

FACULTY OF ENGINEERING AND TECHNOLOGY

**DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION
ENGINEERING**

FINAL YEAR PROJECT REPORT

**TITLE: DESIGN AND FABRICATION OF A LASER LEVELING SYSTEM FOR A
WALKING TRACTOR**

Case study: Ngenge irrigation scheme in Kween District.

(The system works specifically on a relatively flat lowland areas in Rice fields)

By

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A final year project report submitted to the Department of Agricultural Mechanization and Irrigation Engineering as a partial fulfillment of the requirements for the award of a bachelor's degree of Science in Agricultural Mechanization and Irrigation Engineering.

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ABSTRACT

Land leveling plays a critical role in improving irrigation efficiency, crop productivity, and soil health. In Uganda, particularly in areas like the Ngenge Irrigation Scheme in Kween District, small-scale farmers continue to rely on traditional, labor-intensive land leveling methods due to the high cost and incompatibility of existing laser leveling systems with walking tractors. This project aimed to design and fabricate a low-cost, scalable laser land leveling system suitable for integration with a walking tractor to support farms under five acres. The system employs a laser transmitter, ultrasonic and laser sensors, and a microcontroller-based control unit to automatically adjust a scraper mechanism. The components were designed using SolidWorks, fabricated with locally available materials like mild steel and cast iron, and integrated with an Arduino-based control system. Performance testing revealed a leveling index of 55.7%, indicating partial effectiveness but highlighting the need for improvements in motor speed, driver capacity, and hoe responsiveness. Despite the limitations, the project demonstrated the feasibility of creating a low-cost leveling solution for smallholder farmers, with potential for refinement and wider adoption. The system contributes toward achieving SDG goals related to poverty reduction, food security, and sustainable land management.

DECLARATION

We MUTEBI INNOCENT, NASSIMBWA DAMALIE, OWORI GEORGE AND OGWANG ALDRINE DEO declare that this final year project report was prepared out of our own endless efforts and it has never been presented to any institution of higher learning for any award.

MUTEBI INNOCENT BU/UP/2021/0258

Signature

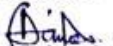

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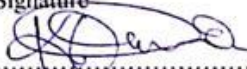

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APPROVAL

This final year project report has been prepared and compiled by **Mutebi Innocent, Nassimbwa Damalie, Owori George and Ogwang Aldrine Deo**. It is therefore submitted to be approved by,

Supervisor

MR. ASHABAHEBWA AMBROSE.

Signature


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Date


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