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FACULTY OF ENGINEERING

**DEPARTMENT OF AGRICULTURAL MECHANISATION AND IRRIGATION
ENGINEERING**

BY:

DESIGN AND CONSTRUCTION OF A SOLUBLE FERTILISER RELEASER

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**A design and construction fourth year project proposal submitted in partial fulfilment for
the award of bachelors of agricultural mechanisation and irrigation engineering.**

ABSTRACT

In Uganda, pressurised systems of irrigation are increasingly being adopted, this is due to the convenience they render, amongst which, is fertigation. Fertigation in any irrigation practice involves the introduction of soluble fertiliser solutions and/or intended chemicals into the irrigation system using any dosing apparatus.

Fertigation enriches and replenishes the soils with one or more nutrients, however the device used for fertigation determines the quality and quantity of output of the produce as the available methods of fertigation are sophisticated to both operate and repair plus the high initial cost. The local farmers in Uganda usually fertigate their crops by methods: pump injection, vacuum injection (venturi), and pressure differential. However, these all require skilled labour and they are intricate, the reason for the low adoption rate of fertigation by most potential farmers. This is as a result of lack of a device that can easily be afforded, set up, operated and as well maintained. This demands an extensive research in the area fertigating devices which the researcher should develop a design and eventually construct a simpler liquid fertiliser releaser to effectively address the above mentioned challenges faced by the farmers.

This study was conducted to design and construct a simple fertigating device for mainly drip irrigation system for perennial crops and citrus growing on heavy soils. This involved factors like availability of raw materials, ease of operation, maintenance costs and affordability of the device, while importantly focusing at the uniformity of the mixture proceeding to the crops.

The performance results indicated that the minimum head required for the device to function as required was 0.8m, low enough to be employed on most the fields using pressurised systems of irrigation. The homogeneity of the solution improved with increase in head.

Key words: soluble fertiliser releaser, fertigation, nutrients, pressurised system, drip system, citrus, heavy soils, uniformity homogeneity, head.

DECLARATION

I *MUSANYANA RUBEN* hereby declare this project report titled “design and construction of a soluble fertiliser releaser” a result of entirely my own efforts except as cited in the references.

Signature.....

Date..... 27TH - MAY - 2015



APPROVAL

This final project report is submitted to the Faculty of Agricultural Mechanisation and Irrigation Engineering as a partial fulfilment for the requirements for the Bachelor's degree in Agricultural Mechanisation and Irrigation Engineering with approval from the following supervisory committee.

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DEDICATION

To my beloved parents; **Priscilla Bilungi** and **Dison Musanyana Subire**.

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LIST OF ACRONYMS

PVC - Polyvinyl Chloride

GI - Galvanized Iron

HDPE - High Density Polyethylene

S/N - Serial Number

FAO – Food and Agriculture Organisation

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1.0 INTRODUCTION

1.1 Background of the Project.

Globally, pressurised systems of irrigation are increasingly being taken up by both household farmers and commercial farmers, and companies. This is due to the convenience the pressurised systems render and amongst them is Fertigation.

“Fertigation” – “fertilisation” plus “irrigation” in any irrigation technology involves the introduction of soluble fertiliser solutions into the irrigation systems via any dosing apparatus.

One way of enriching and replenishing the soil is by addition of artificial fertilisers. These fertilisers, which are simple chemical compounds, add one or more nutrients to the soil.

Though fertigation is being practised here in Uganda, it is still on a low because of the sophisticated nature of the available equipment that is not only costly but also complicated to use. And fertigation being such a good practice to modern farmers, it is better if farmers adopt hence there was need to construct a simpler and less costly fertigating equipment.

1.2 Problem statement

Despite the popularity of fertigation as a modern practice of farming, most farmers in Uganda are not adopting it easily though they are practising modern crop farming. Numerous designs of fertigation equipment are available however; they are sophisticated and costly for the farmers hence making it difficult for the farmers and their farm workers to adapt to them. Besides, the final solution that is fed to the crops is imperfectly mixed which results into either underfeeding or overfeeding. This is further complicated by the unavailability of spare parts coupled with no means of improvising due to the intricacy of the components. There is therefore a need to avail equipment that is less complicated for the farmers.

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