



**BUSITEMA  
UNIVERSITY**  
*Pursuing Excellence*

**FACULTY OF ENGINEERING**

**DEPARTMENT OF WATER RESOURCES AND MINING  
ENGINEERING**

**FINAL YEAR PROJECT REPORT**

**REMOTE SENSING AND GIS APPLICATION IN DETERMINING  
WATER REQUIREMENT FOR PADDY AT KIBIMBA IRRIGATION  
SCHEME IN BUGIRI DISTRICT, EASTERN UGANDA**

By

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*A final year project proposal report submitted to the Department of Water Resources and Mining Engineering as a partial fulfillment of the requirements for the award of a Bachelor of Science degree in Water Resources Engineering*

*Dec 2020*

## **Abstract**

Water in the modern world is a highly valuable resource, so it is very necessary to use this very precious resource wisely. One of the major users of water is agriculture either in form of direct use or through irrigation. It becomes very important to note the various requirements and their amount of supply, in this case an important tool can be useful to the calculation. I.e. IRRIGATION EFFICIENCY and with this crop water requirement can also be an effective tool. Irrigation efficiency is highly useful data in calculation the actual water requirement at the field and the amount of water that is supplied to the farm lands. There are many techniques usually applied for calculation of such process but ArcGIS was taken into consideration with high resolution satellite images because a large area can be covered with ease a thematic map can be usually designed, land use and land cover map can be used too. The study area is Kibimba rice irrigation scheme, in Bugiri district of eastern Uganda. This study is focusing on estimating the water demand for paddy crop during specific cropping season within the study area. High quality satellite images were taken into consideration to identify the irrigated areas and the fallow land.

## **ACKNOWLEDGEMENT**

First, I thank Almighty God for giving me grace to endure until the end.

My deep gratitude is expressed to my supervisor Mr. Mugisha Moses for the guidance, precious advice, relevant remarks and never-ending support. It was a great honor and pleasure to work with you. Thanks for all the time devoted to me.

My heart pulsates with the thrill for tendering gratitude to the entire staff of the department of Mining and Water Resources Engineering Busitema University for providing all kind of possible assistances throughout this project.

Let me also convey my heartfelt appreciation to the management of Kibimba Uganda ltd for permitting me carry out my research project using the scheme as my case study area and for also providing me with the required data and all support that aided completion of the project. Many thanks Goes to DR. John S.J Daniel head of research and farming at the scheme and Mr. Raju ragupathi head of farming at the scheme, may the almighty God bless you.

Great thanks to my beloved Mother Ms. Auma Rose AND my father Mr. Godfrey Musisi for the financial and moral support you gave me. It would be great injustice if I omit the role played by my dear friend Weredwong Emmanuel in tremendous tireless support and guidance given to me during the writing of this report and the entire team of class 2016. May the good Lord reward you all!

**DECLARATION**

I **ONYANGO MICHAEL**, hereby declare to the best of my knowledge, that this project report is an outcome of my efforts and that it has not been presented to any institution of learning for an academic award.

Signature: .....

Date: ...../...../.....

**APPROVAL**

This final research report has been submitted to the Faculty of Engineering for examination with approval of my supervisor.

MR. MUGISHA MOSES

Signature..... Date...../...../.....

**Project Supervisor**

## **DEDICATION**

*This report is dedicated to my beloved parents in appreciation for their paramount care and countless support provided to me since childhood, and for the spirit of hard work, courage and determination instilled in me, which attributes I have cherished with firmness and which have indeed made me what I am today. I further dedicate this works to all my sibling's ben, Esther, henry, Vincent and joseph.*

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## LIST OF ACRONYMS

GIS	Geographical Information System
GPS	Global Positioning System
FAO	Food and Agriculture Organization
ETM+	Enhanced Thematic Mapper plus
UBOS	Uganda bureau of statistics
UNEP	United Nations Environmental Program
NDVI	Normalized Difference Vegetation Index
LULC	Land Use Land Cover
NIR	Near infra-red
OLI	Operational land imager
RS	Remote sensing
TM	Thematic map
VI	Vegetation index
TIRS	Thermal infra-red sensor
EVI	Enhanced vegetation index
FOSS	Free and open source software
HDF	Hierarchical data format
ESRI	Environmental systems research institute
EMS	Electromagnetic spectrum
MLC	Maximum likelihood classifier
TIRS	Thermal infrared sensor

METRIC	Mapping Evapotranspiration at High Resolution with Internalized Calibration
SEBAL	Surface Energy Balance Algorithm for Land
SEBS	Surface Energy Balance System
SSEB	Simplified Surface Energy Balance