



Original Article

Range Component at Two Rainy Season Camping Areas (Comparison Study)

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ABSTRACT

This study was conducted in two camping areas; open areas (*Mogshasha-Sheikan* and *Abulgor-Rahad*) and a protected rangeland (*Alnabagaya-Sheikan*) in North Kordofan State from March, 2010 to December, 2011. The objective of the study was to investigate the impact of rainy season camping on range resources attributes. Data was collected using a questionnaire. Results from questionnaires data confirmed that rangelands around rainy season camps were continuously used throughout the year. As indicated by (79.6%) of the respondents. Because those rangelands were communally used, no one claimed responsibility for management, rehabilitation or development of the degraded areas. Protected areas were grazed in organized pattern and protection, management, rehabilitation and development was clearly defined.

Keywords: Range components, Camping Areas, North Kordofan State.

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INTRODUCTION

Rangelands are important resources in Africa, North and South America, Asia, Australia and many parts of Europe. Rangelands effectively contribute to the economic well being of rural communities, and natural wildlife diversity (Maxwell, 1991). The traditional grazing of livestock, mainly cattle and sheep, is generally acceptable to the public if properly applied, using sound principles of range management. It produces food and fiber for people uses and enjoyment and contributes to the economy (Tixer, 1991).

Rangeland the habitat for wildlife as well as livestock with competition for forage and space existing to varying degrees when large herbivores are involved (Tixer, 1991). Hunters and anglers, hikers, backpackers, equestrians, of road-vehicle users and many others also enjoy the out-off-doors use of rangelands both public and private, just as used forests range are important as and usually more accessible than those more popular areas (Tixer, 1991).

Food products from forested range are important economically, also removal of posts, poles and fuel woods can stimulate forage growth for livestock and wildlife, and opening made by timber harvest benefit grazing and browsing as well. Most range managers agreed that the most important use for rangeland is healthy productive watershed. Rangeland, including important use of riparian areas, produces valuable high quality water in large volumes. The key is good range management and coordination of use (Tixer, 1991).

North Kordofan state is rich in rangeland resources. However, grazing rangeland system is communal and over grazing around autumn camping areas, especially before the time of seed production. Another feature of continuous grazing during the rainy season is over utilization and removal of palatable species leaving the less palatable species to dominate the area. The biomass production and carrying capacity has declined and sustainable livestock production has become difficult since the natural grazing at plant maturity and production of the seeds is low and of poor quality. North Kordofan lies in the fragile environment that is rapidly deteriorating due to improper utilization of plant resource. Autumn camping areas are exposed to frequent grazing by pastoralist from South Kordofan as well and this put more pressure on the range resource. This work aims to investigate the impact of over grazing on range components and attributes especial at rainy season.

MATERIALS AND METHODS

The Study Area

North Kordofan State lays between latitudes 11°: 20' to 16 °:36' N and longitudes 27°: 13' to 32°: 24' E and area occupies that amounts to almost 25 million ha. Out of this area, 14.5 million hectares are rangeland (AFRICOVER, 2004). The state is considered among the leading regions of Sudan in terms of animal and range resources, where more than million heads of sheep, goats, camels and cattle are raised (RPA, 2005). Animal production in the state is mainly practiced under traditional extensive systems, depending on natural rangeland (Cook and Fadlalla, 1993). The average monthly temperature according to Nimer (2000) was 34.60 C, and the coldest months were December and January with mean temperatures of 14.10 C and 13.5 0C, respectively. The hottest months were April, May and June with an average mean temperature exceeding 40 C. The soil of the site lies within the sand dune area locally known as "Goz" soil, these soils are inherently poor, but their high permeability and easy penetration of roots, compensate for their inherent poverty.

Data Collection

A questionnaire was used to collect data from 60 herders who use resources in the area. They represent all stakeholders in the area. The sample taken was a stratified random sampling from the tow sites, Mogshasha (30 samples) and Abuelgor (30 samples).

Statistical Analysis

The data were analysed using Statistical Package for Social Sciences (SPSS) v.14.0 software package (SPSS, 1996).

RESULTS

Personal Characteristics of the Respondents

The personal characteristics of the respondents of the study on impact of continuous utilization of the range lands around rainy season livestock camping areas (Makharif) in North Kordofan are presented in table 1. The results have indicated that most respondents were illiterate (59.1%) and the proportion who have completed university education represented the smallest percentage (1.9%). It was also found that those who have completed the primary education represented (27.8%), compared to khlowa level of education that amounted to (5.6%), and that percentage was equal to secondary school level in the samples.

Most of the respondents were married (92.6%) and the percentage of these who were divorced represented (1.9%) though (5.6%) indicated being single.

The main occupation of the represents was breeding livestock (42.6%) and their proportion was slightly higher than those who were employed in agriculture by (40.7%) a small group reported working in trade (1.9%) and (3.7%) were government employees and Agro-pastoralists farming and keeping livestock, reported (11.1%).

Table 1: Characteristics of the respondents selected for data collection on impact of utilization on range condition in North Kordofan

Variables	Frequency	%
Educational levels		
Illiterate	32	59.3
Khlowa	3	5.6
Primary	15	27.8
Secondary	3	5.6
Above university	1	1.9
Marital status		
Married	50	92.6
Single	3	5.6
Divorced	1	1.9
Occupation		
Farmer	22	40.7
Breeder	23	42.6
Merchant	1	1.9
Government employee	2	3.7
Farmer and breeder	6	11.1

Range Resource Utilization

The Strategies followed in rangeland and range resource utilization by the respondents of the current study are presented in table 2. To overcome the problem of grazing scarcity, the respondents adopted a number of strategies. The majority (57.4%), of the producers usually move from places of scarce grazing to areas that have good potential whereas (11.1%) sought securing crop residues for their animals at time of feed scarcity and (7.4%) reported that they purchased fodder and rations.

The rangelands are usually grazing communally as indicated by (79.6%) of the respondents far from any government or technical supervision though government official supervised some areas and ensured proper use (3.7%).

Table 2: Strategies followed in Range Utilization in rainy season camping areas in North Kordofan

Variables	Frequency	%
Range shortage		
Move to other place	31	57.4
Purchase fodder	4	7.4
Use crop residues	2	3.7
Store crop residues	4	7.4
Crop residues synthesis	2	3.7
Move & store	6	11.1
Purchase & use residues	5	9.3
Methods of range utilization		
Communal range	43	79.6
Under local supervision	2	3.7
Under official supervision	2	3.7
Communal & under official supervision	7	13

Conflicts over Range Resource and Reasons in Camping Season

Parties involved in conflicts, over natural rangelands as reasons for those conflicts in rainy season camping areas as reported by respondents of this study is presented in table 3. Parties involved in conflicts are either farmer against nomads (50%), among nomadic group from different ethnicities or sometimes among farmers themselves.

Table 3: Involved in these Conflicts and Reasons in Camping Season (*Makharif*) in North Kordofan:

Variables	Frequency	%
Involved in these conflicts		
Among nomads	0	0
Between farmers and nomads	27	50
Nomads and government officials	0	0
Others	27	50
Reasons for the conflicts		
Narrow routes	1	3.6
Small sized rangelands	7	25
Water shortage	1	3.6
Animals getting into farms	3	10.7
Others (farmers getting into <i>makhraf</i>)	3	10.7
Small sized rangelands & water shortage	13	46.4

The reasons that initiate conflicts over the grazing resources are either feed scarcity and water shortage (46.4%) water shortage (3.6%) improper demarcation of the livestock routes (3.6%) disturbance of farms by livestock (10.7%) or parties involved in conflict over grazing resources are farmers, herders or local and governmental officials. When field crops are destroyed herders are always accused and held responsible and conflicts erupt among farmers and herders. Herders complained over using some rangelands for cultivation by farmers and considered that as means for taking rangelands and areas allotted for grazing and again that becomes source of conflicts between herders and farmers. Governmental and local traditional administrative bodies are believed to block some rangelands and farming areas when roads or any other national projects are set in the area without taking into consideration the needs of the farmers and herders. Hence conflicts are inevitable between government, public, herders and farmers together.

Herders come into conflicts among themselves when one group come into traditional grazing area of another group especially when they are from different tribal group or raising different species of livestock.

Rainy season Period and Water Resources

The rainy season camping areas are used by the nomadic groups only for a short period usually 2 months (83.3%) or 3 months (16.7%). After this period of time, camping places are used by the agropastorlists (farmers in villages) till start of the rainy season or by camel herders during their retreat to their permanent grazing areas in far north of the State (Table 4) Water is available from the natural reservoirs during the rainy season and from bore holes when those reservoirs dry up.

Table 4: period spent at rainy season and water resources in camping season in North Kordofan

Variables	Frequency	%
Period spent at rainy season		
Two months	45	83.3
Three months	9	16.7
Water resources for man & animals		
Rahad	7	13
Haffir	21	38
Underground water	17	32.3
Rahad & haffir	9	16.7

Animals are watered from different sources of water Hafirs and underground water. Collected water of the rainy surfaces run-off is perhaps the main water sources for animals during this period of the year as indicated by (38%) and (32.3%) of the respectively. Other less important sources were boreholes, wells and rahad -natural water reservoirs- (Table 5).

Management Practices of the Camping Season

The management practices followed in utilization of range resource around camping season in North Kordofan was shown to be short period continuous grazing during the growth stage of the range plants and without considering stocking density and stocking rates. The results on all those matters are presented in table (5).

Table 5: Management Practices of the Camping Season in North Kordofan

Variables	Frequency	%
The concept of rainy season camping place		
Grazing land for animal	15	27.8
Living place for nomads and families	13	24.1
Living place for families and their animals	26	48.1
The types of interventions applied		
Reseeding	11	20.4
Water harvesting	8	14.8
Extension	1	1.9
Women develop	5	9.3
Makhraf demarcation	5	9.3
All mentioned	24	44.4
Interventions followed in range rehabilitation		
Protection	6	11.1
Seeding	12	22.2
Water harvesting	6	11.1
Protection & seeding	8	14.8
Protection, seeding and water harvesting	15	27.8
Other (Haffir)	7	13

Table 6: Species relative frequency (%) in ten year before and now in North Kordofan

Latin name	Local name	Types of dominant plant			
		Before	%	Now	%
<i>Dactyloctenm aegyptiaum</i>	Abuasaba	31	18	6	5.5
<i>Ruellia patula</i>	Tagtaga	6	3.6	0	0
<i>Aristida pallida</i>	Gew	9	5.3	0	0
<i>Cenchrus biflorus</i>	Haskaneetkh	28	16.6	8	7.3
<i>Blepharis linarrifolia</i>	Beghail	17	10.1	0	0
<i>Tribulus torrestis</i>	Drisa	4	2.4	23	21.1
<i>Eragrostis termula</i>	Benu	26	15.4	0	0
<i>Echinochloa colonum</i>	Defra	26	15.4	7	6.4
<i>Amaranthus graecisans</i>	Lisan eltir	3	1.8	0	0
<i>Geigeria alata</i>	Gdgad	3	1.8	0	0
<i>Chloris prieurii</i>	Abumalih	7	4.1	5	4.6
<i>Chloris pilosa</i>	Afankhadim	0	0	5	4.6
<i>Cassia tora</i>	Kawal	0	0	33	30.3
<i>Indigofera spp</i>	Temralfar	0	0	5	4.6
<i>Cassia cena</i>	Senamka	0	0	2	1.8
<i>Indigofera stenophylla</i>	Herisha	0	0	3	2.8
<i>Crochorus olitorius</i>	Mulokhia	0	0	2	1.8
<i>Hyparrhenia spp.</i>	Umgir	5	3	1	0.9

Prior to classifying management practices followed, the interviewees were requested to explain what makharaf meant to them. The majority (48.1%) believed that makharaf is a place that nomadic families and their herds live and they assert land and resources ownership at those places even during their time of absence. Other reported that once nomads have used the camping place for any period of time, the sites become their home land even if they abandon livestock rising.

The nomads are aware that continuous use of the resource has led to the deterioration of the rangelands and interventions are needed for sustainable use. A package of interventions that combined reseeding, extension, water harvesting and enhancement of women participation was seen to be the best tools to sustain the resource use.

Interventions proposed for affective range rehabilitation, and conservation as perceived by the respondents included recognition of their ownership of the rangelands, training herders to better range management practices, prevention of any attempts to take over those areas for others proposes, reseeding, water harvesting and mechanisms for conflicts management and prevention.

Type of Dominants Plant Species

The dominant plant species reported by the respondent before ten years was as follows: the majority (18%), reported *Dactyloctenm aegyptium* (Abuasaba) followed by *Cenchrus biflorus* (Haskaneet-kheshin) (16.6%). While plants dominant now on the rangelands as reported by the respondents were *Cassia tora* (kawal) as reported by (30.3%) followed by *Tribulus terrestris* (drasa) as reported by 21.1% of the respondents (Table 6).

DISCUSSION

Impact of Personal Characteristics of the Respondents on Management, utilization and development of Rangeland

The personal characteristics of the selected sample of respondents of this study have shown that most of them were illiterate and mostly married and working in agriculture and livestock rising. The sedentary and semi-settled farmers also reported being livestock owners, hence were also interested in range utilization in the area. The nomadic nature of life of those livestock owners could not help in educating family members, so most of them were illiterate. This is in line with Shoka *et al.*, (2011) who reported that nomadic family members were mostly illiterate. The increasing population of farmers around rainy season camping areas resulted in the increase of agricultural areas at the expense of rangelands and this is in line with Harrington *et al.*, (1984) and Garcia, (1981) who reported that population growth was always the cause of expansion of agricultural land that increases at the rangelands.

Concerning land tenure system, the sedentary farmers believe that nomadic groups are outsiders and their stay is temporary and should not have the right for land ownership. That is in contrast to the belief of the nomadic group that they have land ownership right under the pretext of communal ownership of the land. The sedentary group support their argument by saying that the majority of the nomads usually move from places of scarce grazing to areas that have good potential whereas the farmers use crop residues for their animals at time of feed scarcity or purchased fodder and prepare rations.

The nomadic groups are seen as an infringement on the rainy season camping areas but they do not accept that. Instead, they consider those areas as their property. This is the reason why those areas are not well rehabilitated, monitored or developed. The communal use of rangelands with two different groups has created situation that development of natural resources difficult if not impossible, because the development of resources is especially rangelands require adoption of the ideas related to this first, and this only possible when there harmony within the community and its members share benefits.

Range Condition as Perceived by the Respondents

The respondents reported that dominant plant species before ten years were as *Dactyloctenm aegyptium* (Abuasaba) *Cenchrus biflorus* (Haskaneet-kheshin). Those species were palatable and decreased or disappeared to be replaced by less desirable or non-palatable species such as *Cassia tora* (kawal), *Tribulus terrestris* (drasa), *Cassia senna* or *Abutilon figarium*. The finds reported here are similar to Glallyn and Ebrahiem (2015) who reported that continuous grazing around water sources and other similar sites could lead to plant composition change.

CONCLUSIONS

Though the rainy season camping areas were selected by the nomads as their settlements due to their potentiality, continuous grazing and lack of good management, utilization and development as well as conflicts of the parties using the resource has lead to deterioration of the area. Protected area of Alnabagaya, showed good plant composition, higher forage biomass productivity, carrying capacity, vegetation cover and frequencies for palatable plants is the example of the possibility of improvement of the rangelands when good management and development means are applied.

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