

## **DEDICATION**

To my father's soul

To my family

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## ABBREVIATIONS

**ARC:** Agricultural Research Corporation.

**FAO:** Food and Agriculture Organization.

**LP:** linear Programming.

**MAF:** Ministry of Agriculture and Forestry.

**ITDG:** Intermediate Technology Development Group.

**GDP:** Gross Domestic Product.

**MVP:** Marginal Value Productivity.

**SDG:** Sudanese Pound.

**MFNE:** Ministry of Finance and National Economy.

**SE:** State Encyclopedia.

**SMAAWI:** State Ministry of Agriculture, Animal Wealth and Irrigation.

**SC:** Save the Children.

**UN:** United Nations.

**BLUE:** Best Linear Unbiased Estimators.

**OLS:** Ordinary Least Square.

**Kg:** Kilogram.

**CD:** Cobb-Douglas

**MET:** Ministry of Environment and Tourism.

**ABS:** Agricultural Bank of Sudan.

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## **ABSTRACT**

This study shed light on the main constraints of agricultural development in the traditional rainfed sector of Sudan through investigating the situation of agriculture in North Darfur State, more specifically in Darelsam and Umkdada districts.

The study area is one of the most important agricultural regions in North Darfur State; it contributes in food production beside cash crops. Despite the above mentioned importance, the agricultural production in DarElsam and Umkdada districts suffers many problems (economical, technological, environmental and social problems) that hinder its development and success resulting in low yield and low income. These problems are:

- a. The shortage of agricultural credit, agricultural inputs, low farm-income and limited chances of off- farm income (SMAAWI, 1994 and 2004, ITDG, 2000 and 2001 and MET, 2000).
- b. The limited use of technology as a result of lack of technology and absence of know-how (SMAAWI, 2004).
- c. Variability of rain in amount and distribution within the same year and from year to year and low soil fertility (SMAAWI, 2002, 2003, 2005 and 2006, Amin, 2002, MET, 2000 and ITDG, 2000).
- d. Darfur conflict and its secretion of armed robbery and tribal conflicts (SMAAWI, 2004).

The general objective of the study is to describe and analyse the existing farming systems in the study area (DarElsam and Umkdada districts). Specifically the study intended to:

1. Describe and analyze the existing nature of traditional rainfed agriculture.
2. Specify the main factors affecting crop production.

3. Determine the optimum cropping pattern.
4. Identify the constraints of increasing farm income in the study area.
5. Assess the impact of some scenarios on farm income.
6. Provide some policies based on the findings of the study.

The study mainly depended on primary data of the agricultural season 2006/07 collected from the targeted farmers through direct interviewing using questionnaires.

Descriptive statistics, Regression and linear programming were used in the data analysis.

The results of Regression analysis revealed that the produced crops in season 2006 were significantly affected by some factors, including most important factors that affect the crops output. Millet production affected by the total land under millet, labour, capital expenses, agricultural extension, period of cropping and rain quantity.

The sorghum production affected by total land of sorghum, off-farm income and agricultural extension.

The important significant factors affecting groundnuts production were total land under groundnuts, labour, period of cropping, agricultural extension, crop rotation and dry spell.

Okra production affected by the total land under okra, seed rate, education and security situation.

The main results of linear programming showed that the basic models gave a cropping pattern different from real farmers' production plan. Groundnuts is the more profitable crop at prevailing price and productivity of season 2006/07. The basic models solution gave a profitable objective function while in reality the farmers gained a loss. Family labour and operating capital represent the main constraints of agricultural production in the study area. Application of recommended

technologies, increasing output prices and lowering production costs gave high support to the farm income in the study area.

In order to achieve agricultural development and farmers' food security in the study area the study gave some recommendations including the following recommendations:

1. Supply the farmers with agricultural inputs through (a) distribution of inputs especially seeds through repayment (in kind) after harvesting and (b) entering the durable inputs such as pesticides pumps and hand implements through rent system.
2. Support agricultural extension to be more efficient and effective in adoption of recommended improved technologies.
3. Find credit sources in the rural areas and facilitate funding process.
4. Encourage government intervention to stabilize the output prices.

## خلاصة الأطروحة

هذه الدراسة تلقي الضوء على أهم معوقات التنمية الزراعية بالقطاع المطري التقليدي في السودان من خلال دراسة حالة الزراعة بولاية شمال دار فور أكثر تحديدا من خلال منطقتي دار السلام وأم كدادة.

تعتبر منطقة الدراسة من أهم المناطق الزراعية بولاية شمال دار فور حيث تساهم في إنتاج الغذاء بجانب المحصولات النقدية. بالرغم من الأهمية المذكورة أعلاه للإنتاج الزراعي بمنطقتي دار السلام وأم كدادة يعاني من عدة مشاكل (اقتصادية وتقنية وبيئية واجتماعية) والتي تعوق تنميته ونجاحه مؤدية إلي الانخفاض في الإنتاجية والدخل المزرعي. هذه المشاكل تتمثل في :

أ. نقص التمويل الزراعي والمدخلات الزراعية وانخفاض الدخل المزرعي ومحدودية الفرص في الحصول علي الدخل غير المزرعي (وزارة الزراعة ولاية شمال دار فور, 1994 , 2004 ومجموعة تنمية التقنية الوسيطة, 2000, 2001 ووزارة البيئة والسياحة, 2000).

ب. محدودية استخدام التقانة نتيجة لنقص التقانة وغياب المعرفة (وزارة الزراعة ولاية شمال دار فور, 2004) .

ج. تذبذب الأمطار من حيث الكمية والتوزيع في ذات السنة ومن سنة لأخرى وانخفاض خصوبة التربة (وزارة الزراعة ولاية شمال دار فور, 2002, 2003, 2005, 2006 وأمين, 2002 ووزارة البيئة والسياحة, 2000 ومجموعة تنمية التقنية الوسيطة, 2000).

د. الصراع في دار فور وافرازاته النهب المسلح والحروب القبلية (وزارة الزراعة ولاية شمال دار فور, 2004) .

الهدف الرئيسي من هذه الدراسة هو وصف وتحليل النظم الزراعية الحالية الموجودة بمنطقة الدراسة (دار السلام وأم كدادة) أكثر تحديدا هدفت الدراسة إلي ما يلي :

1. وصف وتحليل طبيعة الزراعة المطرية التقليدية.
2. تحديد العوامل الرئيسية التي تؤثر علي إنتاج المحاصيل الرئيسية.
3. تحديد التركيبة المحصولية المثلى.
4. التعرف على معوقات زيادة الدخل المزرعي بمنطقة الدراسة.
5. تقييم اثر بعض السيناريوهات على الدخل المزرعي.
6. تقديم بعض السياسات بناءا علي النتائج التي توصلت إليها الدراسة .

اعتمدت الدراسة بصورة أساسية على المعلومات الأولية للموسم الزراعي 2006 / 2007 التي جمعت من المزارعين المستهدفين بواسطة المقابلة الشخصية مستخدمة الاستبيان.

استخدمت الدراسة الإحصاء الوصفي وأسلوب البرمجة الخطية والانحدار في تحليل المعلومات التي جمعت.

أوضحت نتائج تحليل الانحدار أن المحاصيل المنتجة في الموسم الزراعي 2006 تأثرت معنويًا ببعض العوامل تضم العوامل الأكثر أهمية في التأثير علي إنتاج المحاصيل. إنتاج الدخن تأثر بالمساحة المزروعة بالدخن والعمالة و الخدمات الرأسمالية و الإرشاد الزراعي وفترة الزراعة وكمية المطر. إنتاج الذرة تأثر بالمساحة المزروعة بالذرة والدخل غير المزرعي والإرشاد الزراعي. أهم العوامل المعنوية التي أثرت في إنتاج الفول السوداني هي المساحة المزروعة وفترة الزراعة و الإرشاد الزراعي والدورة الزراعية والصبنة. إنتاج البامية تأثر بالمساحة المزروعة ومعدل البذور والتعليم والحالة الأمنية.

النتائج الرئيسية للبرمجة الخطية أوضحت أن النماذج الأساسية أعطت تركيبة محصولية تختلف عن الخطة الفعلية للمزارعين. الفول السوداني من أكثر المحاصيل ربحية في ظل الأسعار والإنتاجية السائدة في الموسم 2006/2007. حل النماذج الأساسية أعطت دالة هدف مربحة بينما في الواقع حقق المزارعين الخسارة. العمالة الأسرية ورأس المال تمثل المعوقات الرئيسية للإنتاج الزراعي بمنطقة الدراسة. تطبيق الحزم التقنية الموصى بها وزيادة أسعار المنتجات الزراعية ونقصان تكاليف المدخلات أعطت دعم كبير للدخل المزرعي بمنطقة الدراسة.

من أجل تحقيق تنمية زراعية وامن غذائي بمنطقة الدراسة قدمت الدراسة بعض من التوصيات من ضمنها:

1. مد المزارعين بالمدخلات الزراعية من خلال (أ) توزيع المدخلات خاصة البذور من خلال السداد (عيناً) بعد الحصاد و(ب) إدخال المدخلات المعمرة مثل طلمبات الرش والأدوات اليدوية عن طريق الإيجار.
2. دعم الإرشاد الزراعي ليصبح ذات فعالية وكفاءة في تبني التقنية الموصى بها.
3. إيجاد مصادر تمويل في المناطق الريفية وتسهيل عملية الائتمان الزراعي.
4. تشجيع التدخل الحكومي لتركيز أسعار الغلات المزرعية.

**THE CONSTRAINTS OF AGRICULTURAL DEVELOPMENT IN THE  
TRADITIONAL RAINFED SECTOR IN SUDAN  
A STUDY OF NORTH DARFUR STATE**

معو قات التنمية الزراعية في القطاع المطري التقليدي في

السودان

دراسة ولاية شمال دارفور

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