

**بسم الله الرحمن الرحيم**

**Sudan University of Science and Technology**

**College of Graduate Studies**

**Description and Analysis of Farming Systems  
in  
South Kordofan: A Case Study of Rashad  
Locality**

**وصف وتحليل النظم المزرعية فى جنوب كردفان: دراسة  
حالة  
محلية رشاد**

**Thesis Submitted In Fulfillment For The  
Requirements Of The Degree Of M.Sc. In  
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## **Dedication**

**To my father, mother, sisters, brothers and  
my  
small family who gave a meaning to my life**

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# CONTENTS

	<b>Page No.</b>
Dedication ii	
Acknowledgments iii	
Content	iv
List of Tables	vii
Abbreviations	ix
Definition of Local Terms	x
Abstract	xi
Abstract in Arabic xiv	

## CHAPTER ONE

1. Introduction	1
1.1 South Kordofan General 1	
1.1.1 Agricultural Institutions in South Kordofan 3	
1.1.1.1 Nuba mountains agricultural corporation 3	
1.1.1.2 Nuba Mountains Rural Development Project 3	
1.1.1.2.1 South Kordofan Agricultural Development Project 4	
1.1.1.2.2 South Kordofan Rural Development Programme 4	

1.2 General Description of the Study Area	5
1.2.1 Location	5
1.2.2 Climate	6
1.2.2.1 Temperature and Humidity	6
1.2.2.2 Rainy Season	6
1.2.3 Soils	7
1.2.3.1 Sandy Loamy soils	7
1.2.3.2 Jebel soils	7
1.2.3.3 Dark Cracking Light and Heavy Clay Soils	7
1.2.4 Vegetation	7
1.3 Problem Statement	8
1.4 Objectives of the Study	9
1.5 Organization of the Study	11

## **CHAPTER TWO**

2. Literature Review	12
2.1 Farming System Definitions	12
2.2 Regional Farming Systems	13
2.3 Farming Systems in Sub-Saharan Africa	15
2.4 Farming Systems in Sudan	17

**Page No.**

2.4.1 Irrigated farming system	17
--------------------------------	----

2.4.2	Traditional rainfed farming	
		17
2.4.3	Mechanized rainfed farming	
		18
2.4.4	Livestock production system	
		18
2.4.5	Forests system	18
2.5	Farming Systems in South Kordofan	
		18
2.5.1	Rainfed Traditional Farming System	
		21
2.5.1.1	Clay Plains Farming Subsystem	
		21
2.5.1.2	Sandy Plains Farming Subsystem	
		22
2.5.1.3	Jebel Terrace Farming Subsystem	
		22
2.5.1.4	Pastoralists Farming Subsystem	
		23
2.5.2	Rainfed Mechanized Farming System	
		23

### **CHAPTER THREE**

3.1	Sampling	
		25
3.2	Methodology	
		25

### **CHAPTER FOUR**

4.	Socio-economic Characteristics	
		29
4.1	Household Demographic Details	
		29
4.1.1	Education background of household head	
		30

4.1.2	Residence in study area	
	32	
4.2	Land	33
4.2.1	Description of landholding in the study area	
	34	
4.2.2	Cropping Intensity	
	36	
4.2.3	Agricultural calendar	
	37	
4.2.4	Seasonal calendar	
4.2.5	Cropping pattern	
	38	
4.2.6	Crop yields	
	39	
4.3	Labour	41
4.3.1	Cost of production	
	41	
4.3.2	Domestic food production and requirements	
	43	
4.4	Capital	44
4.4.1	Off-farm income sources	
	44	
4.4.2	Income from subsistence occasional sales of agricultural products	45
4.4.3	Livestock	46
4.4.4	Livestock annual costs	
	48	
		<b>Page</b>
		<b>No.</b>
4.4.5	Annual sales of livestock and by-products	
	49	
4.4.6	Household farming assets	
	49	

## CHAPTER FIVE

5. Analysis of Farm Budget Models
51

5.1 Rainfed semi-mechanized farming system	52
5.2 Rainfed traditional farming system	53
5.3 Subsystems of Rainfed Traditional farming System	54
5.3.1 Clay plains	54
5.3.2 Sandy plains	55
5.3.3. Terrace Jebels	55
5.3.4 Pastoralists farming	56
5.4 Problems and Constraints	59

## **CHAPTER SIX**

6. Summary And Recommendations	62
6.1 Summary	62
6.2 Main Findings	62
6.3 Recommendations	68
7. References	70
8. Appendices	71

## **LIST OF TABLES**

<b>Table</b>	
<b>Page No.</b>	
2-1: Rural and Agricultural Population by Developing Regions	12
2-2: Major Farming Systems of Sub-Saharan Africa	15
3-1: Classification of Study Area by Farming System and Population	26



3-2: Sample villages and households	26
4-1: Distribution of Farm Household by Size	28
4-2: Household Age and Sex Structure for Rainfed Traditional Farming	29
4-3: Household Age and Sex Structure for Rainfed Semi-Mechanized Farming	29
4.4 Literacy Level of Household Head for main systems (%)	29
4.5 Literacy Level of Household Head for rainfed Traditional	

Subsystems (%)	
30	
4.6	Duration of Settlement for main systems (% of Households) 32
4.7	Duration of Settlement in the Area for subsystems (% of households) 32
4.8	Details of average landholding in feddan by household 34
4.9	Land under Different Garden Types as percentage of average land holding/household 35
4.10	Average price/unit area (SD/feddan) for the different garden types 35
4-11:	Cropping Intensity for Main farming Systems 36
4-12:	Agricultural Calendar 37
4-13:	Cropping Pattern for Rainfed Traditional and Semi-mechanized Farming (Average Area per feddan per household) 39
4-14:	Field Crops Yields (sacks/feddan) for Rainfed Traditional System 39
4-15:	Field Crops Yields (sacks/feddan) for Rainfed Semi-mechanized System 39
4-16:	Cost of Operations for Rainfed Traditional System (SD/feddan) 41

4-17:	Cost of Agricultural Operations for Rainfed Semi-Mechanized System (SD/feddan)	41
4-18:	Comparison of household average production of grains (kg) and average household annual consumption (kg) by farming systems	43
4-19:	Percentages of different off -farm income sources	44

**Table  
Page No.**

4-20:	Average household income from subsistence occasional sales of agricultural products per SD	45
4-21:	Average numbers of livestock owned by household	46
4-22:	Percentages of households owning different livestock	46
4-23:	Average Number of Livestock per household for the Sub-systems of the Rainfed Traditional Farming System	47
4-24:	Percentages of Households Owning livestock for the different subsystems of the rainfed Traditional Farming System	47
4-25:	Percentages of Livestock Annual Costs	48
4-26:	Livestock and products annual sales (%)	48
4-27:	Percentages of households owning Assets	49

5-1: Livestock Unit (LSU) Conversion Factors	51
5-2: Conversion of Classes of Baggara Cattle to Livestock Units	
(LSU) in Southern Darfur	51
5-3: Analysis of Enterprises of Rainfed Semi-mechanized Farming System	52
5-4: Analysis of Enterprises of Rainfed Traditional Farming System	53
5-5: Clay Plains Analysis of Enterprises	54
5-6: Sandy Plains Enterprises Analysis	54
5-7: Terrace Jebels Enterprises Analysis	55
5-8: Pastoralists Enterprises Analysis	55
5-9: Summary of the Subsystems of the Rainfed Traditional System	56
5-10: Comparison between Rainfed semi-mechanized and traditional	

- farming system  
56
- 5-11: Constraints to agricultural production; Rainfed  
Traditional
- farming System  
57
- 5-12: Constraints to agricultural production; Rainfed  
semi-
- mechanized farming system  
57
- 5-13: Constraints to agricultural production; Clay  
Plains Farming
- Subsystem  
58
- 5-14: Constraints to agricultural production; Sandy  
Plains Farming
- Subsystem  
58
- 5-15: Constraints to agricultural production; Terrace  
Jebels Farming 58
- 5-16: Constraints to agricultural production;  
Pastoralists Farming 59

## **Abbreviations**

ABS	:Agricultural Bank of Sudan
CPA	:Comprehensive Peace Agreement
EEC	:European Economic Community
FAO	:Food and Agriculture Organization
GDP	:Gross Domestic Production
GOS	:Government of Sudan
IFAD	:International Fund for Agricultural Development

IPM	:Integrated Pest Management
LSU	:Livestock Unit
MFC	:Mechanized Farming Corporation
NMAC	:Nuba Mountains Agricultural Corporation
NMRDP	:Nuba Mountains Rural Development Project
PCAP	:Public Corporation for Agricultural Production
RAU	:Rural Administrative Unit
SDG	:Sudanese Guinea
SKADP	:South Kordofan Agricultural Development Project
SKRDP	:South Kordofan Rural Development Programme
SPLM	:Sudan People's Liberation Movement
UNDP	:United Nations Development Program

### **Definition of Local Terms**

Assida	:A porridge-like preparation, made from fermented or fresh batters of sorghum or millet flour.
Baleela	:Traditional food consists of sorghum, sesame, groundnuts, beans and leaves of some plants.
Gardud	:Non-cracking clay of pediments around the base of hills
Goz	:Sand dune, applied commonly to the fixed sand dunes occurring in the Darfur, Kordofan and northern regions
Jebel	:Hill or mountain; rocky hill outcrop.
Jubraka	:Home garden, or backyard garden
Kantar	:A yield of crop equal to 141.523 kg
Karkade	:Rossel ( <i>Hibiscus sabdariffa</i> )

Khor	:A seasonal watercourse, usually smaller than a wadi, but both words are synonymously used in Sudan.
Kisra	:An unleavened, fermented batter made from sorghum flour and water, cooked into thin sheets.
Merissa	:A weak alcoholic drink made of fermented sorghum or millet flour.
Molokhiya	:Leaves and tender shoots of young jute (Corchorus olitorius) plants
Mulah	:Traditional sauce eaten with kisra or assida.
Nafier	:Work party.
Remail	:Dry sowing/planting
Sheikh	:Village chief
Sheil	:Credit, a system of money lending repaid at harvest with a specific quantity of crop yield equivalent to the loan.
Shermute	:Sun dried strips of meat.
Wadi	:Seasonal watercourse, usually wider than a khor, but both words are used almost synonymously in the Sudan
Weika	:Okra (Hibiscus esculentus)
Zakat	: Islamic religious tax

## **ABSTRACT**

The main objective of the study was to describe and analyze the farming systems in Rashad Locality. The specific objectives were to describe and analyze the farming systems in the area, to study the socio-economic characteristics of the farmers in the different farming systems as well as conducting crop budget analysis for the farming systems to come up with recommendations for the development of these farming systems. The study also

covered the problems and constraints of agricultural production in the study area.

Primary and secondary data were obtained from different sources, books, reports and other published articles in websites. A multi-stage stratified random technique was used to select a sample size of 160 households, which represents 8% of the total population. Descriptive statistics e.g. means, frequencies, cross tabulations, percentages and t-tests were used to describe and analyze the socio-economic characteristics of households in the study area, and conduct enterprise and farm budget models for the farming systems in the study area.

The results of the study indicated that, average household size is 9 members for traditional system and 10 members for the semi-mechanized. For rainfed mechanized farming system, 40% or 4 household members were in age group less than 15 years, 20% in age group 16-25 years, 30% in age group 26-45 years. Then the last two age groups 46-55 years and 56 years and above are represented by 10% and zero of household members, respectively. Those engaged in farm labour represent 30% of total household size, out of this percentage, females represent 33%. For the rainfed traditional farming system, 55% of household members are in age group less than 15 years old, 23% in both age group 16-25 years old, and age group 26-45 years old.



Fifty six percent of total household members are engaged in farming activities with females representing 40%.

The study indicated that, average harvested area under the rainfed traditional farming system accounted for 18 feddans bringing crop intensity index to 33%. Household cultivated area decreases to 66% at harvest time, while it is 90% of the cultivated area under the rainfed semi-mechanized farming system, cropping intensity accounted for 68%.

The cropping pattern in the study area is dominated by four main crops, these are; sorghum, millet, sesame and groundnuts. Minor crops that could be consumed in the home or sold in the market are; cowpea, karkadeh, maize, okra and pumpkin. All sample households are cultivating sorghum and virtually 57% and 67% of the cultivated land was under sorghum for the rainfed traditional and semi-mechanized farming systems, respectively.

Off-farm income from categories listed under others (Gum Arabic tapping and petty trading) and income from semi-skilled labour are the major sources of income for the rainfed traditional farming system accounting for 31.9% and 28.9%, respectively. For the rainfed semi-mechanized farming system, income from skilled labour scored the highest percentage of 75.6% followed by cash sent from household members.

The results indicated that, all households for the rainfed traditional and semi-mechanized farming system

are involved in livestock raising. For the traditional system, 33%, 65%, 14% are reported owning cattle, goats and sheep, respectively. Camels and donkeys are kept as animals for burden and transportation; the well-off households tend to have camels 6%, while the majority is using donkeys 42%. Forty percent of households within the rainfed semi-mechanized farming system own cattle, 13% goats, 27% sheep and only 13% owning donkeys.

The comparison between the two main systems as reflected by gross margin and net income proved that, rainfed traditional farming system is far better than the rainfed semi-mechanized farming system e.g. gross output per feddan for the traditional system is almost three times that of the semi-mechanized system, while gross margin per feddan and net income are also nine times those calculated for the semi-mechanized farming system.

The study provided some recommendations, but the most important is that; focus should be on vertical production expansion through provision of improved agricultural inputs. Agricultural extension and agricultural research should play a key role to provide responsive farmers with quality information to increase their production.

**بسم الله الرحمن الرحيم**

## **الملخص**

الهدف من الدراسة وصف وتحليل النظم المزرعية المختلفة بمحلية رشاد بولاية جنوب كردفان بالتركيز على وصف وتحليل النظم المزرعية بالمنطقة ودراسة الخصائص الاقتصادية والاجتماعية وفقاً للنظم المزرعية المختلفة، بالإضافة إلى إجراء

تحليل للميزانية للمحاصيل بهذه النظم المزرعية بغية الوصول إلى التوصيات التي تساعد على تطوير وتحسين هذه النظم المزرعية. كما شملت الدراسة أيضاً المشاكل والمعوقات التي تواجه الإنتاج الزراعي عموماً بالمنطقة.

تم جمع البيانات الأولية والثانوية من المصادر المختلفة والتي شملت الكتب والتقارير والمراجع والمطبوعات المنشورة وقد تم استخدام (Websites) في مواقع الشبكة العنكبوتية الأسلوب الطبقي العشوائي متعدد المراحل لإختيار 160 أسرة عشوائياً كعينة طبقية والتي تمثل 8% من جملة السكان. تم استخدام منهج الإحصاء الوصفي لتحليل البيانات وشمل ذلك وصف وتحليل الخصائص الإجتماعية والإقتصادية للأسر بالمنطقة بالإضافة إلى تطبيق نموذج ميزانية المزرعة للنظم المزرعية بمنطقة الدراسة.

أشارت نتائج الدراسة إلى أن متوسط حجم الأسرة 9 فرد للنظام المطري التقليدي و 10 فرد للنظام المطري شبه الآلي. فيما يتعلق بنظام الزراعة الآلية المطرية التقليدي فقد تبين أن 40% من أفراد الأسرة ضمن الفئة العمرية أقل من 15 عام و 20% منهم من الفئة العمرية بين 16-25، بينما 30% منهم يقعون في الفئة العمرية 26-45 عام. أما بالنسبة للفئات العمرية 46-55 عام وأكثر من 56 عام فقد بلغت نسبتهما 10% و صفر على التوالي. إتضح أن العاملون بالزراعة يمثلون حوالى 30% من النسبة الكلية لعدد أفراد الأسرة وأن النساء يمثلن 33% من هذه النسبة. وبالنسبة للنظام المطري التقليدي فنجد أن 55% من أفراد الأسرة يقعون ضمن الفئة العمرية أقل من 15 عام و 22% منهم يقعون في كلاً من الفئة العمرية 16-25 سنة و الفئة العمرية 26-45. أشارت النتائج أيضاً إلى أن 56% من حجم الأسر الكلى يعملون في الأنشطة المزرعية والنساء يمثلن 40% منهم.

أوضحت النتائج كذلك أن متوسط المساحة المحصودة في النظام التقليدي المطري بلغت حوالى 18 فدان مع ملاحظة أن متوسط المساحة المزروعة للأسرة تنخفض بنسبة 66% عند وقت الحصاد. المحاصيل الرئيسية بمنطقة الدراسة هي الذرة، الدخن، السمسم والفول السوداني، حيث تزرع الأسر الذرة بنسبة بلغت سبعة وخمسين وسبعاً وستين بالمائة من جملة الأراضى المزروعة في النظامين التقليدي المطري والنظام شبه الآلي على التوالي. وهنالك محاصيل ثانوية للإستهلاك العائلي

ويتم فى بعض الأحيان بيع الفائض منها فى الأسواق المحلية مثل اللوبيا والكركدى والذرة الشامية والبابية والقرع.

الدخل من خارج المزرعة مثل (طق الصمغ العربى والتجارة الصغيرة) والدخل من العمل شبه الماهر يعتبر من المصادر الرئيسية للدخل فى النظام التقليدى حيث بلغت نسبتهما 32 و 29% على التوالى. بالنسبة للنظام المزرعى شبه الآلى نجد أن الدخل من الأيدى العاملة الماهرة أحرز نسبةً عاليةً 76% بلغت.

أشارت نتائج الدراسة إلى أن كل الأسر فى النظامين التقليدى وشبه الآلى يقومون بتربية الحيوانات، أما بالنسبة للنظام المزرعى التقليدى فإن نسب الحيوانات بلغت 33% و 65 و 14% تمثل الماشية، الماعز والضأن على التوالى، أما الإبل والحمير فتستخدم للنقل والترحيل حيث نجد أن الأسر الغنية تمتلك الإبل بنسبة 6%؛ بينما غالبية الأسر تستخدم الحمير بنسبة بلغت 42%؛ حيث نجد أن 40% من الأسر فى نظام الزراعة المطرى شبه الآلى يمتلكون الماشية و 13% الماعز و 27% الضأن و 13% الحمير.

إن المقارنة بين النظامين الرئيسيين تنعكس فى الربح الإجمالى وصافى الدخل ويثبت هذا أن النظام المزرعى المطرى التقليدى أفضل بكثير من نظام الزراعة المطرى شبه الآلى ومثال ذلك أن إجمالى الدخل الناتج من الفدان فى النظام المطرى التقليدى يعادل ثلاث مرات النظام المطرى شبه الآلى، بينما إجمالى الربح للفدان وصافى الدخل يساوى ضعف النظام شبه الآلى.

خلصت الدراسة إلى بعض التوصيات تتمثل ضرورة التركيز على التوسع الرأسى للإنتاج عن طريق المدخلات الزراعية الحديثة.