Study of Traditional Husbandry Practices of Desert Goats (Capra Hircus) in Selected Localities in South Darfur State, Sudan

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Abstract

The present study aimed to profile the status quo of traditional desert goat husbandry practices through an extensive questionnaire in three localities (Belail, Edelfirsan, and Nittaega) in South Darfur State. The experiment was conducted in South Darfur State at the University of Nyala Faculty of Veterinary Science Farm, located about 10 km south of Nyala town in the Mosey area, during the period extending from (month when did you start) 2014 to May 2016. The data were analyzed using the Statistical Package for the Social Sciences (SPSS version 11.5). The Chi-Square Test was used to analyze the questionnaire data; the values were expressed as percentages with their standard errors, and the results were considered significantly different at P < 0.05. The survey results indicated that the main goals of keeping goats were to ensure against financial problems and provide milk for family consumption and sale. The majority of the owners depended on hay feeding, and only 5% of the owners fed concentrates to lactating and pregnant goats. The results showed that the lactation yield was 75.88 ± 28.86 kg, the lactation length was 98.51 ± 18.13 days, the average daily yield was 0.74 ± 0.28 kg, the peak yield was 1.14 ± 0.70 kg, the dry period was 67.05 ± 26.87 days, and the weaning age was 7.05 ± 1.63 months under the traditional management system. The survey also revealed that the main constraints facing goat raising were disease prevalence (pneumonia 61.5%, sheep pox 0.8%, internal parasites 0.8%, and external parasites 1.5%), lack of capital (26.2%), poor pasture (22.3%), shortage of labor (21.5%), and lack of security (1.5%). The study concluded with recommendations for the establishment of clinical centers and mobile clinics in all localities to prevent and control diseases that directly affect goats' productivity. Additionally, it emphasized the importance of protecting owners from purchasing drugs randomly from suppliers without medical prescriptions. The study also recommended utilizing the diversity of grazing plants in South Darfur State to improve both the quality and quantity of range pastures, as well as adopting supplementary feeding programs to enhance the productivity of Sudan Desert goats..

Keywords: *Traditional practices, desert goats, South Darfur, Sudan.*

1. INTRODUCTION

1.1. Background

Livestock is a vital sub-sector of agriculture, with a significant portion of the global population directly or indirectly dependent on farming and animal husbandry for their livelihoods. In many developing countries, it plays a central role in the rural economy, serving as a primary source of income and food security for millions of landless and low-income individuals (Boyazoglu et al., 2005; Qureshi, 2010; Sodiq et al., 2002). Among livestock species, goats are particularly important to traditional pastoralists and small-scale farmers due to their adaptability, low maintenance requirements, and ability to thrive in diverse climatic and ecological conditions. They are a key source of animal protein and serve as a source of income for smallholders around the world (Alabi et al., 2019). Goats are mainly raised for meat and milk, and also provide valuable by-products such as hair, skins, and manure (FAOSTAT, 2011; Macha & Mbaga, 2009; Kioumaris et al., 2011).

In Sudan, goats represent a significant portion of the national livestock sector. The goat population is estimated at around 32.8 million heads, making Sudan one of the top three African countries in total livestock numbers. As of 2023, the country's total livestock population was approximately 111.8 million, comprising 41.4

million sheep, 32.8 million goats, 32.7 million cattle, and 5 million camels. Goats are especially prevalent in tropical and arid regions, where they often outnumber other domestic animals and form an integral part of sustainable farming systems. Sudan's goat population consists mainly of four indigenous breeds—Nubian, Desert, Nilotic, and Taggar—spread across diverse ecological zones. These are predominantly raised under traditional pastoral systems, which account for over 90% of livestock management practices in the country. Among these breeds, the Desert goat is particularly valued for its high carcass weight and dressing percentage, due to its larger body structure (El-Khidir et al., 1998). Goats contribute significantly to the national economy and rural livelihoods through four main pillars: poverty alleviation, food security, environmental preservation, and gender equality (R Trevor Wilson, 2018).

In addition to meat and milk production, goats in Sudan also support landscape conservation, nutritional security, and income generation, especially in arid and semi-arid regions where other livestock species are less resilient (Devendra, 1992; 2001).

1.2. Problem Statement

Despite the vital role of goats—particularly Desert goats—in supporting rural livelihoods in South Darfur and other regions, there is limited scientific documentation on the traditional husbandry practices used in their management. This knowledge gap limits efforts to enhance productivity, animal welfare, and the overall economic viability of goat production in arid zones.

1.3. Hypothesis

Traditional husbandry practices in South Darfur significantly influence the productivity and sustainability of Desert goat populations in the region.

1.4. Objectives

1.4.1. General Objective

To evaluate traditional husbandry practices and their impact on the productivity of Desert goats in selected localities of South Darfur State.

1.4.2. Specific Objectives

- To document the current traditional management practices used by goat herders in the study area.
- To identify key constraints and challenges affecting Desert goat production in traditional systems.

- To assess the influence of these husbandry practices on goat health, growth, and productivity.
- To recommend appropriate interventions for improving goat production under traditional systems in arid and semi-arid regions.

2. MATERIALS AND METHODS

2.1. Area of study

The experiment was conducted in South Darfur State at the Faculty of Veterinary Science Farm, located south of Nyala town, Mosey area, about 10 Km. The region is a flatland sloping from the West to the East, where the rain collects in a few water reservoirs. The soil is sandy (Goze) with clay vertisol.

2.2. Climate

Rainfall in Darfur is influenced by the seasonal movement of the Intertropical Convergence Zone (ITCZ) and the northward movement of the southwest monsoon. The Jebel Marra massif significantly affects local weather, impacting temperature, clouds, and rainfall. The rainy season begins in April with sporadic showers, intensifying in June, followed by the main rains in July and August, and tapering off in September. However, rainfall, predictability, and the duration of the rainy season decrease as you move north, with a corresponding increase in average annual temperature. In North and South Darfur, temperatures remain high year-round (e.g., Nyala's mean annual temperature is 27.3°C), except during the short cool period (Darat) from January to February and a drop in temperature during the peak of the rains in August (El Moulah, 1993).

2.3. Vegetation

South Darfur's vegetation is part of the savannah region and can be categorized into ecological zones based on climate and botanical features (El Hassan, 2005). Andrews (1948) described it as an Acacia tall grass forest with annual rainfall of 21"-40" (1" = 25.4 mm). Dominant trees and shrubs include Balanites aegyptiaca, Acacia nubia, Sclerocarya birrea, Boscia senegalensis, Hyphaene thebaica, Albizia amara, Tamarindus indica, Acacia Senegal, Bauhinia rufescens, Combretum cordofanum, Diospyros mespiliformis, Ximenia americana, Prosopis Africana, and Gardenia lutea. Dominant grasses and herbs include Aristida funiculata, Blepharis linariifolia, Ipomoea hispida, and Asteracantha longifolia (El Hassan, 2005).

2.4. Questionnaire

The questionnaire covered three localities, Beleil, Nittaega, and Edelfirsan, located south, North, and West of Nyala town, respectively. The questionnaire was designed to give data about how the breeders practice and handle their animals on their farms and whether the breeding information is correct or not through many questions that include goals from breeding goats, feeding, productive performance, reproductive performance, constraints, prevalence of diseases, and sources of veterinary service (Appendix 1, questionnaire).

2.5. Statistical analysis

For the questionnaire data, the Statistical Package for Social Sciences (SPSS, ver. 11.5) was used, and the Chi-square test was applied. The results were expressed as percentages.

3. RESULTS

3.1. Objectives from breeding animals

The main objectives for breeding animals in the study area are shown in Table 1. In the Belail locality, 82.4% of owners breed animals for insurance against financial problems, 15.8% for milk for home consumption, 1.8% for income from selling animals, and 0.0% for income from milk sales. In Edelfirsan, 52.2% breed for milk consumption, 43.5% for financial insurance, 4.3% for income from selling animals, and 0.0% for milk sales. In Nittaega, 72% breed for insurance, 20% for selling animals, 6.0% for milk consumption, and 2.0% for milk sales. Overall, 71.5% breed for insurance, 18.5% for milk consumption, 9.2% for selling animals, and 0.8% for milk sales. The primary objective for breeding goats is financial insurance, followed by milk for home consumption, income from selling animals, and income from milk sales.

Table 1. *Main objectives from breeding animals in the study area*

Objectives	Localities			Total
	Belail	Edelfirsan	Nittaega	
Income from milk sales	0.0	0.0	01	01
	(0.0%)	(0.0%)	(100%)	(100%)
Home consumption	09	12	03	24
	(37.5%)	(50.0%)	(12.5%)	(100%)
Income from the sale of animals	01	01	10	12
	(8.3%)	(8.3%)	(83.3%)	(100%)
Insurance against financial problems	47	10	36	93
	(50.5%)	(10.8%)	(38.7%)	(100%)
Total	57	23	50	130
	(43.8%)	(17.7%)	(38.5%)	(100%)

3.2. Feeding

3.2.1. Hay supplementation

The data in Table 2 show the percentage of animal owners feeding hay in the study area.

The results indicate that 98.2% of owners in Belail, 100% in Edelfirsan, and 76% in Nittaega feed their animals hay.

Overall, 90% of owners feed hay to their animals, while 10% do not.

Table 2. *Owners feed their animals hay in the study area*

Locality	Owners who feed their animals	Owners who do not feed their animals	Total
Belail	56	01	57
	(98.2%)	(1.8%)	(100%)
Edelfirsan	23	0.0	23
	(100%)	(0.0%)	(100%)
Nittaega	38	12	50
	(76.0%)	(24%)	(100%)
Total	117	13	130
	(90.0%)	(10%)	(100%)

3.3. Concentrate Supplementation

Table 3) illustrates the percentage of owners supplementing concentrates for different animal groups in the study area. In Belail, the percentages were 36.8% for all animals, 1.8% for milking dogs, 0.0% for old animals, 5.3% for

pregnant does, and 56.1% for non-fed animals. In Edelfirsan, none of the owners supplemented concentrates for any animal group, while 100% did not supplement non-fed animals. In Nittaega, the percentages were 48% for all animals, 10% for milking does, 2% for old animals, 4% for pregnant does, and 36% for non-fed animals. Overall, 34.6% of owners supplemented concentrates for all animals, 4.6% for milking does, and 0.8% for old animals, 3.8% for pregnant does, and 56.2% did not feed concentrates to any animals.

3.4. Productive and reproductive performance

The data depicted in Table 4 shows the survey results of the productive traits performance of Sudan desert goats in the study area. The mean values of lactation yield, lactation length, average daily yield, peak yield, and drying period were 75.88 ± 28.86 kg, 98.51 ± 18.13 days, 0.74 ± 0.28 kg, 1.14 ± 0.70 kg, and 67.05 ± 26.87 days, respectively.

3.5. Constraints Affecting Goat Production in the area of the study

Table 5 shows the key constraints affecting goat production in the study area: capital, diseases, labor, lack of pasture, and security. In Belail, the percentages were 26.3% for capital, 38.8% for diseases, 33.3% for labor, 0.0% for lack of pasture, and 1.8% for security. In Edelfirsan, the percentages were 13% for capital, 17.4% for diseases, 0.0% for labor, 69.6% for lack of pasture, and 0.0% for security. In Nittaega, the percentages were 32% for capital, 22% for diseases, 18% for labor, 26% for lack of pasture, and 2% for security.

Overall, the constraints were 26.2% for capital, 28.5% for diseases, 21.5% for labor, 22.3% for lack of pasture, and 1.5% for security.

The results show minor differences in the constraints, with security having the least impact on production.

Table 3. *Concentrate supplementation for different groups of animals in the study area*

Locality	All animals	Milking does	Old animals	Pregnant does	Non fed	Total
Belail	21	01	0.0	03	32	57
	(36.8%)	(1.8%)	(0.0%)	(5.3%)	(56.1%)	(100%)
Edelfirsan	0.0	0.0	0.0	0.0	23	23
	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(100%)	(100%)
Nittaega	24	05	01	02	18	50
	(48.0%)	(10.0%)	(2.0%)	(4.0%)	(36.0%)	(100%)
Total	45	06	01	05	73	130
	(34.6%)	(4.6%)	(0.8%)	(3.8%)	(56.2%)	(100%)

Table 4. *Overall survey result of productive and reproductive performance of Sudan desert goats in the study area*

Parameter	Mean ± SD	Minimum	Maximum
Lactation yield/kg	75.88 ± 28.86	20.4	102
Lactation length/day	98.51 ± 18.13	60	120
Average daily yield/kg	0.74 ± 0.28	0.2	1.0
Peak yield/kg	1.14 ± 0.70	0.5	3.0
Drying period/day	67.05 ± 26.87	30	120
Weaning age of kids/month	7.05 ± 1.63	3	12
Age at sexual maturity/month	7.94 ± 2.20	4	18
Kidding interval/month	11.94 ± 0.78	9	15
Total annual births / 100 does	137.85 ± 18.76	90	180

Table 5. *Important constraints affecting goat production in the study area*

Locality	Capital	Disease	Laborer	Lack of pasture	Security	Total
Belail	15	22	19	0.0	01	57
	(26.3%)	(38.6%)	(33.3%)	(0.0%)	(1.8%)	(100%)
Edelfirsan	03	04	0.0	16	0.0	23
	(13.0%)	(17.4%)	(0.0%)	(69.6%)	(0.0%)	(100%)
Nittaega	16	11	09	13	01	50
	(32.0%)	(22.0%)	(18.0%)	(26.0%)	(2.0%)	(100%)
Total	34	37	28	29	02	130
	(26.2%)	(28.5%)	(21.5%)	(22.3%)	(1.5%)	(100%)

3.5.1. Prevalence of Diseases

The data in Table 6 depict the prevalence of diseases affecting goat production in the Belail, Edelfirsan, and Nittaega localities. The percentage of owners whose animals were infected by pneumonia, sheep pox, internal parasites, external parasites, and non-infected animals in the Belail locality was 71.9%, 0.0%, 0.0%, 1.8%, and 26.3%, respectively. In Edelfirsan locality, the percentages were 56.5%, 0.0%, 0.0%, 0.0%, and 43.5%, respectively, while in Nittaega locality, the percentages were 52%, 2.0%, 4.0%, 0.0%, and 42%, respectively. The overall percentages of owners whose animals were infected by pneumonia, sheep pox, tick diseases, worm diseases, and non-infected animals across all localities were 61.5%, 0.8%, 1.5%, 0.8%, and 35.4%, respectively.

3.6. Source of veterinary services

The data on the different sources of veterinary services are presented in Table 7. The percentage of owners who received veterinary services from drug suppliers, the government, and private veterinary services in the Belail locality was 98.2%, 0.0%, and 1.8%, respectively. In Edelfirsan locality, the percentages were 100%, 0.0%, and 0.0%, respectively, while in Nittaega locality, the percentages were 66%, 0.2%, and 32%, respectively. The main sources of veterinary services for breeders are drug suppliers, private services, and the government. The overall results indicated that the percentage of owners who received veterinary services from drug suppliers, the government, and private veterinary services across all localities was 86.2%, 0.8%, and 13.1%, respectively.

Table 6. *Prevalence of diseases in the study area*

Locality	Pneumonia	Sheep pox	Internal parasites	External parasites	Healthy	Total
Belail	41	0.0	0.0	1.0	15	57
	(71.9%)	(0.0%)	(0.0%)	(1.8%)	(26.3%)	(100%)
Edelfirsan	13	0.0	0.0	0.0	10	23
	(56.5%)	(0.0%)	(0.0%)	(0.0%)	(43.5%)	(100%)
Nittaega	26	1.0	2.0	0.0	21	50
	(52%)	(2.0%)	(4.0%)	(0.0%)	(42%)	(100%)
Total	80	1.0	2.0	1.0	46	130
	(61.5%)	(0.8%)	(1.5%)	(0.8%)	(35.4%)	(100%)

Table 7. *Main sources of veterinary services in the study area*

Locality	Drug suppliers	Government	Private	Total
Belail	56	0.0	01	57
	(98.2%)	(0.0%)	(1.8%)	(100%)
Edelfirsan	23	0.0	0.0	23
	(100%)	(0.0%)	(0.0%)	(100%)
Nittaega	33	01	16	50
	(66%)	(2.0%)	(32.0%)	(100%)
Total	112	01	17	130
	(86.2%)	(0.8%)	(13.1%)	(100%)

4. DISCUSSION

4.1. Productive and reproductive performance of the questionnaire:

The data depicted in Table 4 shows the survey results of the productive and reproductive traits performance of Sudan desert goats in the study area. The mean values of lactation yield, lactation length, average daily yield, peak yield, and drying period were 75.88 ± 28.86 kg, 98.51 ± 18.13 days, 0.74 ± 0.28 kg, 1.14 ± 0.70 kg, and 67.05 ± 26.87 days, respectively. These results are in disagreement with Bedhane et al. (2012), who reported 209 g of daily milk yield, 86 days

of lactation length, and 18 kg of lactation milk yield for Arsi-Bale goats under station management. The mean values of the age at sexual maturity, weaning age of kids, kidding interval, and the total annual births/100 were 7.94 ± 2.20 months, 7.05 ± 1.63 months, 11.94 ± .78 months, and 137.85 ± 18.76, respectively. The average age at first service (7.94 ± 2.20) obtained from survey results is within the range of maturity age reported for most of the tropical goat breeds under traditional management systems (Wilson, 1991; FARM-Africa, 1996). The average weaning age (7.05 ± 1.63 months) is very late compared to different studies that

weaned early at 3 and 6 months, and this may be due to the harsh environment and the level of nutrition and their effect on the growth rate of the animals. The mean results of the kidding interval (11.94 ± .78) were compatible with those reported by Belay (2008), who found that the average kidding interval of Abergele and Central Highland goats was 11.31 ± 2.21 and 10.3 ±1.42 months, respectively. The total annual births/100 were 137.85 ± 18.76, and this indicated that most of the births were single and twins.

5. CONCLUSION AND RECOMMENDATION

This study highlights the critical need to establish clinical centers and mobile veterinary clinics across the localities of South Darfur to effectively prevent and control diseases affecting goat productivity. Such initiatives would not only improve the health and welfare of the animals but also safeguard livestock owners from the risks associated with self-prescribing or purchasing veterinary drugs without professional guidance. Implementing this recommendation would promote a more sustainable, efficient, and well-regulated approach to goat management in the region.

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