

# Dedication

*I dedicate my dissertation work  
to my family and many friends.*

*A special*

*Feeling of gratitude to my  
loving parents, for their  
encouragement and push for  
tenacity ring in my ears. My  
sisters have never left my side  
and are very special.*

*I also dedicate this dissertation  
to all friends who supported  
me throughout the process.*

*I dedicate this work and give  
special thanks to my best  
brother Adris Musa.*

*Thanks for everything.*

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## ملخص الدراسة

هذه الدراسة أجريت في قسم الهندسة الزراعية- كلية الدراسات الزراعية – جامعة السودان للعلوم وتكنولوجيا في عام 2015-2016 الهدف الأساسي للدراسة هو تصميم وتنفيذ واختبار نموذج لمنقيه درامية واستخدامها في تنقية الطمي في مياه النيل الأزرق . تم تصميم الجهاز من مواد متوفرة محليا. لم تتعدى تكلفتها 2610 جنيه سوداني .

قطر الأنبوب الداخلي والخارجي 2 بوصة. سعة التصريف للأنموذج 5900 لتر/ الساعة. أوضحت النتائج المتحصل عليها في اللانموذج إن الأداء مرضي ومتفق مع مواصفات مياه الري التي نصت عليها منظمة الزراعة العالمية FAO. تم عمل تجربتين تمثليتين لتنقية الطمي المحمول بتركيز 6.9 جرام/لتر و 8.6 جرام/لتر. النتائج المتحصل عليها قريبة من النتائج المتحصل عليها في تنقية مياه النيل الأزرق .

الاختلافات البسيطة تعزي لوجود طين زائد علي الطمي المتحصل عليه مع الطمي في تجربة التماثل. تمت مقارنة مستوي العكارة قبل وبعد التنقية لمياه النيل الأزرق . النتائج المتحصل عليها

اقل من المستوى المسموح به في مواصفات United States Environmental Protection Agency(EAp) وهذا ما أدت إليه التجربتان التماثلتان. والتكلفة الكلية لتصميم وتنفيذ الجهاز 2610 جنيه بينما تكلفة المستورد 3499 جنيه . النتائج النهائية تدل علي أن تبني هذا الجهاز يضمن أداء فني مرضي و بتكلفة اقل .

## **Abstract**

This study conducted at the Department of Agricultural Engineering, College of Agricultural Studies , Sudan University of Sciences and Technology 2015 – 2016. The main objective of this study is to design , construct and test a model for a hydro cyclone irrigation water filter to be used in filtration of Blue Nile water for modern pressurized s irrigation systems. The hydro cyclone was constructed from locally available materials. The local cost did not exceed 2610 SDG .The inlet and outlet pipes diameter were two inches. The discharge capacity of the model was 5900 l/h. The results obtained from the model were very satisfactory since it was complying with irrigation water silt load standards adopted by FAO (2 gm/l). Two filtration simulations were carried out for silt loads of 6.8gm/l and 8.6gm/l. The results were very close to the Blue Nile filtration results. The slight difference seem to be attributed to extra clay conduct that was achieved to the river silt used in the simulation process. Turbidity levels before and after filtration for Blue Nile water was compared. The results were below the allowable level specified by United States Environmental Protection Agency (EAp). This is also true for the two simulation levels. The total cost of the designed and constructed model 2610 SDG which the cost of the imported similar size model filter is 3499 SDG. The final results revealed that the adoption of such a model is quite satisfactory for it well satisfactory technical performance and lower cost.

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## Abbreviations

WHO	The world health organization.
FAO	Food Agricultural Organization.
USDA	United States Department of Agriculture.
APHAA	American Paint Horse Association.
ECw	Water Electrical Conductivity.
TSS	Total Suspended Solids.
SAR	Sodium Absorption Ratio.
BCM	Billion Cubic Meter.
MoRD	Ministry of Rural Development.
NCPAH	National Committee On Plasticulture Application Horticulture
SPSS	Statistical Package for Social Sciences.
LAT	Latitude.
Alt	Altitude.
N	Northern.
E	Eastern.
Q	Discharge( $m^3/h$ ).
NTU	Nephelometric Turbidity Unit.
EAP	United States Environmental Protection Agency.