

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.

Acknowledgements

Praise be to Allah who gave me health, strength and patience to conduct this work. I would like to express my gratitude and appreciation to my supervisor Dr. **Mysara Ahmed Mohamed** for his consistent supervision and patience, invaluable advise, and guidance throughout the course of study.

Finally, I would like to express my deep thanks and appreciation to my family members, special thanks to my grand-brother **Saied Nuri Salih**, who helped me in every possible way and for their encouragement and patience.

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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 ومدير المزرعة في تحديد عدد الجرارات، جدول العمليات الزراعية بكفاءة وتقليل تكاليف العمليات الزراعية. تم تدقيق 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 12 الي 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

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