

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

**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 في جنوب كردفان: دراسة  
حالة  
محلية رشاد**

**Thesis Submitted In Fulfillment For The  
Requirements Of The Degree Of M.Sc. In  
Agricultural Economics**

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**July 2007**

## **Dedication**

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

## **Acknowledgement**

**This study would not have been possible without moral, academic and material support rendered from various institutions, individuals and friends. I wish to express my sincere thanks to all who directly or indirectly contributed to the completion of this study.**

**First and foremost, my deepest gratitude and appreciation are due to my Supervisor, Dr. Haj Hamad Abdul Aziz for his invaluable efforts exerted by way of advice, guidance and encouragement.**

**My thanks and appreciations are also extended to the Extension Teams of the Rural Administrative Units of El Abbasiya, Tajmala, Um Lubia and Abu Karshoula, for their generous support that made the field work of my study possible. Equally, my sincere thanks and acknowledgments are due to the PMU Staff of South Kordofan Rural Development Programme (SKRDP) and State Ministry of Agriculture and Animal Resources for their different types of support and encouragement.**

**Finally my deepest gratitude to UN RCO-Kadugli for their encouragement and moral support.**

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## **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 (Hibiscus sabdariffa)

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 ( <i>Corchorus olitorius</i> ) 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 ( <i>Hibiscus esculentus</i> )
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) فى موقع الشبكة العنكبوتية الأسلوب الطبقي العشوائى متعدد المراحل لإختيار 160 أسرة عشوائياً كعينة طبقية والتي تمثل 8% من جملة السكان. تم استخدام منهج الإحصاء الوصفى 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 التقليدى و10 فرد للنظام المطري شبه الآلى. فيما يتعلق بنظام الزراعة الآلية المطري التقليدى 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 و 55-65 عام وأكثر من 56 عام فقد بلغت نسبتها 10% و صفر على التوالي. إتضح أن العاملون بالزراعة يمثلون حوالي 30% من النسبة الكلية لعدد أفراد الأسرة وأن النساء يمثلن 33% من هذه النسبة. وبالنسبة للنظام المطري التقليدى 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 45-26. 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 فى النظام التقليدى المطري بلغت حوالي 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 سبعاً وخمسين وسبعاً وستين بالمائة من جملة الأراضى المزروعة فى النظامين التقليدى المطري والنظام شبه الآلى على التوالي. وهنالك محاصيل ثانوية للإستهلاك العائلى

ويتم في بعض الأحيان بيع الفائض منها في الأسواق المحلية مثل اللوبيا والكركدي والذرة الشامية والبامية والقرع.

الدخل من خارج المزرعة مثل (طق الصمغ العربي والتجارة الصغيرة) والدخل من العمل شبه الماهر يعتبر من المصادر الرئيسية للدخل في النظام التقليدي حيث بلغت نسبتها 32 و 29% على التوالي. بالنسبة للنظام المزرعى شبه الآلى نجد أن الدخل من الأيدي العاملة الماهرة أحرز نسبةً عاليةً بلغت 76%.

أشارت نتائج الدراسة إلى أن كل الأسر في النظامين التقليدي وشبه الآلى يقومون بتربيه الحيوانات، أما بالنسبة للنظام المزرعى التقليدي فإن نسب الحيوانات بلغت 65% و 14% تمثل الماشية، الماعز والضأن على التوالي، 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 في نظام الزراعة المطري شبه الآلى يمتلكون الماشية و 13% الماعز و 27% الضأن و 13% الحمير.

إن المقارنة بين النظامين الرئيسيين تتعكس في الربح الإجمالي وصافي الدخل ويثبت هذا أن النظام المزرعى المطري التقليدي أفضل بكثير من نظام الزراعة المطري شبه الآلى ومثال ذلك أن إجمالي الدخل الناتج من الفدان في النظام المطري التقليدي يعادل ثلث مرات النظام المطري شبه الآلى، بينما إجمالي الربح للفدان وصافي الدخل يساوى ضعف النظام شبه الآلى.

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