
FACULTY OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION
ENGINEERING

FINAL YEAR PROJECT REPORT

**APPLICATION OF GIS-BASED MULTI-CRITERIA DECISION ANALYSIS
TECHNIQUES IN EVALUATING SOIL SUITABILITY FOR COTTON
CULTIVATION-Case study area: Tororo District (Uganda)**

BY

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**Report submitted in partial fulfillment of the requirements for the award of Bachelor of
Science in Agricultural Mechanization and Irrigation Engineering of Busitema University.**

Date.....

DECLARATION

I EGESSA EMMANUEL MWOHO declare that this research project is my original work, except where due acknowledgement has been made. I declare that this work has never been submitted to this University or to any other institution for funding/partial fulfillment for any award.

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DEDICATION

In life three sect of people matters most, firstly, God Almighty, secondly, parents and thirdly, friends. I dedicate this report to God for His unlimited grace, consistent love, immeasurable faithfulness, and for preserving my life throughout the period of doing this research, secondly to my loving parents for their undiminished support and unquantifiable assistance throughout the whole exercise and also my beloved friends who always encourage me to be strong.

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LIST OF ACRONYMS AND ABBREVIATIONS

AHP	Analytical Hierarchy Process.
BFP	Budget Framework Paper.
BPA	Bukalasa Pedigree Albar.
CDO	Cotton Development Organization.
COVID	Corona Virus Disease.
FAO	Food and Agriculture Organization.
GIS	Geographical Information Systems.
GPS	Global Positioning System.
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries.
MCDA	Multi-Criteria Decision Analysis.
MCDM	Multi-Criteria Decision Making.
NAP	National Agricultural Policy.
NARO	National Agricultural Research Organization.
NASA	National Aeronautics and Space Administration.
UBOS	Uganda Bureau of Statistics.
UGX	Uganda Shillings.
UN	United Nations.
UNBS	Uganda National Bureau of Standards.
UNCTAD	United Nations Conference on Trade and Development.
USDA	United States Department of Agriculture.
USGS	United States Geological Survey.
WWF	World Wildlife Fund.

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ABSTRACT

In this study an attempt was made to analyze the soils of Tororo district, Eastern Uganda for soil suitability evaluation for cotton cultivation using geographic information system (GIS)-based multicriteria decision analysis techniques. The study shows the effective nine parameters (calcium carbonate, organic carbon, soil pH, soil type, coarse fragments, soil texture, slope, drainage and altitude) that were analyzed and reclassified by matching the requirements of cotton crop with the properties of a particular land unit into different suitability classes such as; $S \in \{S1, S2, S3, N\} = \{\text{highly suitable, moderately suitable, marginally suitable, not suitable}\}$.

The thematic maps of the factors that determine the potential for cotton cultivation were formed (from the effective nine parameters), overlaid and weighted to come up with a soil suitability map for cotton cultivation.

The area analysis revealed that, 28274.7598 ha (23.6332%) was Highly suitable (S1), 50722.5312 ha (42.3960%) was Moderately suitable (S2), 20824.7154 ha (17.4061%) was Marginally suitable (S3), and 19817.9935 ha (16.5647%) was not suitable (N) for cotton cultivation in Tororo district because of uncorrectable factors such as soil depth and slope.

The study demonstrated that GIS-based multicriteria overlay analysis of soil thematic parameters will be of immense help in soil-suitability evaluation for cotton.