DEDICATION

To my Father and Mother

To my lovely wife (Setana)

To my Sister and Brothers

To my Supervisor, Relatives and Friends

To those who serve the nature and willing to live for the Service of God's Creatures

I dedicate this humble work

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ABSTRACT

Assessment of Rangeland and the Impact of Grazing on Semi-arid Zone of North Darfur State - Sudan

North Darfur State is of considerable importance to Sudan economy. It is ecologically vulnerable and has been exposed to recent desertification and deterioration of rangeland with very serious biological, physical, social and financial losses. For these and other reasons it has been chosen for the study.

The research work focused upon assessment of the physical environment to study the vegetation cover and the impact of animal grazing on it. It was conducted over a two years period of 2012 and 2013 at three sites of Alfashir locality (Ummarahik 25km north of Alfashir, Fashar in eastern part of Alfashir about 5km and Berka 30km west of Alfashir) – Western Sudan in semi-arid zone.

The objectives were to assess rangelands and the effect of grazing levels on range attributes. Measurements of range components, plant density, vegetation cover, range productivity, species composition, plant frequency, carrying capacity and grazing level were assessed.

Results showed that total forage production was low and inadequate to satisfy requirements of livestock for inhabiting the area; average range production all over the area was found to be 50.68 kg/ha and 59.21 kg/ha for the seasons 2012 and 2013 respectively. The average ground cover was about 34.71% and 42.41% for two seasons. The average plant density for the first season was 27.1 plant/m^2, while the average plant density for the second season was 29.4 plant/m^2. Total plant composition

for the two seasons was found to be 52.33% / 68.04, litter 10.82% / 6.52%, bare soil 27.74% / 16.18% and fecal dropping was 9.11% / 9.26%. Based on the above percentages the range condition was classified as good. Percentage composition for the four species which dominated the area was *Aristida sp* (26.75%/ 26.56%), *Cenchrus sp* (26.25% / 24.55%), *Eragrostis sp* (20.46% / 22.87%) and *Dactyloctenium aegyptium* (10.48% / 10.83%). The average frequencies of the four plant species which dominated the area was *Aristida sp* 83.34%, *Eragrostis sp* 80.56%, *Cenchrus sp* 77.78% and *Zalya pentandra* 64.82%. The carrying capacity was 8.88 ha/AU/month and 7.6 ha/ AU/month for season 2012 and 2013 respectively.

The study showed that the average species density of dominants tree and shrub per hectare were *Balanites aegyptiaca* (16/10), *Calotrophis procera* (10/10), *Acacia tortilis* (10/4) and *Capparis deciduas* (5/5) for the first and the second seasons respectively.

The results showed the higher number of quadrates subjected to grazing were at level (I) with the average percentage of 37.04% for the first season, while the higher number of quadrates subjected to grazing were at level (II) with the average percentage of 42.6% for the second season.

The study showed that unwise utilization and exploitation of the rangelands particularly by man causes range deterioration and serious reduction in range production of both quantity and quality. Also continuous removing of trees and overgrazing expose the rangeland to wind erosion. Erosion index and vegetation degradation were very high and vegetation composition was of low quality, so, the study suggested that improvement and rehabilitation such lands rangelands should be done. It is also recommended that a major effort is needed to be exerted in natural resources management in general and range resources in

particular; this is needed for mitigation and recovery of the range at the study area. Further research work is needed to assess rangelands and condition across different ecological zones in North Darfur State.

الخلاصة

تقييم المراعى وأثر الرعى على المناطق شبه القاحلة بولاية شمال دارفور - السودان

تعتبر ولاية شمال دارفور من المناطق المهمة للإقتصاد السودانى، فهى تعرضت للتصحر ومهيأة للتدهور والذى نتجت عنه خسائر إحيائية وطبيعية وإجتماعية ومادية خطيرة، لهذه الأسباب وغيرها تم إختيار هذه المنطقة للدراسة.

إهتمت الدراسة برصد وتقييم الموارد الطبيعية وهدفت لدراسة الغطاء النباتى وتأثير الرعى عليه. تم إجراء هذه الدراسة بمحلية الفاشر(ولاية شمال دارفور) لموسمين متتاليين (2012 و 2013) وتم إختيار ثلاث مناطق وهى: أم مراحيك (25كلم شمال الفاشر)، فشار (5كلم شرق الفاشر) ومنطقة بركة (30كلم غرب الفاشر). هدفت الدراسة إلى تقييم المراعى وتقييم أثر مستوى الرعى على خصائص المرعى.

خلال الدراسة تم حصر وتحديد مكونات المرعى، الكثافة النباتية، الغطاء النباتى، الإنتاجية الكلية للمرعى بالمنطقة، التركيبة النباتية، التردد النباتى، الحمولة الرعوية ومستوى الرعى.

أظهرت الدرسة إنخفاض الأنتاجية لتغطية حاجة الحيوان مقارنة بكثافة الثروة الحيوانية بالمنطقة، حيث بلغت متوسط الإنتاجية للموسمين (2012 و 2013) 50.68كجم/هكتار و 59.21كجم/هكتار على التوالى. كانت متوسط الغطاء النباتى 34.71% و 42.41% للموسمين. كانت متوسط كثافة النباتات للموسمين 27.1 نبات/متر^2 و 29.4 نبات/متر^2. كانت التركيبة النباتية للموسمين 52.33% / 68.04% نباتات حية، 10.82% / 6.52% بقايا نباتات، 27.74% / 16.18% أرض جرداء و 9.11% / 9.26% بقايا حيوانية. بناءاً على النتائج أعلاه صنفت حالة المرعى بأنها جيدة.

كان المحتوى النسبى لأربع نباتات سائدة بالمنطقة 26.75% و 26.56% للقو، 26.25% و 24.55% للحسكنيت، 20.46% و 22.87% للبنو ونسبة أبو أصابع كانت 10.48% و 10.83% للموسمين على التوالى. أظهرت الدراسة متوسط نسبة التردد النباتى لأربع نباتات سائدة بالمنطقة كانت 83.34% للقو، 80.56% للبنو، 77.78% للحسكنيت و 64.82% لنبات الربعة. الحمولة الرعوية للموسمين كانت 8.88هكتار/وحدة حيوانية/شهر و 7.6هكتار/وحدة حيوانية/شهر.

أوضحت الدراسة بأن متوسط كثافة الأشجار والشجيرات السائدة بالمنطقة كالآتى: الهجليج 10/16، العشر 10/10، السيال 4/10 والطندب 5/5 شجرة-شجيرة لكل هكتار للموسمين على التوالى.

أظهرت النتائج بأن أعلى عدد من الأمتار المربعة تعرضت للرعى كانت مستوى الرعى (I) بمتوسط نسبة 37.04% للموسم الأول، بينما فى الموسم الثانى كانت أعلى عدد من الأمتار المربعة تعرضت للرعى مستوى الرعى (II) بمتوسط نسبة 42.6%.

خلصت الدراسة الى ان الاستغلال غير المرشد ونشاطات الانسان المتعددة ادت الى التدهور والنقصان المريع فى انتاجية المراعى كماً ونوعاً. أيضاً القطع المستمر للأشجار والرعى الجائر يعرض المراعى للتعرية بواسطة الرياح.

مؤشر التعرية وتدهور النباتات عالية جداً وإنخفاض مكونات النباتات النوعية، لذا إقترحت الدراسة بأن تحسين وإعادة تأهيل مثل هذه الأراضى ضرورية. أوصت الدراسة بأنه لابد من تضافر الجهود للإهتمام بالموارد الطبيعية وإدارتها ادارة رشيدة ومستدامة وعلى الأخص المراعى الطبيعية وهذا فى حد ذاته يحد من الضغط على المراعى بالمنطقة. هنالك حوجة لمزيد من البحوث لتقييم مكونات المراعى الطبيعية وحالتها فى الأحزمة البيئية المختلفة فى ولاية شمال دارفور.