



FACULTY OF ENGINEERING

**DEPARTMENT OF WATER RESOURCES AND MINING ENGINEERING
SMART DECISION SUPPORT TOOLS FOR OPTIMAL CROP PLANNING AND
PIPED IRRIGATION SYSTEM DESIGN**

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ABSTRACT

The high population density and the projected rapidly increasing population in sub-Saharan Africa and Uganda in particular combined with the effect of the increasingly inadequate and irregular rainfall patterns due to climate change have led to the increased need for modern piped irrigation networks to cope with the increasing demand and diminishing supply of food. However, most agricultural practitioners are limited by the use of personal judgement to select the crop to grow as well as the highly tedious and intellectually challenging computations for the type of piped irrigation system to install. This project, therefore, is inclined towards optimizing the cropping patterns ensuring land utilization and minimising the initial and operational costs of using piped irrigation systems whilst reducing the time taken to design an efficient piped irrigation system through the use of a genetic algorithm for optimisation of the system parameters and Epanet-Matlab toolkit for simulation using pressure and discharge as the parameters.

Keywords: Irrigation systems, Epanet-Matlab toolkit, Genetic algorithm, Optimisation.

DECLARATION

I the undersigned, declare that this research proposal is my original work, except where due acknowledgement has been made. I declare that this work has never been submitted to this University or any other institution for funding / for partial fulfilment for any award.

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SUPERVISOR APPROVAL

This research proposal submitted as partial fulfilment for the award of Bachelors Degree of Science in Water Resources Engineering of Busitema University, with my approval as the academic supervisor.

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LIST OF ACRONYMS

MATLAB- Matrix laboratory

SIDT-Smart Irrigation Design Tool.

GUI- Graphical User interface.

GA- Genetic Algorithm.

ET_o- Reference Crop evapo transpiration

K_c - Crop Coefficient

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