

EFFECT OF SOCIAL GROUPS AND FLOCK SIZE ON ECONOMIC RETURNS FROM TRADITIONAL GOAT REARING IN SOUTH GUJARAT

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ABSTRACT

A field survey of 150 goat keepers registered under AICRP on goat (Surti field unit) from nineteen villages of four districts of South Gujarat was carried out during year 2011 to find the effects of social group and flock size on economic returns from traditional goat rearing in study area. Farmers were selected using proportionate random sampling method. The information on general characteristics of goat keepers, their source of expenditures and earnings were collected tabulated and analyzed using standard statistical tools. Analysis revealed that the Ahir caste (82.4%) was principle goat keepers found in South Gujarat High Rainfall Zone and owned 89.5% of large flocks, whereas in South Gujarat Medium Rainfall Zone majority goat keepers were Muslims (66.2%) maintaining mainly medium (44.2%) and small (41.9%) sized flocks. The average flock size observed in study was 25.42 goats. The majority of them were marginal farmers (47.3%). The study of economics of goat farming revealed that the overall percent expenditure on labours, feed & fodder, treatment, interest and depreciation, was 73.54, 22.04, 2.09, 1.28 and 1.04 respectively. The percent return from sales of milk, animals and manure was 48, 46 and 6 respectively. These economical parameters were found to be highly significant ($P < 0.01$) between flock sizes and castes. The net return obtained was in the ratio of 5.31 : 2.68 : 1.00 by Ahirs : Muslims : Others and 5.49 : 2.18 : 1.00 in Large: Medium : Small flocks. The net return per goat had also shown similar trend. The goat farming with larger flocks followed by Ahirs under traditional production system was found significantly more profitable in compare to goat farming involving small to medium sized flocks followed by others and Muslims in South Gujarat.

Key words: Caste, Economics, Flock size, Man days, Net return, Rainfall zone, Surti goat.

Goats contribute significantly to the Indian economy by sustaining livelihood and supplementing income of small farmers and rural poor. Landless or marginal farmers like Bharwads (Saurashtra region), Rabaries (North & Middle Gujarat region), Muslims and particularly Ahirs

(South Gujarat) had adopted goat farming since generations as a main or subsidiary enterprise¹². South Gujarat is vested with agro-climatic areas characterized by medium to high rainfall zones. In a pilot survey of AICRP (Surti Field Unit), it had been observed that goat keepers in these zones differ according to their caste, the flock size they keep and traditional knowledge base of keeping goats. Although different but sustainable ways of

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goat rearing are being practiced mostly by traditional farmers in these zones. Navsari and Valsad districts of South Gujarat have more tribals and socially and economically backward class (SEBC) population. Valsad has highest 36.38% wasteland of total geographical area as compared to other districts in Gujarat¹. Good grazing options for livestock are present due to availability of wasteland and good quantum of rainfall for sustaining green vegetation well suited for goat farming. On other hand goat farming in Bharuch and Vadodara districts of South Gujarat sustains on medium rainfall zone having less availability of green vegetation and practiced mainly by Muslims. The present study is an effort to analyze quantitative and socio economic models of goat rearing involved in these zones by different social groups. Additionally, effect of flock size vis-à-vis economic feasibility had also been investigated. The baseline socio-economic information generated in this study will be useful to understand various pros and cons of goat farming practiced by farmers with different social background.

MATERIALS AND METHODS

The data were collected through specially structured and pre-tested proforma by personnel interview method. Farmers were selected using proportionate random sampling method during year 2011. Total 150 goat keepers registered under AICRP on goat (Surti field unit) were interviewed from 19 villages across four districts of South Gujarat. Among the four districts Bharuch and Vadodara are in South Gujarat medium rainfall zone (SGMRZ), which receives 800-1000 mm of average annual rainfall, where as Navsari and Valsad districts falls under South Gujarat heavy rainfall zone (SGHRZ), which receives 1800-2000 mm average annual rainfall.

The data was collected on general information about goat keepers, their source of expenditures and earnings. Crosstabulation and statistical analysis using chi square test⁹ was done after classifying variables based on flock size, caste and rainfall zone.

The respondents were categorized into three groups based on their education level i.e. illiterate, upto primary and secondary and above. They were also categorized into small family (upto 6 members), medium family (6-11 members) and large family (more than 11 members). The respondents were grouped based on land holding as land less, marginal (up to 1 acre), small (1-3 acres) and large (> 3 acres). The respondents were classified based on social group they belong as Ahirs, Muslims and others. The age of farmer/farm women was categorized into three groups as young (less than 35 years), middle (Between 35-60 years) and old (more than 60 years). The flock size of less than 15, 15-35 and more than 35 was grouped as small, medium and large flock, respectively.

The fixed cost consisted of labour cost and depreciation of house and equipments @ 5% of construction/ purchase cost. The imputed values of family labours engaged in goat rearing activities were considered to calculate labour cost. The imputed value of family labour were calculated by converting hours of working of all family members together to man days (annual working hours divided by 8) and further, it was multiplied with minimum daily wages run in particular villages (Rs 60 in SGHRZ, Rs 80 in SGMRZ). No initial investment on purchase of goats was considered as majority of respondents are doing goat keeping since many generations. The incurred expenditure on purchase of feeds and fodders and treatment

and medicine was considered as variable cost. The interest on expenditure on above said both variables at current 11% interest rate was also considered as a variable cost. Fixed and variable costs of each flock were summed to derive total cost of flock. Then gross return, net return and return per man days were calculated for each flock².

RESULTS AND DISCUSSION

General characteristics of goat keepers:

The cross tabulation of general characteristics with social group and flock size of the respondents is presented in Table 1. The overall 46.7% of respondents were Ahirs, 28.7% were Muslims and only 24.7% belonged to other (SC/ST) caste. Overall 40%, 22% and 38% flocks were small, medium and large, respectively. The average flock size observed in study was 25.42 goats. The average flock size of 25.3 in Kanni Adu goats of Tamil Nadu is also reported¹¹. The selected villages of Valsad district are forest dominating area having good natural grazing available round the year. On the other hand goat keepers of Bharuch and Vadodara district have good option of pigeon pea gotar as quality feed for their goats. The Ahirs were large flock owners, the Muslims were of medium sized flock owner, whereas, majority other caste goat keepers have maintained relatively smaller flocks. It may be due to the availability of better grazing opportunities available with Ahirs and the practice of goat farming as their sole agribusiness since centuries¹². Similarly, the flock size in Kanni Adu goats was affected by feed resources and space availability for sheltering¹¹.

The Ahirs (Maldharis) were principle traditional goat keepers found only in SGHRZ

(Navsari, and Valsad district). The Muslims also keep goats as a part of tradition but mostly in SGMRZ (Bharuch and Vadodara district). Rabaries were the principle traditional goat keepers (50%) in North Gujarat, moreover, role of Muslims in goat farming was very limited (5.77%) in North Gujarat⁶. The majority (59.5%) of goat keepers among other caste (Dhodia Patels, Vasavas, and Harijans) were from SGMRZ. Majority of larger flocks were found in SGHRZ due to availability of more grazing resources and presence of Maldharis i.e. Ahirs in said region. Similarly, the flock size of Gohilwadi goats in Saurashtra region of Gujarat varied depending upon grazing land in villages or nearby areas or by populations of the professional goat keepers- Maldharis⁷.

The effect of social group on flock size revealed that, 89.5% of large flocks were owned by Ahirs whereas majority (44.2%) Muslims and other caste (78.4%) goat keepers maintained medium and small sized flocks, respectively which is in accordance with earlier study⁸.

Overall 72.7% of respondents were literate, hence, it could be said that they possessed good literacy rate across both the rainfall zones. So far higher education is concerned, the Ahirs were better educated, and similarly, small and large flock owners possessed higher education than medium sized flock owners. The goat keepers in South Gujarat have higher literacy rate³ where as it is lower in goat owners in other parts of Gujarat² and India^{6&10}. Non nomadic nature of goat keepers in study area had probably resulted in higher literacy rate.

The main persons of Ahir and Muslim families were mainly old and middle age, respectively. The respondents belonged to SC/ST, Muslims and Ahirs were mostly lived in small,

medium and large sized families, respectively. Overall majority of goat keepers were old. The large, medium and small flocks were maintained mostly by young, old and middle age goat keepers respectively. Report of earlier study also revealed that majority of large flocks was not owned by old persons (> 55 yr.) in Haryana².

The majority of goat keepers (56%) having small family up to 6 members, on other hand only 5.3 % of respondents having large families, contradictory with another study³ in which they reported 21.33% of goat keepers of South Gujarat under large family category. It was due to inclusion of respondents from Ahir community in Valsad district which was not the part of earlier studies. Small and medium sized flocks were mainly maintained by small families, whereas majority of large flocks were maintained by large families.

Land holding characteristic of respondents indicated that majority of Ahir and Muslim families were large and small farmers, respectively. However, most goat keepers of other caste were landless to marginal farmers. Mostly all flock sizes under study were being kept by marginal farmers. Similar land holding pattern of goat keepers was reported in Rajasthan¹⁰, but in other states more goat owners were reported landless^{2&6}.

Economics of goat rearing per flock basis:

The analysis of annual costs and returns per flock basis of all 150 respondents in relation to various parameters like social group and flock size were analyzed and presented in Table 2. All economical parameters under study were significant ($P < 0.01$) between flock sizes and social groups. The overall total cost, gross return, net return and net return per man days per flock per annum was Rs. 15524, 35151, 19627 and 189,

respectively. The study of economics of goat farming revealed that the overall percent expenditure on labours, feed & fodder, treatment, interest and depreciation, was 73.54, 22.04, 2.09, 1.28 and 1.04 respectively. The percent return from sales of milk, animals and manure was 48, 46 and 6 respectively. It revealed that labour cost and sale of milk were the major sources of expenditure and income, respectively. Share of milk in return was found higher in present study than earlier reports in other goat breeds of Western India^{2&5}. This may be due to higher milk yield per day in Surti goat as compared to other goat breeds of Western India¹³. The goat milk in Valsad district is generally sold to village cooperative society. The respondents have sold overall average 12 kids and 2 adults per year, even though they have earned less as compare to previous studies⁵ may be due to involvement of middleman in live animal marketing channel. Kids were mostly sold around 9 months of age reaching average 20 kg live body weight. Respondents fetched average Rs 2000/- per kid, however, kids younger than 6 months age were also sold at lower prices due to economic needs of poor farmers. Sale of manure also contributed to a sizable extent to the total returns^{2, 5-6}, however, our findings showing 6% share of manure in total return from goat farming which is lesser than their actual potentiality. As now a days due to popularization of cash cropping of vegetables and flowers in South Gujarat created great demand of organic manure and thus, goat keepers may takes advantages of selling of manure at higher price rate with some value addition by composting or vermicomposting. Both said value added products from goat droppings enhances microbial activity, mineralisable nitrogen and phosphorus content in

raw material and converts into value added manure⁴. However, majority of goat keepers are selling their manure to farmers of their respective village at a reasonable rate with mutual understanding of using their empty fields to graze their flock after harvesting of crops. The goat enterprise has used overall average 140.77 man days to manage their goat flock; moreover, goat enterprise has generated an overall average employment Rs. 189.63 per man days spent in goat management.

The expenditure and returns from flocks of goats owned by three social groups was also having significant effect on economical parameters. The cost and return was high in flocks of Ahirs, intermediate in Muslims and lower in other caste, generally it was in correspondence with flock sizes as they were mostly maintained large, medium and small flocks, respectively. The net return per man days was high (Rs. 201.92) in Muslim goat keepers due to less numbers of labours involved. Bharuch district didn't use shepherd for grazing of their goats, however, goats found feeds/grazing by their own in and around their villages, hence, man days used was observed less (119.9) in compare to other castes under study. The SC/ST farmers have also earned Rs.158/man days in spite of only few numbers of goats kept by them. The income generated by them is better than present minimum daily wages declared by Government (Rs. 120/day). Hence, it could be said that the rearing of fewer goats by other caste (SC/ST) also helped their economy.

The flock sizes have linear relationship among all economical parameters under study. The comparative economics of goat farming based on their flock size revealed that gross total returns was significantly higher ($P < 0.01$) from large flock

(Rs. 61,204) than small (Rs. 14,974) and medium sized flocks (Rs. 26,839). The net return per man days was found significant higher ($P < 0.01$) in medium flocks than small flocks but comparable with large flocks. Earlier study also reported more or less similar gross returns^{2&5}. They have also reported higher return per man days in medium flock size category. However, the values under all parameters reported by them are lower than present study may be due to inflation associated with time factor only as said study was conducted in year 2001 which is 10 year earlier than present study. The average gross returns on various groups of goat farms mainly varied due to variations in their flock sizes.

Economics of goat rearing per goat basis:

The difference in average annual fixed and variable cost per goat on different size of farms was due to the variations in their flock sizes. The average expenditure per goat was considerably higher in small sized flock. The average annual gross return per goat was worked out to be significantly different ($P < 0.01$) Rs 2096, 2085, 2352 and 2191 on small, medium and large flocks and overall average, respectively. The net profit per goat increased linearly with size of the flock. Similar trends for net profit per goat between different flock sizes, with maximum net receipt of Rs 814.38/ lactating goat was observed in very large sized flock⁶. The gross return per goat was also found significant between different social groups of goat keepers ($P < 0.01$). The Ahirs were the principle respondents in heavy rainfall zone owning large flock and generated significantly ($P < 0.01$) more gross and net return. Further, Valsad district, a principle area for large flocks have got highest waste land than any district in Gujarat¹ giving more grazing option to goat keepers, hence, the more grazing resources might have resulted in more profit.

Economic return from goat rearing

Table 1: Classifications of goat keepers based flock size and social groups of South Gujarat

General characteristics of goat keepers			Social Group			Flock Size			Total
			Ahir	Muslim	Other	Small (1-15)	Medium (16-35)	Large (>36)	
General mean	Total	n	70	43	37	60	33	57	150
		%	46.7	28.7	24.7	40.0	22.0	38.0	100.0
Rainfall zone	SGHRZ	n	70	0	15	25	9	51	85
		%	82.4	0.0	17.6	29.4	10.6	60.0	56.7
	SGMRZ	n	0	43	22	35	24	6	65
		%	0.0	66.2	33.8	53.8	36.9	9.2	43.3
Social Group	Ahir	n	-	-	-	13	6	51	70
		%	-	-	-	21.7	18.2	89.5	46.7
	Muslim	n	-	-	-	18	19	6	43
		%	-	-	-	41.9	44.2	14.0	28.7
	Other	n	-	-	-	29	8	0	37
		%	-	-	-	78.4	21.6	0.0	24.7
Education level	Illiterate	n	12	11	18	22	7	12	41
		%	29.3	26.8	43.9	53.7	17.1	29.3	27.3
	Primary	n	31	23	15	21	20	28	69
		%	44.9	33.3	21.7	30.4	29.0	40.6	46.0
	Secondary and Above	n	27	9	4	17	6	17	40
		%	67.5	22.5	10.0	42.5	15.0	42.5	26.7
Age of main person of family	Young	n	17	12	9	14	9	15	38
		%	44.7	31.6	23.7	36.8	23.7	39.5	25.3
	Middle age	n	14	19	20	25	12	16	53
		%	26.4	35.8	37.7	47.2	22.6	30.2	35.3
	Old age	n	39	12	8	21	12	26	59
		%	66.1	20.3	13.6	35.6	20.3	44.1	39.3
Family size	Small (Up to 6)	n	41	20	23	38	21	25	84
		%	48.8	23.8	27.4	45.2	25.0	29.8	56.0
	Medium (6-11)	n	24	21	13	20	12	26	58
		%	41.4	36.2	22.4	34.5	20.7	44.8	38.7
	Large (>11)	n	6	2	0	2	0	6	8
		%	71.4	28.6	0.0	25	0.0	85.7	5.3
Land holding	Landless	n	20	7	9	16	4	16	36
		%	55.6	19.4	25.0	44.4	11.1	44.4	24.0
	Marginal (Up to 1 Acre)	n	32	14	25	28	17	26	71
		%	45.1	19.7	35.2	39.4	23.9	36.6	47.3
	Small (1-3 Acre)	n	14	19	3	13	10	13	36
		%	38.9	52.8	8.3	36.1	27.8	36.1	24.0
	Large (>3 Acre)	n	4	3	0	3	2	2	7
		%	57.1	42.9	0.0	42.9	28.6	28.6	4.7

Table 2: Means economics of goat farming in South Gujarat influenced by social group and flock size in South Gujarat (Rs./Year)

Parameters	Social group			Flock size			Overall average	
	Ahir	Muslim	Other	Small (1-15)	Medium (16-35)	Large (>36)	Mean	%
N	70	43	37	60	33	57	160	100
Expenditures								
Fixed costs								
Imputed value of family labour	15323 ^a ±782	9316 ^b ±607	5675 ^c ±345	5683 ^a ±233	8628 ^b ±368	18226 ^c ±618	11221 ^a ±529	72.28
Depreciation	227 ^a ±17	132 ^b ±10	69 ^c ±5	73 ^a ±3	129 ^b ±4	272 ^c ±19	161 ^a ±10	1.04
Total fixed cost	15551 ^a ±794	9448 ^b ±616	5743 ^c ±349	5956 ^a ±236	8957 ^b ±371	18498 ^c ±628	11382 ^a ±537	73.32
Variable costs								
Feed & Fodder	4862 ^a ±426	3398 ^b ±248	1486 ^c ±117	2136 ^a ±199	3003 ^b ±213	5518 ^c ±483	3612 ^a ±240	23.27
Treatment & Medication	455 ^a ±35	263 ^b ±20	137 ^c ±11	145 ^a ±6	259 ^b ±8	543 ^c ±37	321 ^a ±21	2.07
Interest on variable cost	283 ^a ±24	193 ^b ±14	87 ^c ±6	120 ^a ±10	173 ^b ±11	323 ^c ±27	209 ^a ±14	1.34
Total variable cost	5599 ^a ±479	3654 ^b ±280	1720 ^c ±129	2401 ^a ±212	3434 ^b ±228	6385 ^c ±544	4142 ^a ±271	26.68
Total cost	21150^a±1119	13302^b±853	7464^c±447	8357^a±368	12391^b±493	24882^c±1021	15524^a±747	100
Returns								
Sale of Animal	22102 ^a ±1660	13428 ^b ±1148	6949 ^c ±542	7328 ^a ±409	12629 ^b ±529	26759 ^c ±1738	19877 ^a ±982	45.17
Sale of milk	26084 ^a ±2230	13574 ^b ±1316	5258 ^c ±500	6806 ^a ±422	12819 ^b ±744	31076 ^c ±2473	17351 ^a ±1318	49.36
Sale of manure	2821 ^a ±192	1366 ^b ±107	871 ^c ±57	840 ^a ±32	1391 ^b ±25	3370 ^c ±186	1923 ^a ±119	5.47
Gross total Return	50986 ^a ±3636	26368 ^b ±2489	13077 ^c ±895	14974 ^a ±726	26839 ^b ±1027	61204 ^c ±4059	35151 ^a ±2327	100
Gross total Return per goat	2330 ^a ±74	2137 ^b ±37	1981 ^c ±69	2096 ^a ±62	2085 ^a ±61	2352 ^b ±76	2191 ^a ±41	-
Net Return (N.R.)	29837 ^a ±2823	15065 ^b ±1747	5614 ^c ±549	6617 ^a ±418	14447 ^b ±765	36321 ^c ±3151	19627 ^a ±1637	-
N.R. per goat	1270 ^a ±43	1098 ^b ±39	833 ^c ±48	912 ^a ±40	1120 ^b ±53	1320 ^c ±44	1113 ^a ±30	-
Man days /year	234 ^a ±10	118 ^b ±8	71 ^c ±4	97 ^a ±10	113 ^b ±4	255 ^c ±7	161 ^a ±8	-
N.R./ Man days	192 ^b ±10	210 ^b ±10	158 ^a ±5	153 ^a ±6	214 ^b ±11	211 ^b ±10	189 ^a ±6	-

Means with different superscript within category in rows are significant different (P< 0.01)

CONCLUSION

In conclusion, goat farming under traditional production system is a profitable enterprise having capability to solve rural unemployment and to provide livelihood security for rural mass in general and landless, small and marginal farmers and rural poor in particular. The profitability can further be improved by increasing the size of the flock as practiced by Ahirs with approximately same utilization of labour as with small sized flock. The profitability from goat rearing may be increased by

alteration in present marketing of live animals, milk and manure. Milk and manure produced by goats have tremendous scope to increase net income of goat keepers. The medium flock sized semi urban goat rearing enterprise had better opportunity for the gainful employment of their available family labours. Thus, the goat rearing seems to be a feasible employment generation activity in the rural and semi urban areas of state.

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