

Dedication

To

My Family

Acknowledgement

I would like to express my deep gratitude and sincere appreciation to my main supervisor Dr. Mohammed Abdo Desougi and my co supervisor Dr. Abbdel Hafeez Ali Mohammed for their helpful supervision, valuable comments and professional guidance. Deep and warm thanks are due to Dr. Abdl Elaziz Karamalla for his valuable assistance during the preparation of the proposal of this study. Thanks are extended to my brother Giddo Mugadam Sailh to my uncle Abasher Hassan and naphew Salih for their assistance during the fieldwork.

I would like to thank the staff of Babanousa range office for their assistance during the data collection. Thanks are due to my colleagues Hussain, Gamer Eldian, Mahgoub, Yasir, Ishag, Allazim and all the college staff for their comments and assistance.

Last and not least I would like to thank Miss Wigdan for her help in typing my thesis.

Contents

Dedication	i
Acknowledgement	ii
List of contents	iii
English Abstract	viii
Arabic Abstract	x

Chapter 1

Introduction

1.1 Location of the study area	1
1.2 Population	1
1.3 The Topography	3
1.4 The Climate	3
1.5 The Vegetation	3
1.6 The Soil	4
1.7 The Water sources	4
1.8 Traditional livestock Migration Routes	7
1.9 Land use	7
1.10 Socio- economic aspects	9
1.11 The problem	10
1.12 The objectives	10

Chapter 2

Literature Review

2.1 General	11
2.2 Rangelands	12
2.2.1 The importance of rangelands	12
2.2.1.1 The economic importance of rangelands	13
2.2.1.2 The environmental importance of rangelands.....	13
2.3 Range management	13

2.3.1 Aims and methods of range management	14
2.3.2 Development of range management	15
2.3.3 Future of range management	15
2.4 Mixed versus pure stands	16
2.5 Plant succession	17
2.6 Range inventory	17
2.6.1 Purposes on range inventory	17
2.7 Range utilization	20
2.8 Physical factors affecting use of rangelands	20
2.8.1 Soil	21
2.8.2 Topography	21
2.8.3 Precipitation	21
2.8.4 Humidity	22
2.8.5 Temperature	22
2.8.6 Evaporation	22
2.8.7 Climate	22
2.9 Pastoral system	23
2.9.1 Nomadic system	23
2.10 Range problems	25
2.10.1 Soil degradation	25
2.10.2 The causes of soil degradation	26
2.10.2.1 The analyzation of soil degradation from an economic perspective.	27
2.11 Livestock	28
2.11.1 Livestock production	28
2.11.2 Water requirement of range livestock	29
2.12 Vegetation properties	30
2.12.1 Cover	30
2.12.2 Density	31

2.12.3 Plant composition	31
2.12.4 Biomass production	31
2.12.5 Carrying capacity	32
2.12.6 Stocking rate	33
2.12.6.1 Adjusting stocking rate	33
2.12.6.2 Effect of distribution upon grazing capacity	34
2.12.7 Range condition	36
2.12.8 Range trend	38
2.13 The importance of improving and developing rangeland..	38
2.14 The ways of improving and developing rangelands	39
2.14.1 Inventory	39
2.14.2 Pilots and protection	40
2.14.3 Water protection and spreading	41
2.14.4 Rangelands administration and control	42

Chapter 3

Material and Methods

3.1 General	44
3.2 Vegetation measurements	44
3.2.1 Qualitative measurements	44
3.2.1.1 Vegetation composition	44
3.2.1.2 Species composition	46
3.2.1.3 Plant density	46
3.2.1.4 Ground cover	47
3.2.2 Quantitative measurements	47
3.2.2.1 Biomass production	47
3.2.2.2 Carrying capacity	48
3.3 Socio- economic survey	48

Chapter 4

Results and Discussion

4.1 Vegetation measurements	49
4.1.1 Qualitative measurements	49
4.1.1.1 Dominance	49
4.1.1.2 Frequency	50
4.1.1.3 Plant composition percentages	51
4.1.1.4 Plant density	52
4.1.1.5 Forage composition percentages	53
4.1.1.6 Ground cover	54
4.1.1.7 Litter percentages	55
4.1.1.8 Bare soil	55
4.1.2 Quantitative measurements	56
4.1.2.1 Biomass production	56
4.1.2.2 Carrying capacity	56
4.1.2.3 Stocking rate	57
4.2 Socio economic aspects	58
4.2.1 Number of educated people in family	58
4.2.1.1 Basic education	58
4.2.1.2 Secondary education	58
4.2.1.3 University education	59
4.2.2 Social status	59
4.2.3 Main food for family	60
4.2.4 Type of animals	61
4.2.5 Number of animals	63
4.2.6 The time of the nomads coming to the wet season area ...	63
4.2.7 Reasons for the movement to the wet season area	64
4.2.8 Settlement area at the wet seasons	66

4.2.9 Herding practice at autumn residence	66
4.2.10 The time of Movement to Baher Elarab	67
4.2.11 Government services	68
4.2.12 Animal vaccination	68
4.2.13 Families main activities	69
4.2.14 Farming purposes	69
4.2.15 The type of farming system	71
4.2.16 Concerning the productive crops and need requirement	72
4.2.17 The income sources during summer season	72
4.2.18 Problems in the dry season	73
4.2.19 The conflicts between the Nomads and the Residents	74
4.2.20 Nomadic group	74
5. Conclusions and Recommendations	76
6. References	78
7. Appendix 1	87
8. Appendix 2	90
9. Appendix 3	91

Abstract

This study is conducted at Babanousa area (west Kordofan) – to show the importance of the range management in solving the problems of the grazing in the study area and to satisfy the needs of the transhumance (who move from the south to the north when it rains and from north to the south when it is dry) in herding their livestock and marketing their products.

The over all objectives of this study is to investigate and analyze the current condition of Elsalam locality rangeland, to identify the advantages and the disadvantages of future development and to enrich the existing Knowledge of the open grazing practices in Sudan and elsewhere.

Literature was collected for the theoretical and practical work from the relative offices and stations beside the references. The methodology used in this study included intensive survey of vegetation measurements to calculate the qualitative and quantitative measurements. Those parameters were made three times (before, within and after the autumn). The carrying capacity was calculated by clipping plants and weighing them using a sensitive balance. The study explained the importance of rainfall in all the stages of the plant. It also explained the effect of rainfall in increasing or decreasing of the carrying capacity.

The study showed that the stocking rate of the area increases during the rainy season and decreases during the dry season. So the over utilization of the area in the rainy season affects largely the plants of the area.

The study showed that Eragrostis spp are the dominant species before rainfall and Zornria diphylla is the dominant species in the second

phase (within the rainfall) and the third phase (after the rainfall) with high percentage in the plant composition in the wet season (within the rainfall and after the rainfall directly) 56.50 and 60.91 respectively.

A questionnaire was made to investigate the socio – economic aspects of the transhumance. It showed that most of the families move with their herds. This movement is due to ecological factors such as lack of water and forage in the north during the dry season and mud, flies and insects in the south during the rainy season. The study explained that Baggara used certain routes (Middle Mrhal, Eastern Mrhal, Western Mrhal) to link them between the dry and the wet season grazing. They represent pure grazing lands where enough forage and water are available.

ملخص الدراسة

أجريت هذه الدراسة في منطقة بابنوسة (ولاية غرب كردفان)، لتعزز أهمية ادارة المراعي في حل اشكالات المراعي المتعددة بالمنطقة، كما أنها أرادت ان تشبع حاجيات الرحل بالمنطقة (الذين يتحركون من الجنوب الي الشمال في فترة الخريف ومن الشمال الي الجنوب في فترة الصيف) المتمثلة في رعاية قطعانهم وتسويق منتجاتهم الرعوية وشراء احتياجاتهم اليومية. هدفت الدراسة الي التعرف علي الظرف الحالي للمرعي بالمنطقة وتحليل هذا الظرف لتحديد مساوئ ومحاسن الاستخدام الرعوي من اجل التطوير للمحاسن وإيجاد حلول للمشاكل، كما ان الدراسة هدفت الي إضافة بعض المعلومات التي تخص ممارسات الرعي المفتوح في السودان وبقية أنحاء العالم. تم جمع وعرض الادبيات السابقة عن الرعي وإدارته من المكاتب ذات الصلة (إدارات المراعي، الأرصاد الجوية، الخ) بجانب العمل التطبيقي.

استخدمت الدراسة طريقة المسح المكثف للبيانات المطلوبة، حيث تم عمل قياسات للنباتات بالمنطقة لأجراء عمليات الحوسبه للبيانات الكمية و النوعية المجموعة من المرعي (منطقة الدراسة) حيث تم عمل تلك القياسات ثلاث مرات (المرّة الأولى: كانت منتصف مايو 2003م حيث أطلق عليها المرحلة الأولى - قبل نزول الأمطار، المرّة الثانية: كانت منتصف أغسطس 2003م حيث أطلق عليها المرحلة الثانية - أثناء نزول الأمطار، المرّة الثالثة: كانت منتصف نوفمبر 2003م حيث أطلق عليها المرحلة الثالثة - بعد توقف الأمطار). تم جمع العينات بعد قصها علي ارتفاع بوصة ووزنها بواسطة ميزان حساس ومن ثم تم حساب حمولة المرعي.

أوضحت الدراسة أهمية الأمطار في كل مراحل نمو النبات، وأهميتها في التأثير. بالزيادة أو النقصان في الحمولة الرعوية. توصلت الدراسة الي ان عدد الوحدات الحيوانية يزداد كثيراً في منطقة

الدراسة في فصل الخريف ويقبل في فصل الجفاف، ويؤدي ذلك الي استغلال للمرعي غير مرشد في فصل الخريف مما يؤثر علي نباتات المرعي. وجدت الدراسة ان النباتات من نوع البنو سائده في مرحلة ما قبل نزول الأمطار أما نبات اللصيق هو النبات السائد في مرحلتي أثناء الخريف وبعد الخريف مباشرة، حيث بلغت نسبته 56.50 و 60.91 علي التوالي في المرحلتين السالفتين.

تم عمل استبيان للتعرف علي الجوانب الاقتصادية والاجتماعية للرحل والذي أوضح ان غالبية الأسر الرعوية تنتقل مع القطعان من بحر العرب الي اي منطقة في فصل الخريف ومن منطقة الدراسة الي بحر العرب في فصل الجفاف تبعاً للتغيرات البيئية. أوضحت الدراسة ان البقارة لهم مسارات محددة في تنقلهم بين فصلي الخريف والجفاف من بحر العرب الي محلية السلام والعكس هي (المرحال الاوسط، المرحال الشرقي، المرحال الغربي).