Dedication

To the soul of my father who taught me the meaning of life.

To my mother the origin of my success.

To my brothers and sisters, may God bless them.

To my whole (Abdoon) family.

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TABLE OF CONTENTS

CHAPTER TWO: LITRITURE REVEIW

CHAPTER THREE: MATERIALS AND METHODS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The developed optimization model aimed to aid decision-maker and farm manager in determining the number of tractors, scheduling agricultural operations efficiently and minimizing machinery total costs.

Model verification was made by comparing the numbers of tractors of Rahad irrigated scheme for season 2008/2009 with those estimated by the model. The applied model in Binna agricultural scheme was succeeded in reducing number of tractors and operations total costs by 29.4%.

Sensitivity analysis in terms of model response to changes in model input for a single parameter for each of cultivated area and operation total cost showing that:

- Increasing the cultivated area by 20%, increased the total number of tractor after optimization from 12 to 16 tractors and total fuel cost was also increased from 66857.6 SDG to 79760 SDG.
- Increasing the operation total cost by 20%, increased the total number of tractor after optimization by 29.4%, and total fuel cost was also increased by 16.7%.
- Changing both area cultivated and operation total cost increased the fuel total cost by 16.2%.

الخلاصة

تم تطوير النموذج الأمثل بغرض مساعدة صانع القرار و مدير المزرعة في تحديد عدد الجرارات ،جدولة العمليات الزراعية بكفاءة وتقليل تكاليف العمليات الزراعية.
تم تحقيق صحة النموذج بتطبيقه علي حالة مشروع الرهد الزراعي لموسم 2008م/2009م. أدى تطبيق النموذج علي مشروع بنا الزراعي إلي تقليل عدد الجرارات وتقليل تكاليف تشغيل الآلات الزراعية بنسبة 29.4%.

تم تحليل الحساسية لاستجابة النموذج بتغيير مدخلات النموذج:المساحات المزروعة والتكاليف الكلية للعمليات الزراعية: زيادة المساحات بنسبة 20% أدت لزيادة عدد الجرارات من 12الي 16 جرار وأيضا زيادة تكلفة الوقود من 66857.6 إلي 79760 جنيه سوداني. زيادة تكاليف العمليات الزراعية بنسبة 20% أدت إلي زيادة عدد الجرارات بنسبة 29.4% و

أيضا زيادة تكلفة الو قود بنسبة 16.7%. زيادة المساحات و تكاليف العمليات الزراعية معا أدت إلي زيادة تكلفة الو قود بنسبة 16.2%.