Hence, a total of six tehsils were chosen from the two districts.

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Five villages were chosen from each chosen tehsil based on having the highest sheep population. Thus, from six carefully chosen tehsils in the Jaisalmer and Bikaner districts, thirty villages were specifically chosen for the study. Upon consultation with the relevant individual, a full list of all sheep farmers from the chosen villages with a minimum of five years of experience in sheep husbandry has been compiled, referred to as responsive.

For this research study, a total of 300 sheep farmers have been chosen. With the use of an interview schedule, the investigator used a personal interviewing strategy to gather data and information. Following data tabulation, many statistical measures were employed to draw certain conclusions, including frequency, percent, mean, mean percent scores, standard deviation, $\mathbf{I}_1$, $\mathbf{I}_2$, $\mathbf{I}_3$ and $\mathbf{I}_4$.

The income from sheep enterprises was estimated and expressed as a percentage of gross (total) income from all sources, including agriculture, livestock other than sheep and any other sources, in order to measure the contribution of sheep in the economy of sheep respondents. The following methods were used to calculate the estimated income:

(I) Gross returns from sheep enterprise (I_1)

The total returns from the sale of all sheep enterprise items, such as wool, manure, milk and live animals (lamb, ewes, rams, etc.) were added to determine the gross returns.

(ii) Total net returns of sheep respondent (I_2)

It is calculated by totaling the net profits obtained from all sources, such as sheep farming, other sources, animals (apart from sheep) and agriculture.

(iii) Net returns from sheep enterprise (I_3)

The returns that remain after deducting the whole amount spent on sheep rearing from the total returns on sheep rearing.

$I_3 = I_1$ - Total expenditure on sheep components

(iv) Percent contribution of sheep to overall economy of sheep respondent (I_4)

It may be computed as

$$I_4 = \frac{I_3}{I_2} \times 100$$

(v) Percent contribution of returns from sheep products in gross returns of sheep rearing

It may be computed as

$$I_5 = \frac{\text{Returns received from sheep products as sell of milk/ animal/wool/manure}}{I_1} \times 100$$

RESULT AND DISCUSSION

(i) To measure the contribution of sheep in the economy of sheep farmers

Agriculture land and livestock have traditionally been two basic income-yielding assets of every farmer. The crop production is influenced by the vagaries of nature. Crop production is highly influenced by the unpredictability of nature, with uncertain and erratic rainfall often worsening the situation for small and marginal farmers. Therefore, it is crucial to provide these farmers with employment opportunities to generate additional income and improve their standard of living. Sheep farming enterprises play a significant role, especially in the rural economy.

Given this context, it is essential to assess the contribution of sheep to the overall economic condition of sheep farmers of the hyper-arid partially irrigated western plain zone (Ic) of Rajasthan state. This investigation was conducted with one of its objectives being to understand the impact of sheep rearing on farmers' economic status.

An analysis was carried out to examine the expenditure and receipt of sheep farming in Jaisalmer district (Table1). The analysis indicated that an overall average Rs. /sheep/Year farmer in Jaisalmer district, the total return was 77,615 Rs. and total expenditure (variable cost) was 14,658, giving a return over variable cost of Rs. 62,957. In Bikaner district (Table 2) indicated that for an overall average Rs. /Sheep farmer/Year, the total variable cost was Rs.10,653 and the total return was Rs.63,039, giving a return over variable cost of Rs.52,386. Since many of the fixed assets were heritable in nature and difficult to estimate in the case of sheep, which were usually penned in the open, we included only variable costs in the expenditure side. The major items of variable cost were feed and fodder, vaccines, anthelmintics, other medicines and labor. Nearly 80% of the expenditure was accounted for by the feed and fodder, about 6.00 per cent part was accounted for by medicines and the remaining by the vaccine, anthelmintics and labor. Labor use in sheep farming was mainly accounted for by family labor. Use of hired labor was low and amounted to only Rs.715 per year. The major items providing return were sale of live sheep animals, wool, manure and return from sale/consumption of milk. The live animal sale had 76 per cent in total return. The sale of wool, milk and manure together accounted for 24 per cent in total return. Income and expenditure patterns showed differences between Jaisalmer district and Bikaner district. The proportion of sale of live animals is at par in Jaisalmer and Bikaner districts.

The data in Table 3 contain average gross return, total returns and net returns of all three categories of sheep farmers *viz*. small, medium and large from all the resources *i.e.,* agriculture, livestock (excluding sheep enterprise), sheep enterprise and other sources. The analysis of data in Table 3 shows that the overall economic contribution from sheep rearing, as perceived by respondents, was 43.00 per cent in Jaisalmer and 42.07 per cent in Bikaner for small sheep farmers. For medium sheep farmers, the contributions were 49.54 per cent in Jaisalmer and 47.36 per cent in Bikaner district. Large farmers reported the contribution of sheep was 58.49 per cent in Jaisalmer and 56.98 per cent in Bikaner districts. Thus, it could be inferred that sheep enterprise contributes about 42.07 to 58.49 per-cent in the economy of sheep farmers in hyper-arid partially irrigated western plain zone (Ic) of Rajasthan.

Large sheep farmers contributed more significantly to the overall economy compared to medium and small sheep farmers. It might be due to that during the investigation, the researcher observed that most large sheep farmers considered sheep farming as their main occupation due to the lack of large land holdings and irrigation facilities needed for profitable crop cultivation and raising other livestock. They have more resources to invest better in feed, healthcare and breeding practices, leading to higher productivity and profitability. Additionally, larger operations can negotiate better prices for inputs and outputs, have better access to markets and can absorb economic shocks more effectively than smaller farms. Consequently, they focused more on sheep farming for their livelihood. In contrast, small sheep farmers earned less from sheep farming. This could be attributed to factors such as illiteracy, limited participation in sheep training programs and

extension activities, less contact with veterinary personnel and lack of awareness about government programs. Additionally, many small sheep farmers had larger land holdings with irrigation sources, which allowed them to prioritize farming and raising larger animals over small animals. The results are in conformity with the findings of Suresh *et al*. (2008), Verma (2009), and Kumawat (2012).

CONCLUSION

The study indicates that the sheep enterprise plays a crucial role in the livelihood of sheep farmers in the Hyper-Arid Partially Irrigated Western Plain Zone (Ic) of Rajasthan, contributing between 42.07% and 58.49% to their overall economy. This substantial economic share underscores the importance of sheep farming as a primary or supplementary income source for farmers in this region. Given the arid climatic conditions and limited irrigation facilities, sheep rearing emerges as a resilient and viable livelihood option.

Policy interventions aimed at improving sheep productivity, market access and veterinary support could further enhance the economic benefits for these farmers. Additionally, integrating modern husbandry practices and financial assistance schemes may strengthen the sustainability of sheep farming in the region.

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Table: 1 Expenditure and receipt on sheep farming in Jaisalmer district (Rs. / Sheep farmer/year)

S.NO.	Criteria	Categories of sheep farmers in Jaisalmer district			
		Small sheep farmers	Medium sheep farmers	Large sheep farmers	Overall (N=300)
A.	**Expenditures (Rs.)**				
	Feed and Fodder	3400 (65.51)	8550 (77.78)	18500 (85.42)	12016 (81.98)
	Vaccine	75 (01.45)	100 (00.91)	300 (01.39)	183 (01.25)
	Anthelmintics	625 (12.04)	762 (06.93)	951 (04.39)	819 (05.590
	Other medicines	640 (12.33)	980 (08.92)	1007 (04.65)	936 (06.39)
	Labour	450 (08.67)	600 (05.46)	900 (04.16)	704 (04.80)
	Total variable cost	**5190 (100.00)**	**10992 (100.00)**	**21653 (100.00)**	**14658 (100.00)**
B.	**Receipt (Rs.)**				
	Sale of sheep animal	37000 (78.51)	57269 (81.68)	68732 (71.70)	58994 (76.01)
	Wool	4200 (08.91)	6360 (09.07)	13430 (14.01)	9078 (11.70)
	Manure	3925 (08.33)	3960 (05.65)	8500 (08.87)	5943 (07.66)
	Return from sale/self-consumption of milk	2000 (04.24)	2525 (03.60)	5200 (05.42)	3600 (04.64)
	Total return (Rs.)	**47125 (100.00)**	**70114 (100.00.)**	**95862 (100.00)**	**77615 (100.00)**
	Return over variable cost (RS.)	**41935**	**59122**	**74209**	**62957**

Table: 2 Expenditure and receipt on sheep farming in Bikaner district (Rs. / Sheep farmer/year)

S.NO.	Criteria	Categories of sheep farmers in Bikaner district			
		Small sheep farmers	Medium sheep farmers	Large sheep farmers	Overall (N=300)
A.	**Expenditures (Rs.)**				
	Feed and Fodder	3200 (73.23)	7550 (77.98)	17500 (83.37)	8517 (79.95)
	Vaccine	45 (01.03)	150 (01.55)	200 (00.95)	127 (01.19)
	Anthelmintics	425 (09.73)	632 (06.53)	790 (03.36)	600 (05.63)
	Other medicines	500 (11.44)	650 (06.71)	1000 (04.76)	682 (06.40)
	Labour	200 (04.58)	700 (07.23)	1500 (07.15)	727 (06.82)
	Total variable cost	**4370 (100.00)**	**9682 (100.00)**	**20990 (100.00)**	**10653 (100.00)**
B.	**Receipt (Rs.)**				

	Sale of sheep animal	35100 (76.88)	54925 (80.99)	62203 (70.62)	48355 (76.71)
	Wool	4300 (09.42)	6160 (09.08)	14430 (16.38)	7358 (11.67)
	Manure	4225 (09.25)	4500 (06.64)	7200 (08.17)	4543 (07.21)
	Return from sale/self-consumption of milk	2028 (04.44)	2230 (03.29)	4250 (04.82)	2783 (04.42)
	Total return (Rs.)	**45653 (100.00)**	**67815 (100.00)**	**88083 (100.00)**	**63039 (100.00)**
	Return over variable cost (RS.)	**41283**	**58133**	**67093**	**52386**

Table: 3 To measure percent contribution of sheep to overall economy of sheep farmer

S. N	Categories of sheep farmers	Average amount of Jaisalmer district sheep farmers							
		I_1		I_2		I_3		I_4	
		Mean±	S.D.	Mean±	S.D.	Mean±	S.D.	%	S.D.
1.	**Small sheep farmers (n=24)**	47125	3791	101102	27335	41935	3791	43.00	9.05
2.	**Medium sheep farmers (n=61)**	70114	6159	118655	142747	59122	6159	49.54	15.70
3.	**Large sheep farmers (n=65)**	95862	5817	195385	221231	74209	25208	58.49	13.95
	Average amount of Bikaner district sheep farmers								
1.	**Small sheep farmers (n=49)**	45653	3461	103143	26351	41283	3461	42.07	7.35
2.	**Medium sheep farmers (n=)**	67815	8554	126538	158436	58133	8554	47.36	16.92
3.	**Large sheep farmers (n=65)**	88083	7551	199889	233714	67093	7551	56.98	13.16

$I_{1=}$ Gross return from sheep enterprise, I_2=Total net return of sheep respondents, I_3=Net return from sheep enterprise, I_4= Percent contribution of sheep to overall economy of sheep farmer.

Dissertations and Thesis

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