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ABSTRACT

The study was conducted at EL Dilling locality rangeland at South Kordofan State during the years 2011 – 2013. The aim of this study was to assess the impact of open grazing system on socio – economic and environmental aspects. Secondary data was obtained from the documents of corporations related to the study. A Questionnaire was designed to collect primary information from the animal owners at the seasonal grazing land users. In addition to that, field observations and general survey were used to obtain primary data. The SPSS package (computer program) was applied to analyze the socio-economic data. The study showed that, many populations were affected by open grazing system, as results of degradation of rangeland, and there was high demand of rangeland resources. And these led to conflicts among stakeholders; in addition to that many local people abandoned the animal breeding due to low income, inefficiency production, and poor production system and rangeland degradation. The study also concluded that, the degradation of rangeland in Dilling locality is the most serious problem that facing rangeland productivity. Also the results showed that, the income of local people depends mainly on the quantity and quality of the rangeland.

Key words: Conflicts, Open grazing system, Deterioration, Rangeland, Socio-economic aspect

1. INTRODUCTION

The importance of range is to provide human population with reasonable animal production. In Last few years range land estimated by 16% of world food production compared to 77% for cropland (Holechek, 2004). Today range land all over the world is subjected to intensive use due to increasing animal and human population, ecological change, and increase in human demands

and over economical activities. These factors cause severe rangeland deterioration (Abdalla, 2008). In Sudan, the flexibility of animal movement is progressively hampered by increased population pressure and loss of corridors between wet and dry season grazing areas. Most of the rural areas of the Sudan are dominated by a population of pastoralists and agro-pastoralists who are totally dependent on land and its natural resources for support their livelihood (UNDP, 2006: Ahmed,. and Abu Sabah, 1993).South Kordofan region provides an example of increase in natural resources competition and local conflicts that result from the combination of rangeland degradation and agricultural expansion in wet seasonal grazing areas (Dilling locality). . Livestock rising in South Kordofan practiced two systems. The first one is the village – based adapted by the settled communities whereby livestock is kept throughout the year grazing near settlements. The second type is an open range seasonal grazing system followed by nomads and semi- nomads, and livestock is driven to distant rangeland. The nomads are increasingly responding in large by changing the nomadic way of life, through sedentraization in large areas in Dilling locality. The concentrations of people raise some problems like rangeland environment degradation in northern parts in particular that concentration resulted by an insecurity situation in southern parts. Therefore, the traditional open grazing system implies excessive pressure on rangeland by animals and expansions of marginal farming, which accelerate environmental degradation, (Abdullah.1982 and Zaroug, 2006). Over a thousand years grazing has been one of the major land use activities in Southern Kordofan, and continue to remain and important use. According to (Elhassan, 2007and UNDP, 2006) the civil war, inter-tribal frictions and militia fighting in the Southern parts have resulted in a state of insecurity which in turn has created new pressures on livestock movement between seasonal pastures. Of particular importance are the stock routes (Maraheel) which are recognized corridors for animal movements through farmed areas between seasonal pastures. Conflicts along these routes have become common in El Dilling locality and they are generally triggered by increasing demand for cropland, expansion of mechanized agriculture, shortage of water points and land degradation. Rules, agreements, acts and resolution committees have been initiated for governing transhumance routes, but they remained ineffective due to lack of satisfactory involvement of farmers and herders. (UNDP, 2006). In the 1980, cattle herding pastoralists started penetrating deeper into northern parts of south Kordofan in search of water and grazing land for their livestock, due to the loss of their areas in southern parts an result of civil war. On the other hand, pastoralists in North Kordofan

have lost their grazing land due to frequent drought and expansion of rain-fed agriculture. The two groups migrated northward of Southern Kordofan. In Dilling locality the rangeland degradation was due to overuse by the two groups using an open grazing system in large areas. Moreover, the demand for natural resources increased as the result of population growth. These growth rates were indicative of large scale immigration due to environmental factors in northern Kordofan and the security situation in southern parts. In addition to the expansion of agricultural practices into areas that previously used as rangeland, the expansion of rain-fed agriculture into marginal areas historically used for grazing land has been the causes of rangeland environmental components degradation. The study aimed to find out the impacts of open grazing system on the social dimension, using a questionnaire to calculate a data about social economics problems after range land deterioration in Dilling locality.

2. RESEARCH METHDOLOGY

2.1 Study area

The study was conducted in EL Dilling locality rangeland at South Kordofan State which lies about 165km² South East ELobied town during the years 2011 – 2012. The area lies approximately between latitudes 29°:00- 32°:00East and longitudes10°:00- 12°:00North. It covers an area about135, 000 Km². The average elevation is 600m above sea level, (SKRDP-NKRDP, 2002). The climate of Dilling locality is semi- arid, the rainfall is about 300mms – 800mms, the temperatures range from 42C° to 24C° in May and 31C° to 13c° in January (IFAD,2006).

2.2 Methodology

Secondary data was obtained from the documents of corporations related to the study. These documents included reports, scientific papers, textbooks and handbooks.

Primary data: based on the following:

General survey: It was done in October and September in (2011). The primary objectives were to give a general background of the physical features of the study area, and population.

Field observations: This was made possible by covering large distance covered during the field survey. Observations covered various aspects of the area, e.g.: vegetation cover, topography, tracking routes, signs of environmental degradation, impacts of civil war and the living condition of rural people, in addition to their activities in rangeland.

To analyze and assess the social and economic dimension of open grazing system and its impact, descriptive statistical analysis had been used and Questionnaire was designed to collect information from the animal owners at the seasonal grazing land users, covering the following topics: conflicts for rangeland resources, the impacts of open grazing system on local population and the deterioration of rangeland. A total of 120 randomly selected respondents represented 6% of the total number of herders that used seasonal grazing land in the study area were asked about the current situations of their rangeland due to their current utilization. (According to animal union leader in Dilling locality), the socio- economic aspects data were analyzed using the SPSS package (computer program).

3. RESLUTS AND DISCUSSIONS

3.1 Impact of open grazing system on socio – economic aspect

Table (1) The impacts of open grazing system on local population

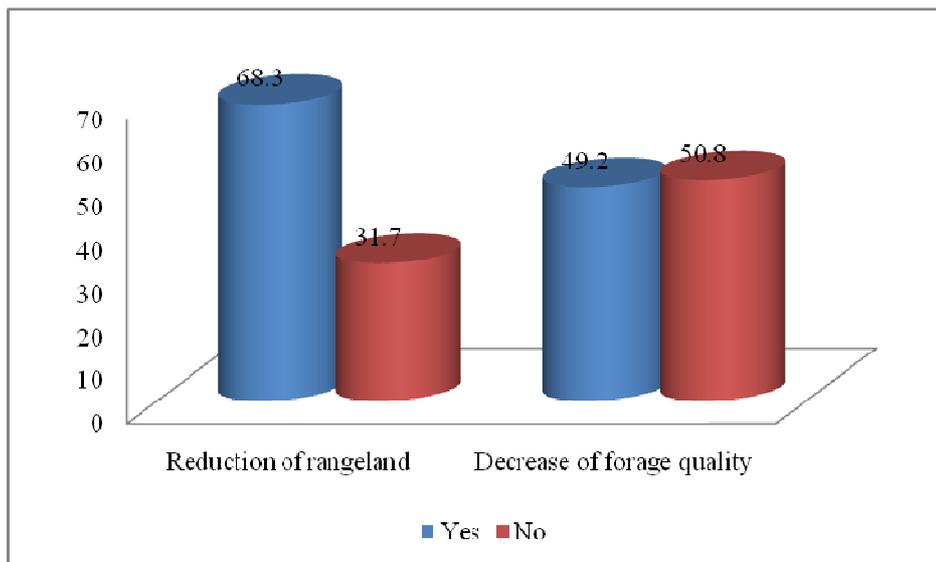
Answer	Frequency	%
Yes	82	68.3
No	38	31.7
Total	120	100

Sign = *** (Very high significant differences)

Table (2) The fluctuation in animal production

Answer	Frequency	%
Yes	94	78.3
No	26	21.7
Total	120	100

Sign = ***



Sign = ***

Sign = 0.855

Figure (1) The reasons of production fluctuation at Dilling locality

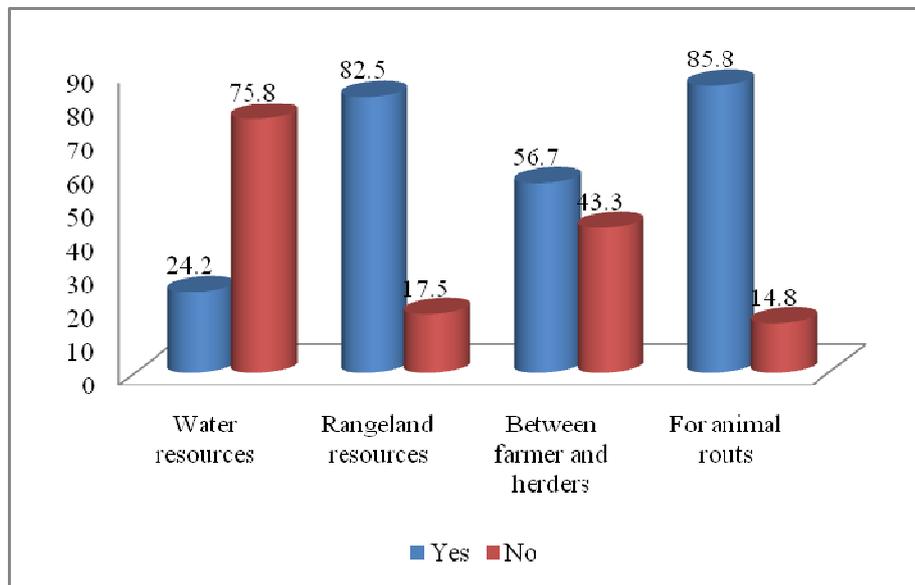
The results in table (1) showed that, there were very high significant differences among pastoralist respondents. (68.3%) mentioned that, many populations were affected by open grazing system. This may be due to degradation of rangeland, and high demand of rangeland resources, and these led to conflicts among stakeholders, hence, the most of local people abandoned the animal breeding may be due to low income, inefficiency production, and poor

production system and rangeland degradation. Results in table (2) indicated that, the majority of pastoralist's respondents (78.3%) said that, there were a fluctuation and reduction in animal productions. They attributed the reasons for the deterioration of rangeland (68.3%) and the decrease in forage quality (49.2%) figure (1). According to Holechek (2004) it's important to recognizing that 80% to 90% of the food energy consumed by nomadic Africa herders comes from animal's production.

Table (3) The conflicts in the rangeland

Answer	Frequency	%
Yes	80	66.7
No	40	33.3
Total	120	100

Sign = ***



Sign = ***

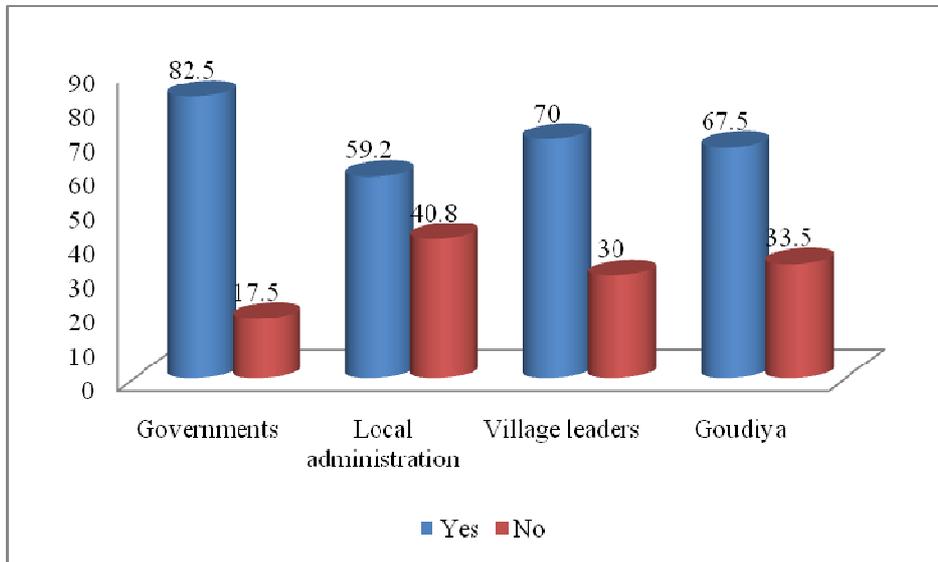
Sign = ***

Sign = 144

Sign = ***

Sign = 144 (No significant differences)

Figure (2) Forms of conflicts in rangeland



Sign = ***

Sign = **

Sign = ***

Sign = ***

Sign = ** (High significant differences)

Figure (3) The pastoralist solve their conflicts

Results in table (3) indicated that, the majority of respondents (66.7%) mentioned that, there were conflicts in rangelands, especially in dry season, while (33.3%) said the opposite. This may be due to extensive grazing practices in the area. Moreover, most of the respondents (82.5%) said that they have conflicts for rangeland resources, while (56.7%) said that there were conflicts between farmers and herders. Abdullah, (1982) reported that the access to grazing land, access to water points and rangelands are a serious source of conflict between different communities, in addition to breakdown of traditional system, in which regular inter-tribal conferences were held prior to the movement of nomadic communities from the north to the south, contributes in many conflicts.

The reason of spreading conflicts for rangeland resources may be attributing to rangeland deterioration in ¹Makharif. In addition to, the land use pattern and deficiency in water supply in dry season. According to figure (2) most of the respondents (85.8%) said that they have conflicts

¹ Makharif: Rainy season open grazing areas usually located at the Northern part of livestock routes.

in animals routes. This may be due to the crowded or the increase in animal numbers that migrated to seasonal rangeland. This in agreement with data of Darrag *et al*, (1995) who reported that livestock in the Sudan are raised mainly by pastoral and agro-pastoral groups, pastoral herds are mainly semi- nomadic, where traditional movements occur between wet and dry season grazing areas. In Dilling locality, pastoralists have a traditional mode of resource utilization, but they had experienced to adopted changes throughout the last decade. The changes were visible through the regression of animal's mobility and the sedentaration of the population. Hence, the rangelands were subjected to the increase pressure, leading to their degradation. Moreover, the complication on sedentary farmers increase, raising their livestock, and are hence, less willing to give grazing rights to nomads. This led to frequent conflicts for rangeland resources between farmers and nomads. Sometime the conflicts can happen within same groups. It seems to be difficult to avoid conflict between herders and farmers, within current situation, but some points should be taken in accounts, such as (1) there should be a map of animals' routes and grazing land. (80.8%) of respondents ranked that there is no land use map in Dilling. (2) Promote extension programme within local people to increase a wariness and (3) promote civil administration roles.

The results in figure (3) marked some way to solve conflicts within local communities, most respondents (82.5%) said that, they prefer governments to solve conflicts in many cases and (67.5%) said they used ²Goudiya , while (70%) said they used village leaders (Omads and Sheakhs).

3.2 Impacts of open grazing system on environmental aspect

The pastoralist interviewed said that many plants species are disappeared from rangeland especially palatable species such as (*Impomia cordofana*, *Asteraceae hyperhernia ofrun*, *Demodium dichotomum*, *Blepheris linoriifolia* *Sorghum purpureosercim* and *Andropogon gayanyus*) see figure (4), this may be caused by selective and early grazing of these species. Moreover, the pastoralists interview ranked that unpalatable plants like, *Cassia tura*, *Oldenlandia herbacea* *Euphorbia hirtal*, *Zaleya pentandra* ,*Xanthium brosilicum* ,*Marettia philaeana*, *Jasminum nitidum* and *Acanthospermum hespidum*, were recorded very high number

² Goudiya: It is local and traditional method that practice to solve the conflicts in Sudan.

in around water points see figure (5). This may be due to increasing animal number in rangeland since no rule or land use map is found in Dilling locality. This result confirmed the findings of Todd and Hoffman, (1999) and Cordon, (2007) stated that, Continuous intense grazing leads to vegetation changes such as the replacement of palatable grasses by less palatable plant species, replacement of perennial grasses by annuals, bush encroachment, lower standing biomass and reduced basal cover.

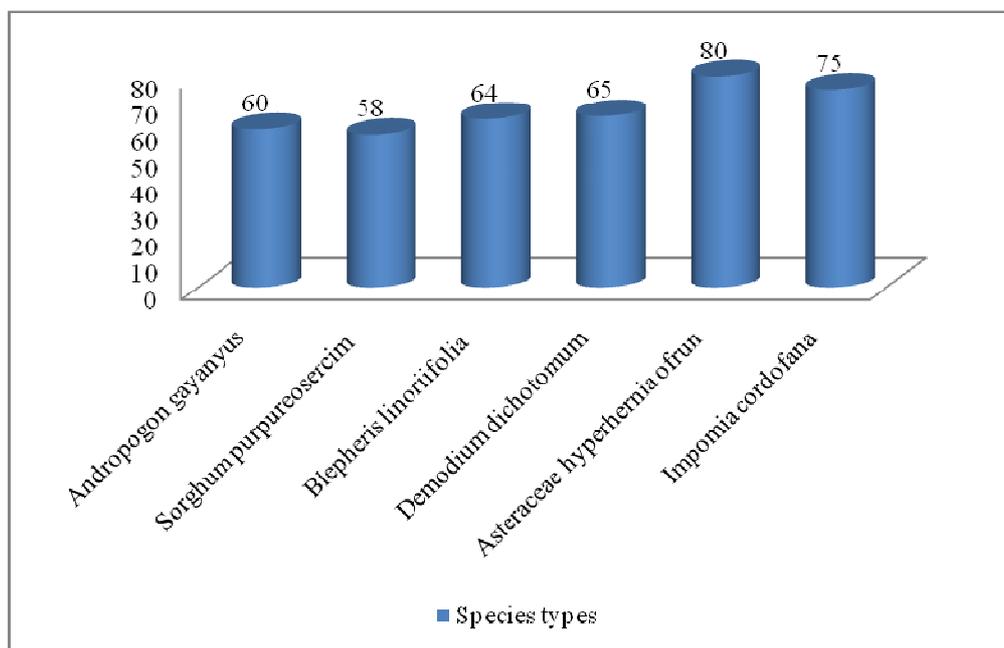


Figure (4) Plants species that disappeared from rangeland according to pastoralist interview

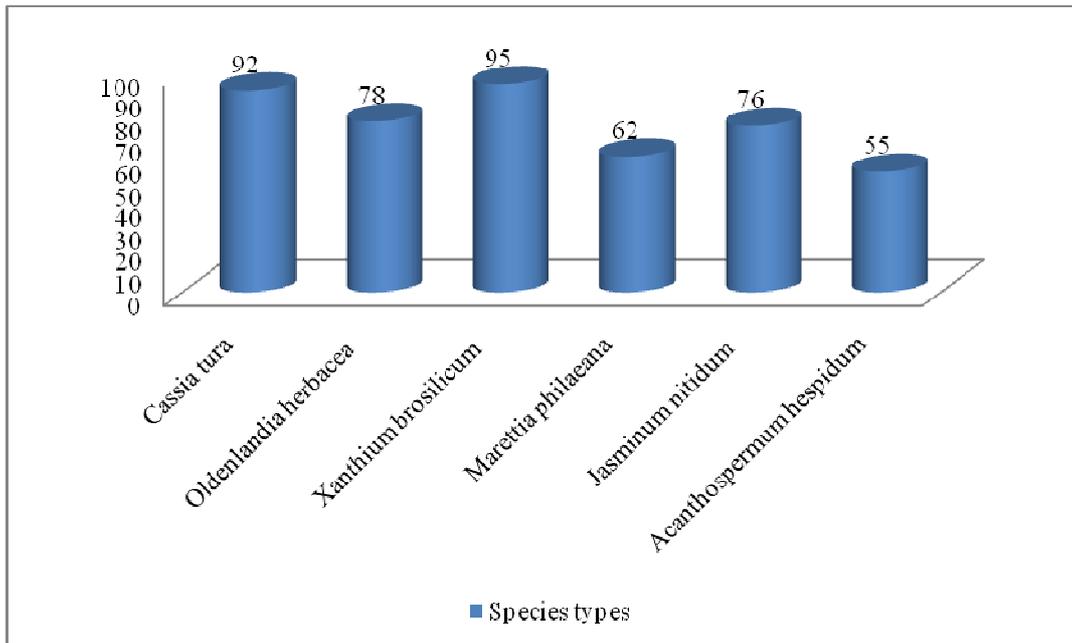
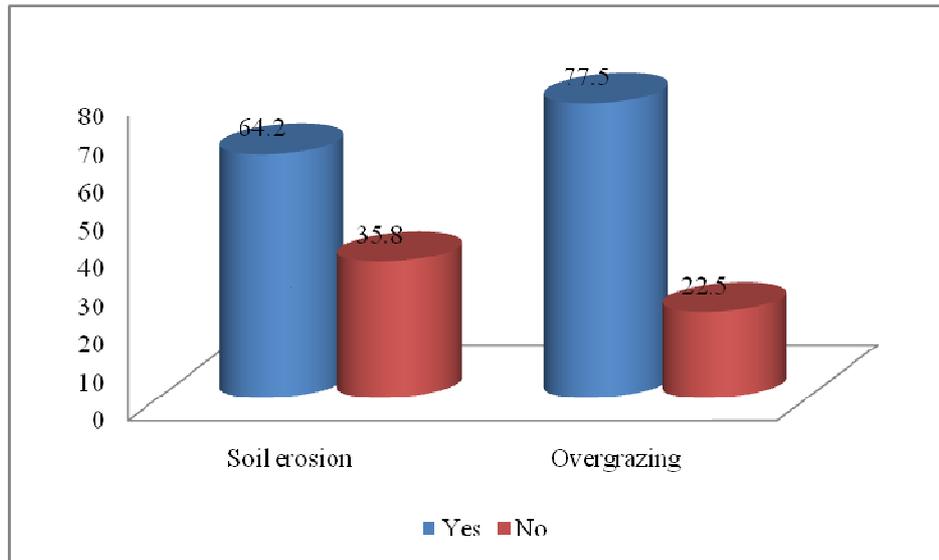


Figure (5) Un palatable Plants species that invades rangeland according to pastoralist interview

Table (4) The deterioration of rangeland

Answer	Frequency	%
Yes	114	95
No	6	5
Total	120	100

Sign = ***



Sign = ***

Sign = ***

Figure (6) The causes of deterioration on rangeland

According to table (4) the majority of respondents (95%) mentioned that, there is degradation of rangeland resources in forage production in particular. This degradation may be due to the high pressure by grazing animals, expansion of rain-fed agriculture and high competition between stakeholders. The same results reported by Manske (2004) who stated that repeated heavy grazing removes a great amount of the leaf area and causes long-term reductions in the total rangeland production. Moreover, Nefzaoui, (2002) concluded that several factors are responsible of range plants degradation, but the most significant ones are the increasing number of livestock population in open grazing system and the cropping in marginal lands. For the types of degradation most of the respondents (64.2%) said that, the causes of the degradation due to soil erosion, and (77.5%) said that as results of the sign of extensive grazing as indicated in figure (6). According to Scholl and Kinucan (1996) who reported that, heavy grazing can also cause soil erosion, loss of soil structure, and deterioration of soil environment.

4. CONCLUSION

The study concluded that open grazing system is most serious problem facing rangeland in Dilling locality. The increases of rangelands resources competition and local conflicts, comes as a result of the combination of rangeland degradation and agricultural expansion in wet seasonal

grazing areas. The rebuts indicated that, the reasons of spreading conflicts for rangeland resources is attributed to rangeland deterioration in Makharif due to open grazing system, in addition to land use pattern and deficiency in water supply in dry season. Also the study found that, many populations were affected by open grazing system, as results of reduction in rangeland, and the high demand of rangeland resources. These factors led to conflicts among stakeholders. The study showed that, there is a fluctuation in rangeland due to reduction in rangeland and decrease of forage quality. Moreover, with rangeland degradation by reason of open grazing system, the large numbers of pastoralists have migrated to other areas searching for water and fodder; in addition to that many local people abandoned the animal breeding due to low income, inefficiency production, and poor production system and rangeland degradation. In consequence the pastoralists face increasing poverty, decreasing food energy and conflicts among land users. The results revealed that, with increasing of animals number in rangeland many plants species were disappeared from rangeland, palatable plants species in particular, while unpalatable plants species were increased.

5. REFERENCES

Abdalla, S.H., (1982). Problem of Nomads in Nuba Mountains. Ministry of Agriculture and Natural Resources, Kordofan Region - Sudan

Abdalla, E.A., (2008). Competition on Range Resources and it is role on the conflict in Darfur. Case study El daein locality. PhD. Thesis in Range Sciences College of Forestry and Range Science. Sudan University of Science and Technology

Ahmed, W. and Abu Sabah, M. (1993). Commission of Nomadic Peoples: Relevance of mobility to rangeland utilization: the baggara transhumant of Southern Kordofan, Nomadic peoples number 32,1993, Khartoum, Sudan

Cordon,J. I, (2007). plant-animal interactions in complex communities: from Mechanism to modeling, Macaulay land use research institute, craingiebuckler, Aberdeen. Ab15 8QH.UK: Inlemaire,G, Nabinger, C, Hoddgson,J and Carvalho, F.C,(2007) Grassland Ecophysiology and Grazing Ecology, CABI Head office, Nosworthy way, Wallingford, Oxfordshire OX108E, UK

Darrag, A., AbdelRahim,A. and MohamedKhiar,M.A. (1995). Range and others forage resources utilization in livestock feeding, paper for Sudanese pastoral development, Kosti Sudan 2-5 octobar 1995.

Elhassan, A, B, (2007). Kordofan, Sobat and Upper Nile Interim Evaluation Report, UNDP, Kartoum Sudan.

Holechek, J.L., (2004). Range Management: Principles and Practices, New Mexico State University, Las Cruces Rex D. Pieper, New Mexico...

IFAD, (2006). Technical report about meteorological situations in South Kordofan State, South Kordofan office.

Manske, L. L. (2004). Effects of Grazing Management Treatment on Rangeland Vegetation, North Dakota State University, Dickinson Research center, 1089 state Avenue, Dickinson, ND 58601.

Nefzaoui, A. (2002). Rangeland management options and individual and community strategies of agropastoralists in Central and Southern Tunisia, International conference on policy and institutional options for the management of rangelands in dry areas. CAPRI Working paper N° 23;

Scholl, E.L., Kinucan, R., (1996). Grazing effects on reproductive characteristics of common curly mesquite (*Hilaria belangeri*). *Southwest Naturalist* 41 (3): 251–256.

SKRDP- NKRDP, (2002). South Kordofan Range Management Strategy Study and Khor Abu Habil Basin planning and Water Development Study. Sudan Ministry of Agriculture and forestry, Central Coordination Unit for IFAD Project SKRDP- NKRDP.

Todd S.W. and Hoffman, M.T. (1999). A fence-line contrast reveals effects of heavy grazing on plant diversity and community composition in Namaqualand, South Africa, *Plant Ecology* 142 (1999):169–178.

UNDP,(2006). Pastoral Productions Systems in South Kordofan study (2),House 7, Block 5, Avenue P.O. Box: 913 Khartoum, Sudan.

Zaroug. G.M., (2006). Country Pasture/Forage Resource Profiles, P.O. Box 772, Khartoum North, Sudan