

FACULTY OF ENGINEERING

**DEPARTMENT OF AGRICULTURAL MECHANIZATION AND IRRIGATION
ENGINEERING.**

**DESIGN OF A TRACTOR PTO POWERED FINGER MILLET THRESHING AND
CLEANING MACHINE.**

CASE STUDY: TORORO AND BUSIA DISTRICT.

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ABSTRACT

Millet is a vital crop for small-scale farmers in sub-Saharan Africa, providing food security and income for millions of people. The Food and Agriculture Organization (FAO) advises Ugandans to grow millets on a large scale due to their being sources of healthy and nutritious food as the country and the entire globe experience climate emergencies and depleting natural resources. Dr Antonio Querido, Uganda's country Representative for the Food and Agriculture Organization (FAO), says millets have nutritional and health benefits and are suitable for cultivation under adverse and changing climatic conditions. He adds that millets like sorghum require limited inputs including water to thrive which makes them some of the most important food security crops since they can withstand climate change challenges including drought as well as growing it does not affect the health of the environment or existing biodiversity. "Millets are small powerful whole grains packed with essential nutrients that make them very important for sustainable health and nutrition security. These are some of the traits that merit millets being called "small crops." It is no wonder, therefore, that millets were among the first plants to be domesticated in the world.

The global annual planting area of finger millet is estimated to be around 4 – 4.5 million ha, with a total production of 5 million tons of grains, of which India produces about 2.2 million tones and Africa about 2 million tons. The rest comes from other countries in South Asia. (M. Singh & Kumar, 2016). However, the labor-intensive process of threshing millet grains from their panicles hinders efficient production.

To address this challenge, we designed and developed a PTO-driven millet threshing machine that simplifies and accelerates the threshing process. The machine is powered by a tractor's Power Take-Off (PTO) shaft, providing a reliable and efficient source of energy. The machine consists of a feeding system, threshing drum, and separation unit. The feeding system collects the millet panicles and conveys them to the threshing drum, where the grains are separated from the chaff and panicles. The separation unit then divides the grains from the chaff and straw. Compared to traditional manual threshing methods, this machine reduces the threshing time and increases the productivity of small-scale farmers. Additionally, the machine is designed to be durable, easy to maintain, and adaptable to various tractor models, making it an ideal solution for small-scale farmers in resource-constrained settings. This innovation has the potential to improve the livelihoods of millions of small-scale farmers.

DECLARATION

We **ERIAU DANIEL, KIRYA JOB AND ATUGONZA BRIAN** declare that this final year project report proposal was prepared out of our own endless efforts and it has never been presented to any institution of higher learning for any award.

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21/06/2024

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To the parents, we thank you for being there for us throughout. You have been a strong pillar in our success because of the financial muscle that you provided whenever need arose. May the almighty Lord grant your heart's desire.

We also cannot fail to express our appreciation to the department of Agricultural Mechanization and Irrigation Engineering for standing with us throughout this period. In this, we would like to recognize the efforts of the project coordinator Mr. Ambrose Ashabahebwa, head of department Mr. Eriau Emmanuel and other departmental members.

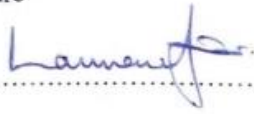
APPROVAL

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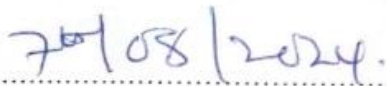
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Signature



Date



ACRONYMS

AMI	Agricultural Mechanization and Irrigation Engineering
BM	Bending Moment
BV	Book Value
DDB	Double Declining Balance
DC	Depreciation Charge
EOY	End Of Year
FAO	Food and Agricultural Organization
ha	Hectare
Mpa	Mega pascal
MOG	Materials Other than Grain
NPV	Net Present Value
PTO	Power Take Off
UGX	Uganda Shillings

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