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Camel herder perceptions towards rangeland utilization at semi-arid areas in the Sudan

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Keywords: Camel Herders, Livestock Production System, Rangeland Utilization.

Abstract

A study was conducted in a semi-arid area in North Darfur State, Sudan, to investigate camel herders' perceptions on rangeland utilization and the main factors affecting pastoralists and pasture. Fifty individuals were interviewed using a structured questionnaire. Herders, who were either nomadic, transhumant, or sedentary, were selected randomly for interviews at home or at markets. Those who declined to cooperate were replaced. Data were analyzed using SPSS, with a T-test estimating differences between means. The results indicated that 86% of respondents were males aged 21-60 years, with 80% not attending secondary school. The study revealed that 46% of interviewees were transhumant, 46% nomads, and 8% sedentary. Sources of income were livestock (84%), agriculture (14%), and trade (2%). Animals raised were camels, sheep, cattle, and goats, using rangeland primarily during the rainy season. Camels were offered sodium chloride in the wet season at 0.45 kg three times a week and sodium bicarbonate in the dry season at 0.23 kg once a week. Sheep received 0.11 kg of sodium chloride twice a week and 0.11 kg of sodium bicarbonate once a week. Cattle were given 0.23 kg of sodium chloride three times a week and 0.23 kg of sodium bicarbonate once a week. Goats were offered 0.11 kg of sodium chloride daily. Some 92% of respondents recognized threats to rangelands namely decreased rainfall (44%), overgrazing (34%) and desert creep, and soil erosion (14%) while 8% perceived no problem. About 90% of respondents blamed nomads for damaging grazing through seasonal fires and early grazing. Shifting cultivation and climate change were also reported. Some 75% of respondents market animals when 1-3 years old increasing pressure on the range. Appropriate management of the range requires reseeding, organizing seasonal movements of pastoralist groups, and enforcing laws.

Introduction

Sudan camel herd is estimated at about 4.9 million. and play an important role in the livelihoods of pastoralists in arid and semi-arid areas of Sudan (Ali et al., 2017). Camels in the Darfur region are commonly raised under nomadic conditions. The annual migrations of nomads vary from year to year to exploit the seasonally abundant forage depending on the amount of rainfall (Abu Sin 1990). Pastoralists have invaluable Indigenous knowledge regarding the environmental changes and vegetation characteristics reflected in how they manage rangeland (Abdalla and Samat 2012). Camel pastoralists in Sudan rely on camels for food, transportation, earning cash,

entertainment, and tent manufacturing. Water scarcity in these areas adversely impact camel rearing forcing them to travel for long distances to feed on the sparse desert shrubs. Long-distance walking leads to emaciation, skinniness, and reduced meat and milk production. Camels are classified as browser-grazer species. Arid and semi-arid zones are characterized by limited amounts and scant distribution of trees and shrubs which are shared with other browser animals in the range such as goats and deer (Mansoor et al. 2016). This study investigates the perceptions of pastoralists on rangeland utilization and the main factors affecting pastoralists and pastures in the study area.

Materials and methods

Data collection: A structured questionnaire which contained closed and open-ended questions was developed to enlist the responses of camel herders on their perceptions on range management and vegetation characteristics. fifty questionnaires were distributed to multiple subjects of the study sample in different localities. Because the nomads were mostly lower education level and illiterate, they were directly interviewed and all questionnaires were filled perfectly (recovery rate of 100%). The data were analyzed using (SPSS.20). A t-test was used to estimate the significance of differences between means**.**

Results and discussion

1. Personal characteristics: All herder respondents in this study were males because the management of camels needed protection and care and that entails roaming to far places, so it is a task assumed by male members of a household. The results in Table 1 indicated that 86% of the respondents were in the age range of 21-40 and 41-60 years. Differences in age groups involved in camel rearing are highly significant (P<0.000). Thus, camel rearing absorbs the most active individuals in the community since it is a tedious job. Therefore, men less than 20 or more than 60 years of age are rarely associated with camel rearing. Highly significant differences (P<0.000) in the education level of pastoralists were also found (Table 2). About 60% of interviewees had education at the Khalwa (Religious school) and primary school level, 30% had intermediate and secondary school education, 4% had a university education and 6% were illiterate. with this result in mind, perhaps it is difficult to apply pastoral extension systems because the Awareness level is an important factor concerning extension activities required to promote technologies that can contribute to improving the livelihoods of camel producers.

Table (1) Distribution of respondents according to age groups (Years)

Age group	Number	Percent
Less than 20	5	10
21– 40	23	46
41 – 60	20	40
More than 60	2	4
Total	50	100
DF	---	2.3
Sig	---	***

***Significant at 0.000 level

Table 2: Distribution of respondents according to education level

Education level	Number	Percent
Illiterate	3	6
Khalwa	17	34
Primary	13	26
Intermediate	7	14
Secondary	8	16
University	2	4
Total	50	100
DF	---	3
Sig	---	***

***Significant at 0.000 level

2. Pattern of utilization of pasture

The results indicated that 92% of the respondents belong to transhumant and nomadic systems while only 8% are sedentary. This agrees with (Abu sin, 1990) whose findings show that camels are commonly rose under a nomadic system in the study area (Darfur region). According to interviewees, the range in previous years was better than nowadays due to the better quality of plant species (42%) and an abundance of plant species (34%). In addition to the limited agricultural areas, small numbers of livestock, and insignificant harmful activities such as tree felling were reported by 12%, 8%, and 4% respectively as reasons for poorer range nowadays. Since camel herders almost completely depend on grazing as their main source of livelihood, rangeland quality is an important factor to consider. Tilahun et al. (2016) found that the traditional pastoral systems are environment-friendly compared to interventions to improve rangeland which, in turn, puts the range under severe pressure.

3. Main types of animals raised by pastoralists

A large number of pastoralists keep sheep and camels and only a few also raise goats and cattle as shown in Figure 1. Moreover, all respondents sold some of their animals to obtain money. Animals sold were mostly males between the age of 1-2 years as reported by 54% of respondents. Moreover, only 14% of respondents stated that they sell animals before they are one year old, while 20% sell at the age of 2-3 years and 12% at more than 3 years of age. This is an area for extension to convince pastoralists to sell animals at an earlier age as this reduces pressure on the range and avails markets with more tender meat.

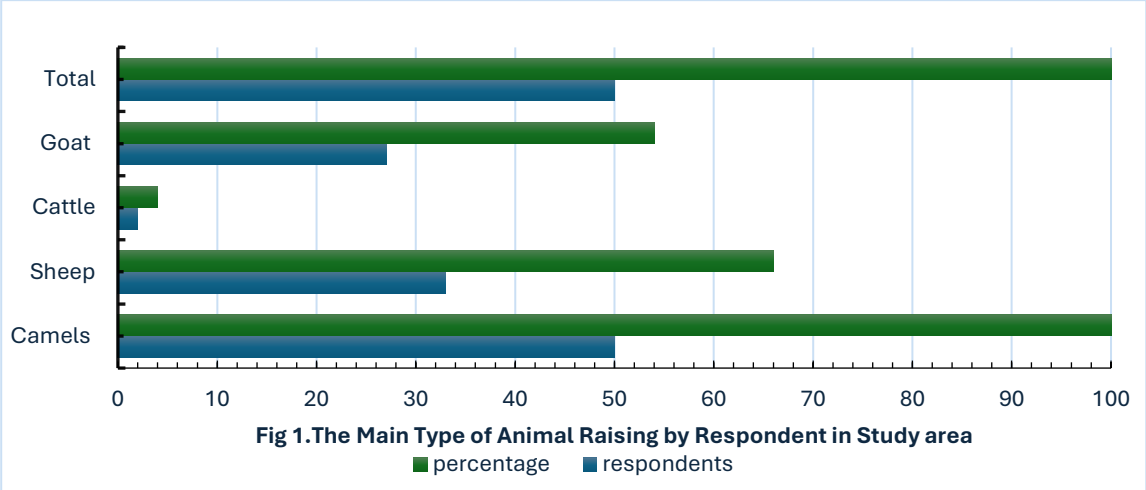

Fig 1.The Main Type of Animal Raising by Respondent in Study area

4. Common problems related to the use of pasture.

According to 92% of the respondents, there was deterioration in the pasture due to various reasons mainly a decrease in rainfall (44%), overgrazing 34% and desert creep and soil erosion (14%). Only 8% of respondents reported that there was no deterioration in the range. These results are in line with several studies that determined the factors causing rangeland deterioration. Amole et al. (2022) reported that the limited availability of forage in terms of quality and quantity in sub-Saharan Africa represented the main factor affecting livestock productivity, often rangeland deterioration is caused by the causes mentioned previously, in a study conducted by (Fenetahun & Yong-dong, 2018) which reported that absence of grazing management, extensive removing the plants for fuel wood, and unclear ownership authority of the rangeland, affect plant abundance, biomass productivity.

Conclusion

Camel herders possess considerable indigenous knowledge of their pastoral systems and they are good range managers. Besides its contribution in rangeland degradation, there are some advantages to the nomadic system such as providing higher quality forage through the seasonal movement and allowing rest periods for the plants to complete their growth cycle. However, the nomadic lifestyle has undesirable effects on pastoralists' education as seen in their education levels.

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