



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF CHEMICAL AND PROCESS ENGINEERING

FINAL YEAR PROJECT

**DESIGN AND CONSTRUCTION OF A NOVEL ROUND THE CLOCK SOLAR
CROP DRYER WITH WATER RECOVERY.**

PART 1: THE SOLAR THERMAL (ST) AND PHOTOVOLTAIC (PV) SUBSYSTEMS

BY AKANKWATSA ADELLA

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Email: akankwatsaadella1@gmail.com

SUPERVISED BY:

PROF. DR. ENG. KANYARUSOKE KANT

MR KILAMA GEORGE

OTHER TEAM MEMBERS

NALUMANSI DOREEN- PART 2

AKIMANZI GLORIA – PART

3

KAKOOZA IBRAHIM – PART 4

SENSUWA ENOCK – PART 5

*A final year project report is submitted in partial fulfillment for the award of a Bachelor of
Science in Agro-processing Engineering*

ABSTRACT

This project is about designing, constructing and testing a round the crop solar crop dryer with water recovery. It involves detailed design of five different subsystems requiring different areas of knowledge, and bringing them together in one integrated solar crop dryer. This particular part of the main project handles the solar (ST) and solar photovoltaic (PV) subsystems. For a dryer capable of drying crop to extract at least 20 liters of water in 24 hours, an ST is designed, constructed and fitted to subsystems by other team members. Sizing is done not only to produce the day time drying energy required but also, to match some of the external dimensions of the drying chamber subsystem, designed by other team member while also satisfying aesthetic design requirements imposed by yet another member. The PV system is designed to run the electrics of the dryer on a 24 hour per day operation basis. Day time design energy requirements are supplied by the solar thermal and the air flow systems. Night time and cloudy hours design energy requirements are supplied solar photovoltaic system and the refrigeration system.

Key words: solar thermal collector, photovoltaic system, round the clock solar crop dryer.

DECLARATION.

I **AKANKWATSA ADELLA** declare that the work presented here is out of my own research except where due references are made. It has not been partially or wholly submitted for any academic award to any institution of higher learning any award whatsoever.

Signature.....

APPROVAL.

This is to certify that this research project has been carried out under my supervision and that it is ready for submission to the department.

Supervisor 1 Name: PROF KANYARUSOKE KANT

Signature.....

Supervisor 2 Name: Mr. KILAMA GEORGE

Signature;.....

DEDICATION.

This report is dedicated to Mr. Karungi Fred and Mrs Mable Karungi, my siblings and friends who have entirely supported me in this project.

ACKNOWLEDGEMENT.

My sincere thanks go to the almighty God for giving me strength, wisdom and protection throughout the preparation of this work.

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