

Dedication

To South Kordofan people to home I
.belong

To my family member, Teachers and
.friends

ACKNOWLEDGEMENTS

I would like to express my deep gratitude and sincere appreciation to my supervisor Dr. Abdel Hafeez Ali Mohmed for his helpful supervision, valuable advice, encouragement and continuous supports throughout this work

My appreciation extends to staff of Kadugli research station for their great help in data collection.

I would like to record my special thanks to staff of College of Forestry and Range science for their great help in data analysis. My especially thanks to range science staff for their encouragement .and supports throughout this work

Abstract

The traditional integrated rangeland management for agriculture and animal production in Sudan is classified generally as less effective for increasing local people income. Despite the richness of rangeland resources, there is still a weakness in production systems in Kadugli locality.

The best approaches to increase rangeland production capacity, is to introduce integration approaches in rangeland management, for agriculture .and animal production in sustainable manner

The study was conducted in Kadugli locality rangeland in Southern Kordofan, as one of the richest rangeland in the Sudan. Kadugli locality is characterised by large area with fertile soil. Despite the numerous efforts in agriculture extension conducted by IFAD and the ministry of agriculture, .still poor systems are used in Kadugli locality

The study aimed to assess the opportunities for increasing the current contribution to improve efficiency in the management and use of natural resources. Demonstration of low- input integrated agriculture and animal's

.production systems for sustainable rangeland production is necessary

The primary data was collected using two different questionnaires. The first questionnaire targeted the settled village's people, while the second one targeted the Government related bodies that deal with natural and agriculture resources. The secondary data was collected from books, and scientific .papers

The first questionnaire was designed to obtain information from five villages, namely Meri Bara, Tellow, Colba, Shaeir and Koyia. The interview covered (40) households from the five villages, eight household from each

The second questionnaire was prepared to collect information from the related corporations, namely Ministry of Agriculture and Forest, Ministry of Animal Production and Animals Wealth, Animals Union, Agriculture Union and Range and pasture Administration

The result showed that livestock in Kadugli locality depend mainly on rangeland vegetation and crops residues. The feed resource provides a direct link between crops and animals. Rangeland becomes traditionally socio-economic component and cultural systems in kadugli

Integrated farming and livestock is an old practice consisting of the culture associated with the husbandry of domesticated animals, and mixed crop production with animal production systems. The integration of livestock and crop production is important in the sense that the soil is fertilized by animal dunk, to make integrated culture economically feasible. The traditional farming systems in Kadugli locality have been based on adaptation of variable rainfall and widely available land. Integrated farming plays major role in increasing employment opportunities, and increases income of rural people

The study recommended that using traditional knowledge to develop and to regulate rural production systems for increasing local people income. Farming combined with animal husbandry should be introduced and developed in small scale rural farming. Employment integration approaches

for agriculture, animal production, resources assessment and planning is needed.

الخلاصة

الإدارة التكاملية الت قلدية للإنتاج الزراعي والحيوان في السودان تصنف على إنها غير فعالة بصورة عامة في رفع المستوى المعيشي لسكان الريف. بالرغم من وفرة الموارد الرعوية وخصوبة الأراضي المراعي إلا إنها ما زالت ضعيفة في طرق إنتاجها وخاصة في محلية كادو قلي.

ومن احسن المداخل لرفع مستوى دخل الأسرة وزيادة إنتاجية اراضي المراعي هو مدخل الإدارة التكاملية لاراضي المراعي لضمان إستمرارية الإنتاج الزراعي والحيواني.

اجريت هذه الدراسة في محلية كاد قلي بولاية جنوب كردفان كواحدة من اغنى اراضي المراعي في السودان ، التي تتميز بوجود مساحات شاسعة واراضي خصبة. وبرغم من الجهود المبذولة في الإرشاد الزراعي من قبل وزارة الزراعة ومنظمة الإيفاد الكبرى في كاد قلي إلا أنها ما زالت تستخدم طرق الإنتاج التقليدي الغير فعالة بالنهوض بالمستوى المعيشي على المستوى الفرد.

هدفت الدراسة على تقويم الفرص الحالية في مساهمة وزيادة وتطوير الإدارة الفعالة في استخدام الموارد الطبيعية ، بالإضافة إلى الإدارة التكاملية للمدخلات البسيطة في إستمرارية الإنتاج الزراعي والحيواني في اراضي المراعي بمحلية الكاد قلي.

اعتمدت طرق جمع المعلومات على المسح الأولي والاستبيان بالإضافة إلا الكتب والدوريات والبحوث. شملت الدراسة عدد خمسة قرى في محلية كاد قلي. لجمع المعلومات وتم تصميم استبيانان يستهدفان مجموعتين هما سكان القرى المستقررين والجهات الحكومية ذات الصلة بالموارد الطبيعية والزراعية.

تم جمع معلومات عامة عن تكامل الموارد الطبيعية ومفهوم التكامل في إدارة الارضي المراعي وطرق استخدامات الاراضي بالإضافة إلى طرق الإنتاج الحيواني والزراعي وطريقة الرعي.

خلصت الدراسة إلى أن سكان محلية كاد قلي يعتمدون على المراعي الطبيعية والمخلفات الزراعية في تغذية حيواناتهم بصفة رئيسية. بالإضافة إلى أن الموارد الغذائية خلقت ربط مباشر بين الزراعة وتربيه الحيوان وأصبحت اراضي المراعي تقليديا من المكونات الاجتماعية من النظم الثقافية في محلية كاد قلي، وكذلك خلصت الدراسة إلى أن تكامل الزراعي والحيواني من اقدم طرق الإنتاج المستخدمة في الاراضي المراعي ، وايضا تعتبر هذه الطريقة من انجح طرق في رفع المستوى المعيشي لسكان وقليل مستوى الفقر.

وايضا خلصت الدراسة الى ان عملية التكامل الزراعي والحيواني توفر أسمدة رخيصة وهي الطريقة الوحيدة التي تستخدم في محلية كاد قلي، بالإضافة إلى ذلك تعتبر هذه الطريقة متوفقة مع الإختلافات المناخية في كاد قلي .

وكذلك خلصت الدراسة إلى ان التكامل الزراعي والحيواني يوفر فرص عمل للسكان المحليين مما يؤدي إلى زيادة دخل الفرد.

وصلت الدراسة على استخدام المعارف المحلية لتطوير وتنظيم طرق إنتاج لرفع مستوى الدخل للسكان المحليين. كما اوصت الدراسة ايضا على إدخال نظم التكامل الفعالة في إنتاج الزراعي والحيواني في مستوى القاعدة ، بالإضافة إلى أنه هناك حاجة ملحة لتوظيف المدخل التكميلية في إنتاج الزراعي والحيواني.

Table of Contents

Dedication	I
Acknowledgement.....	II
Abstract	III
Arabic abstract.....	V
Table of contents.....	VII
Map of study area.....	XIV

CHAPTER ONE: INTRODUCTION

General: .....	.1.1
	....1
Location .....	.1.2
	2
Climate .....	.1.3
	..... 4
Temperatures .....	.1.3.1
	..... 4
Rainfall .....	.1.3.2
	..... 4
Geology .....	.1.3.3
	..... 4

Soil .....	.1.3.4
.....	4
Vertisols or heavy cracking clay soils ... .1.3.4.1	
.....	4
<i>Gardoud</i> soils .....	.1.3.4.2
... 5	
Qoz or sandy soils .....	.1.3.4.3
.....	5
Vegetation .....	.1.4
....	5
Water .....	.1.5
... 6	
Population .....	.1.6
....	6
Households .....	.1.7
.....	7
Social relations .....	.1.8
.....	7
Problem statement	8 .1.9
Objectives:	8 .1.10
General objective	8 .110.1
Specific objectives.....	9 .1.10.2

CHAPTER TWO: LITERATURE REVIEW

General:	10 .2.1
The concept of integration	12 .2.2
Farming systems	12 .2.3

Types of integrated farming systems	13 .2.4
Multiple cropping practices	14 .2.4.1
Integration of annual and perennial crops	14 .2.4.2
Small holder mixed farming	14 .2.4.3
Agroforestry system	15 .2.4.4
Monoculture systems	15 2.4.5
Systems including variety of crops	15 .2.4.6
Parallel husbandry systems	16 .2.4.7
The system of feeding in integration	17 .2.5
Range communities and grazing	19 .2.6
Animal production systems	21 .2.7
Nomadic	21 .2.7.1
Transhumant	21 .2.7.2
Sedentary	21 .2.7.3
Solely livestock production systems	21 .2.7.4
Grassland-based systems	22 5 .2.7
Rain-fed mixed-farming systems	22 .2.7.6
Other systems	22 .2.7.7
Land use change and their influence on the rangeland	23 .2.8
Population dynamics	25 .2.9

CHAPTER THREE: MATERIALS AND METHODS

General:	28 .3.1
Secondary data collection:	28 .3.2
Primary data	28 .3.3

General survey	28	3.3.1
Field observations	29	3.3.2
Structured interview	29	3.3.3
Group discussion	29	3.3.4
Data analyses	29	3.4

CHABTER FOUR: RESULTS AND DISCUSSION

General:	30	4.1
Local people Groups	30	4.2
4.1. Education levels	30	
Main Jobs	31	4.2
4.2.3Human feeding sources	31	
The purposes of crop cultivation	32	4.2.4
The types of the farming systems	33	4.2.5
Types of crop cultivation.....	33	4.2.6
Cropping systems	35	4.2.7
The capacity of agricultural production	36	4.2.8
Sources of animals feeding	36	4.2.9
The efficiency of the land	37	4.2.10
The grazing sites in rainy season	37	4.2.11
Grazing problems	38	4.2.12
Land use map.....	40	4.2.13
Integrated activities in rangelands...	40	4.2.14
Related Groups	41	4.3

Types of animals	41	4.3.1
The main activities	42	4.3.2
Range condition	43	4.3.3
Period of grazing	43	4.3.4
Sources of animals feed	44	4.3.5
Types of agriculture	45	4.3.6
Land use map	45	4.3.7
Methods cropping systems	46	4.3.8
Land use planning	46	4.3.9
Integration of activities	47	4.3.10
The best way of land use	48	4.3.11
The effects of good management	48	4.3.12
Integration of natural resources	48	4.3.13
4.3.14Conflicts for rangeland	48	
Livelihoods from forest	50	4.4

CHAPTER FIVE CONCLSION AND RECOMMENDATIONS

Conclusion	52	5.1
Recommendations	53	5.2
References:	54	

List of tables

Table (1) shows the result of education levels according to respondents answers.....	32
--	----

Table (2) shows main jobs within respondents according to their answers ..	32
Table (3) shows main food consumed by human	32
Table (4) shows the result of purpose of cropping	34
Table (5) shows results of farming systems according to respondent's answers	34
Table (6.1) shows the result of durra cultivated	34
Table (6.2) shows the result of karkaday cultivated	34
Table (6.3) shows the result of melt cultivated	35
Table (6.4) shows the result of groundnut cultivated	35
Table (6.5) shows the result of sesame cultivated	35
Table (7) shows the result of intercropping systems	37
Table (8) shows the result of cultivated crop is enough for family consumption during years?	37
Table (9) shows the results of source of animal feeding in dry season	37
Table (10) shows results if there is shortage in rangeland	39
Table (11) shows the grazing sites	39
Table (12.1) shows the problem of shortage of water	40
Table (12.2) shows the problem of conflict of rangeland	40
Table (12.3) shows shortage of forage	40
Table (12.4) shows the problem of conflict between farmers and herders.	40
Table (13) show is there land use map	42
Table (14) show integration of activities	42
Table(15) shows result about types of animals that they own according the respondents answers	43
Table (16) shows the main activities according the respondents	43
Table (17) shows the main activities according the respondents.....	44
Table (18) shows the range condition according the respondents answers.	45

Table (19) shows result about grazing period according the respondents answers	45
Table (20) shows the animals feed resources according the respondents answers	47
Table(21) shows the types of farming according the respondents answers....	47
Table (22) shows the land use map according the respondents answers.....	47
Table (23) shows the result about method of cropping according the respondents answers	48
Table (24) shows the miss management of land use according the respondents answers	49
Table (25) shows the integration of activities of land use according the respondents answers	49
Table (26) shows result about best way of land use according the respondents answers	50
Table (27) shows result about the effect of good management according the respondents answers	50
Table (29) shows result about the integration of natural resources management according the respondents answers.....	51
Table (30) shows result about the conflicts between farmers and herders according the respondents answers	51
Table (31) shows result about the possibility to avoid conflicts between farmers and herders according the respondents answers	52

Table of Figures

Map of study area.....	XIV
------------------------	-----

Sudan University of Science and Technology
College of Graduate Studies

**A dissertation Submitted in partial Fulfillment of
Requirement M.Sc. Degree in Range Science**

**Integrated Rangeland management for Sustainable
agriculture and animal production
(Case study (Kadugli Locality**

**الإدارة التكاملية للرادي المزاري لإنتاج الزراعي
والحيواني المستدام (دراسة حالة محلية كاد قلي)**

**By
Galal Abbas Fasher Kodeil**

**:Supervisor
Dr. Abdel Hafeez Ali Mohamed**

2008