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Comparative Study on Goat Production Systems at Sanghar and Shaheed Benazirabad Districts of Pakistan

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Authors' contributions

This work was carried out in collaboration among all authors. Authors AAK, NAK and GBK designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AAK, HMS and MAG managed the analyses of the study. Authors AAK and KML managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Study was conducted in order to compare goat production systems at Sanghar and Shaheed Benazirabad districts of Pakistan. Household surveys were conducted in two districts including five villages from each. The results showed 64.00 and 56.00% households possessing 21-25 years age in Sanghar and Shaheed Benazirabad districts. 40.00% had 5-10 years of farming experience, 64.00% were educated up to middle level in district Sanghar. 60 and 70% of household reported that there was availability of electricity and gas at their farms. 70 and 60% of household replied to have availability of transportation at their farms. Most of (70 and 60%) household in the Sanghar

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and Shaheed Benazirabad kept their animals under semi intensive housing system, whereas 20.00 and 26.00% reared their animals under intensive housing system and only 10.00 and 14.00% housed their animals under extensive housing system. 92.00 and 80.00% of households in district Sanghar and Shaheed Benazirabad grazed animals on pasture. 90.00 and 80% of households did not reared their animals in confined sheds in district Sanghar and Shaheed Benazirabad. None of households reared their animals in confined paddocks, confined fences and special housing in district Sanghar and Shaheed Benazirabad. 90.00% of household vaccinated their animals against bacterial and viral diseases in Shaheed Benazirabad district. 90 and 95% of households reported that they call veterinary doctor for treatment of sick animals. It is concluded that in Sanghar district, the majority of household keep their animals under semi-intensive housing system compared to that of Shaheed Benazirabad district.

Keywords: Goat; management system; production; survey.

1. INTRODUCTION

Livestock contributes 60.54 percent to agricultural value addition and 11.22 percent to national GDP. Goat keeping is an essential practice in rural areas as goats play an important role in the social setup and culture in rural areas as well as providing a potential source of employment and income. There are 37 goat breeds in Pakistan. Among them Barbari, Chappar, Kamori, Sindhi Desi, Lehri, Bari, Beiari, Bugi Toori, Bujri, Jattan, Kacchan, Kurri, Lohri, Pateri, Tapri or Lappi, Tharki or Tharri are most common in Sindh province. These breed significantly contribute to human food supply in term of meat and milk [1].

Goat keeping is a low input activity having multidimensional uses: provide the livelihood of a large proportion of rural farmers, landless poor lacking other means of survival, in clearing fodder and cash crop fields; the green foliage, tree leaves, agricultural residues and leftovers. Raising goats as sacrificial animals is still a different production system practiced in Pakistan where by animals are reared using intensive production system and then sold at very high price on occasion Eid-ul-Azha. Appreciable diversity among and within goat breeds therefore exists in performance traits like morphological, growth, fertility and other traits. For instance adult body weight may vary from 20-70 kg with exceptional bucks quadrupling this range [2].

Production systems and socio-economic settings of goat farmers are continuously changing day by day and that considerably influences the production of goats in the respective region. Currently, both live goats and products are targeted for the export market. However, strategies to respond to the potential growth for domestic use and export of goat and goat products are non-existent. Basic information about valuable indigenous goat breeds is needed for managing them at both scientific and farm operational levels [3]. To achieve this and other objectives, a regional project “Development and Application of Decision Support Tools to Conserve and Sustainably use Genetic Diversity in Indigenous Livestock and Wild Relatives” is being executed in four countries including Pakistan, Bangladesh, Sri Lanka and Vietnam by ILRI. Breeding, genetics, socioeconomic and policy aspects of raising goat are being targeted along with capacity building of various stakeholders.

Households’ surveys are a key source of data on social aspects and provide the most flexible method of recording information and provide a cheaper alternative to censuses for timely data. Usually household surveys are used for collection of detailed and varied socio-demographic data pertaining to the living conditions, wellbeing, activities of people, and their socio-economic setup. Any population-based subject can be investigated through these surveys and most of the time the surveys provide interesting and practical information. So far, the present study was conducted to explore goat production systems in Sanghar and Shaheed Benazirabad districts through household surveys.

2. METHODOLOGY AND APPROACHES

Household survey was conducted to gather information regarding goat production systems in two districts of Sindh province of Pakistan viz., Sanghar and Shaheed Benazirabad. Five villages though having higher goat population were randomly selected from each district. The household (HH) survey followed a stratified random sampling method, stratified by ownership of goats. In each village, firstly

Table 1. Questionnaire indicating different parameters of study focused during survey

1. General Household characteristics
Age
15-20 ears
21-25 ears
26-30 ears
31 and above
Sex
Male
Female
Marital status
Married
Unmarried
Divorced
Farming experience
5-10 ears
11-15 ears
16-20 years
21 and above
Level of education
Middle
Matric
Intermediate
Graduate
Any other
2. Farm activities and facilities
Number of young goat
Number of kids
Housing system used at the farm
Intensive
Semi intensive
Extensive
Management strategies (feeding, watering and health care)
Did you reared animal in free range system?
Did you reared animal in confined in sheds?
Did you reared animal in confined in paddocks?
Did you rear animals in confined fences?
Did you rear animals in no special housing?
Time spent on feed preparation
Time spent on feeding
Time spent on watering
Time spent on milking
Time spent on processing
Time spent on caring
Feed type
Rice straw
Wheat straw
Kitchen waste
Commercial concentrates
Grazing on cropland
Green fodder
Feed ingredients
Feed cost / animal / year
Health care
Did you vaccinate the animals?
Did you treat the sick animals?
Cost of treatment (if used)

total number of households were recorded and then from that recorded list of households, goat owners were identified. Using random selection method, a total of fifty (N=50) goat farmers were

selected from recorded list of each village. A comprehensive questionnaire was setup and pretested according to requisite and relevance of current study. A community leader was tasked to inform the selected households in advance of the survey to ascertain the willingness and availability of interviewer. Using questionnaire, data regarding different parameters of study, as indicated in Table 1, was recorded.

2.1 Statistical Analysis

Collected data was interpreted and analyzed using Statistix version 8.1. The percentage and frequencies were derived for each parameters studied.

3. RESULTS

3.1 General Household Characteristics

The survey regarding goat production systems in the districts Sanghar and Shaheed Benazirabad was conducted and the data for age of farmers was analyzed and shown in Table. In district Sanghar and Shaheed Benazirabad, the majority of the households were lying between the age group of 21-25 years (64.00% and 56.00%) followed by 15-20 years (20.00% and 24.00%), 26-30 years (10.00% and 16.00%), 31 and only (6.00% and 4.00%) of the households were lying in the group of 31 and above years. Among recorded numbers of household in district Sanghar and Shaheed Benazirabad, the majority of the household were males (90.00% and 86.00%) followed by females (10.00% and 14.00%) who were engaged in the goat farming (Table 2). 70.00% and 80.00% households were found married followed by 26.00% and 14.00% unmarried. Only 04.00% and 06.00% of households were divorced in district Sanghar and Shaheed Benazirabad, respectively (Table 2). Concerning farming experience, results indicated 40.00% and 44.00% of the households possessed 5 to 10 years farming experience, followed by 36.00% and 32.00% with 11-15 years farming experience and 24.00% and 28.00% with 16-20 years farming experience in district Sanghar and Shaheed Benazirabad, respectively (Table 2). Level of education also variable in both districts. Results showed that in district Sanghar and Shaheed Benazirabad, the majority of the household (64.00% and 60.00%) were educated up to middle level, followed by matric level (20.00% and 22.00%) and intermediate level (16.00% and 18.00%) in Sanghar and Shaheed Benazirabad (Table 2).

3.2 Infrastructural Facilities and Amenities

The results regarding farm activities and facilities are presented in Table 3. Almost 100% of the households in both district (Sanghar and Shaheed Benazirabad) stated that there was availability of clean water at their farms. Likewise, 60% and 70% of household reported that there was availability of electricity or gas at their farms and some of them (40% and 30%) reported that there was no availability of electricity and gas at their farms. However, regarding the transport facility, 70% and 60% of households reported that there was ease of transportation at their farms and some (30% and 40%) of household reported that there was no availability of transportation at their farms. Moreover, 100% of the households in both district (Sanghar and Shaheed Benazirabad) stated that there was availability of farm utensils. The results regarding housing system showed that in Sanghar and Shaheed Benazirabad districts, the majority of households (70.00% and 60.00%) housed their animals under semi intensive housing system, whereas 20.00% and 26.00% housed their animals under intensive housing system, however only 10.00% and 14.00% of them housed their animals under extensive housing system (Table 3).

3.3 Livestock Inventories

The results regarding livestock inventories are presented in Table 4. In Sanghar and Shaheed Benazirabad districts, the average number of total animals in the farm was 200 and 240, respectively. Among them numbers of adult male animals were 14 and 10, adult female animals were 60 and 70, numbers of does were 15 and 16, numbers of bucks were 8 and 20, numbers of wether were 12 and 14, numbers of young goats were 50 and 70, numbers of kids were 14 and 16, Purchase of goats (male, female, young male and young female) were 12 and 10, Sale of goats (male, female, young male and young female) were 13 and 10 and Mortality / slaughter of goats (male, female, young male, young female, kid male, kid female) were 2 and 4, respectively.

3.4 Management Strategies

The results further indicate that majority (92.00% and 80.00%) of households in district Sanghar and Shaheed Benazirabad reared animals in free range system. 90.00% and 80% of households

did not rear their animals in confined sheds in district Sanghar and Shaheed Benazirabad. Almost 100.00% of households did not rear their animals in confined paddocks, confined fences and special housing in district Sanghar and Shaheed Benazirabad (Table 5). The results regarding health care of animals are presented in Table 5. Majority (80.00 and 90.00%) of households vaccinated their animals against viral diseases in both Sanghar and Shaheed Benazirabad districts. Whereas, 20% and 10% of them did not vaccinate their animals in Sanghar and Shaheed Benazirabad district. 90.00% and 96.00% of households reported that they call veterinary doctor for treatment of sick animals, while 10% and 4% did not use treatment of sick animals in both Sanghar and Shaheed Benazirabad districts. The results regarding time spent in various farm activities are presented in the Table 6. Time spent on feed preparation was 30 to 35 minutes, feeding 20 minutes, watering 5 minutes, milking 3 minutes, processing 15 to 20 minutes, caring 1 hour, manure collection 30 to 35 minutes, cleaning 1 hour and marketing 1 week in both Sanghar and Shaheed Benazirabad districts.

Table 2. General household characteristics of farmers observed at Sanghar and Benazirabad districts

Variables	Sanghar (n=50)		Shaheed Benazirabad (n=50)	
	Frequency	Percentage	Frequency	Percentage
Age				
15-20 years	10	20.00	12	24.00
21-25 years	32	64.00	28	56.00
26-30 years	5	10.00	8	16.00
31 and above	3	6.00	2	4.00
Sex				
Male	45	90.00	43	86.00
Female	5	10.00	7	14.00
Marital status				
Married	35	70.00	40	80.00
Unmarried	13	26.00	7	14.00
Divorced	2	4.00	3	6.00
Farming experience				
5-10 years	18	36.00	20	40.00
11-15 years	20	40.00	14	28.00
16-20 years	12	24.00	16	32.00
21 and above	0	0	0	0
Level of education				
Middle	32	64	30	60
Matric	10	20	11	22
Intermediate	8	16	9	18

Table 3. Infrastructural facilities and amenities at different farms of Sanghar and Shaheed Benazirabad districts

Farm activities and facilities				
Variables	**Sanghar**		**Shaheed Benazirabad**	
	Yes (%)	**No (%)**	**Yes (%)**	**No (%)**
Availability of clean water	100.00	0	100.00	0
Availability of electricity and gas	60.00	40.00	70.00	30.00
Availability of transportation	70.00	30.00	60.00	40.00
Availability of farm utensils	100.00	0	100.00	0
Housing systems				
Variables	**Sanghar (n=50)**		**Shaheed Benazirabad (n=50)**	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Intensive system	10	20.00	13	26.00
Semi-intensive system	35	70.00	30	60.00
Extensive system	5	10.00	7	14.00

Table 4. Livestock inventories at different farms of Sanghar and Shaheed Benazirabad districts

Variables	Sanghar (No.)	Shaheed Benazirabad (No.)
Total animals in the farm	200	240
Number of adult male animals	14	10
Number of adult female animals	60	70
Number of doe	15	16
Number of buck	8	20
Number of wether	12	14
Number of young goat	50	70
Number of kids	14	16
Purchase of goats (male, female, young male and young female)	12	10
Sale of goats (male, female, young male and young female)	13	10
Mortality / slaughter of goat ((male, female, young male, young female, kid male, kid female)	2	4

Table 5. Management strategies and health care for goats at Sanghar and Shaheed Benazirabad district

Management strategies				
Variables	**Sanghar**		**Shaheed Benazirabad**	
	Yes (%)	**No (%)**	**Yes (%)**	**No (%)**
Rearing animals in free range system	92	8	80	20
Rearing animal in confined sheds	10	90	20	80
Rearing animal in confined in paddocks	0	100	0	100
Rearing animals in confined fences	0	100	0	100
Rearing animal in no special housing	0	100	0	100
Health care				
Variable	**Sanghar**		**Shaheed Benazirabad**	
	Yes (%)	**No (%)**	**Yes (%)**	**No (%)**
Do you get vaccinate	80.00	20.00	90.00	10.00
Did you use treatment of sick animal	90.00	10.00	96.00	4.00

Table 6. Time spent in various activities at different farms of Sanghar and Shaheed Benazirabad district

Time spent on	Sanghar	Shaheed Benazirabad
Feed preparation	30 minutes	35 minutes
Feeding	20 minutes	20 minutes
Watering	5 minutes	5 minutes
Milking	3 minutes	3 minutes
Processing	15 minutes	20 minutes
Caring	1 hour	1 hour
Manure collection	30 minutes	35 minutes
Cleaning	1 hour	1 hour
Marketing	1 week	1 week

3.5 Feed Type

The results regarding feed type indicated that the household in both districts (Sanghar and Shaheed Benazirabad) provided wheat straw, commercial concentrates, grazing on cropland, green fodder and mixed feed ingredients as feed type to their livestock.

4. DISCUSSION

Household surveys provide ample firsthand knowledge about households' activities and help in providing appropriate guidelines for the betterment of communities. Household surveys also provide useful data about goat production systems, involvement of family members in goat farming activities and role of goats in livelihood. Farmers keep goats for the number of reasons such low investment cost, less expenditure, ease of rearing the animals, potential source of income, and alternative source of agriculture farm income. Marketing of livestock and their products was a problem for the small holders. Sustainable land management and utilization is essential for increased productivity from animals

[4]. Present study, however revealed land utilization and ownership to some extent, and supported other studies [5]. Shrinkage of grazing land is responsible for lower productivity and forcing the farming communities towards intensive farming system. This also affected the flock sizes and resulted in reduced flock's sizes. Hence farmers tend to keep small number of animals according to their resources and needs.

Ownership showed a remarkable contribution of women but their involvement was not to the level as reported by other studies in other countries [5]. Average number of animals owned by the farmers as found in the present study matched with finding of [5]. Breeding males are reared in the same flocks during night time, while kept under extensive system during daytime. As far as vaccination was concerned, the reports differed from the present study. The differences might be due to availability of vaccines and vaccinators and cost of vaccines etc. Regarding ownership, most of the farmers kept goats because of less disease risk involvement and higher income. Women were also keeping goats. The findings of [6] partially matched with present findings, where they reported women as majority goat owners. Jaitner et al. [5] also showed similar results. They indicated that women played leading role in small ruminants' production especially in housing and feeding. A majority of women owned goats (67%) with lower average number of animals. Most of the breeding males were farm born in their respective flocks. Animals were left free in dry season and tethered or flocked in rainy season and housed during night. Supplements were not usually provided. Vaccination was partly carried out. These findings partly matched with present findings but it appeared that our goat production systems are much improved. Finan, [7] revealed the participation of women in goat keeping, which is also supporting present findings some extent. Udo et al. [8] found that keeping small animals was a secondary activity in rural household or essential source of income for the poor peoples. These animals serve to increase the income of the family. Dossa et al. [9] found that goats were kept for sale (cash requirement). The most important problems faced by the farmers were disease outbreak (mortality), poor housing and feed shortages. Bosman et al. [10] reported that cassava products and maize stalks were the most commonly used feeds in Nigeria. Such feeds did not show good growth of animals. They suggested change in amount and type of feed for optimum results. Ambruster and Peters, [11] reported that management, flock and season had significant effects on performance traits. Free roaming flocks performed better and showed positive influence of grazing and browsing. Kids born in rainy season had poor growth and showed need of improvement in flock health care. Kids' mortality was also quite high than that of adults.

According to Bett et al. [12] provision of marketing services were ranked first followed by veterinary services. Wilson, [13] reported unknown genetic potential, poor management, inadequate nutrition and minimal health care as major problems of livestock farming. Kosgey et al. [14] found that only 18% farmers kept goats for regular cash income, meat, manure, milk and sale in emergency. Regular cash and cash in emergency were the highest priorities. Income from sale was spent on school fees, purchase of food, farm investment, medication, off-farm investment, social activities and purchase of animals. These findings are in line with present findings. Zaibet et al. [15] identified flock size, which was larger than those found in the present study. It was natural that income generation is dependent of flock size. It increase with the increase of flock size. Kumbhaker, [16] reported home consumption of the own production and these findings also matched with the present findings. Most of the activities were performed by farmers themselves. Farmers were involved in purchasing animals' feed from local markets to substitute grazing activity. Hence there was increase in farmers' expenses to a great extent. Their findings contradicted present findings. It was found that goats were kept in small groups, while individual households housed their animals under shelters during nights. Purposes of raising goats were nearly similar everywhere. The main management system was free range during the day and pen system at night. According to Kirk, [17] small ruminants are easy to cash assets and they reduce market and climate risk and optimize the use of available resources [18]. The age and gender of the farmers are important factors when looking at livestock ownership. Study of [19] contradicted the present findings that small ruminants are not pooled household resources and are independently owned and managed by household members who were often females. The present findings contradicted the findings of [19] about the sex of owner of the farm. Most of the parameters to access to veterinary services differed from the findings of [20]. Decision making for selling or purchasing of animals was mostly done by the households, matched with the findings of [21].

Present findings supported most of the findings of [5] regarding keeping of goats, size of flock, breeding males, production and housing system. Flock sizes and reason for keeping goats partially matched with their findings. Household heads, their sex, animals' ownership and types of production systems adopted also matched with the present findings. Our results supported the results of [19] regarding ownership pattern, reasons for keeping goat, breeding practices. Reasons for keeping goats were not in line with present findings. Flock size as found in our study was similar to the findings of [22], while results breeding management did not match. Purpose of keeping goats slightly matched, but findings about production systems were not similar to the present findings.

5. CONCLUSIONS

It is concluded that practice of rearing the goats is more common in district Shaheed Benazirabad compared to Sanghar. In both districts majority of the households were found to use semi intensive housing system. Farmers of Shaheed Benazirabad district were found more sound about health care, proper feeding practices, livestock farm maintenance and all other husbandry practices compared to farmers of Sanghar.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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