

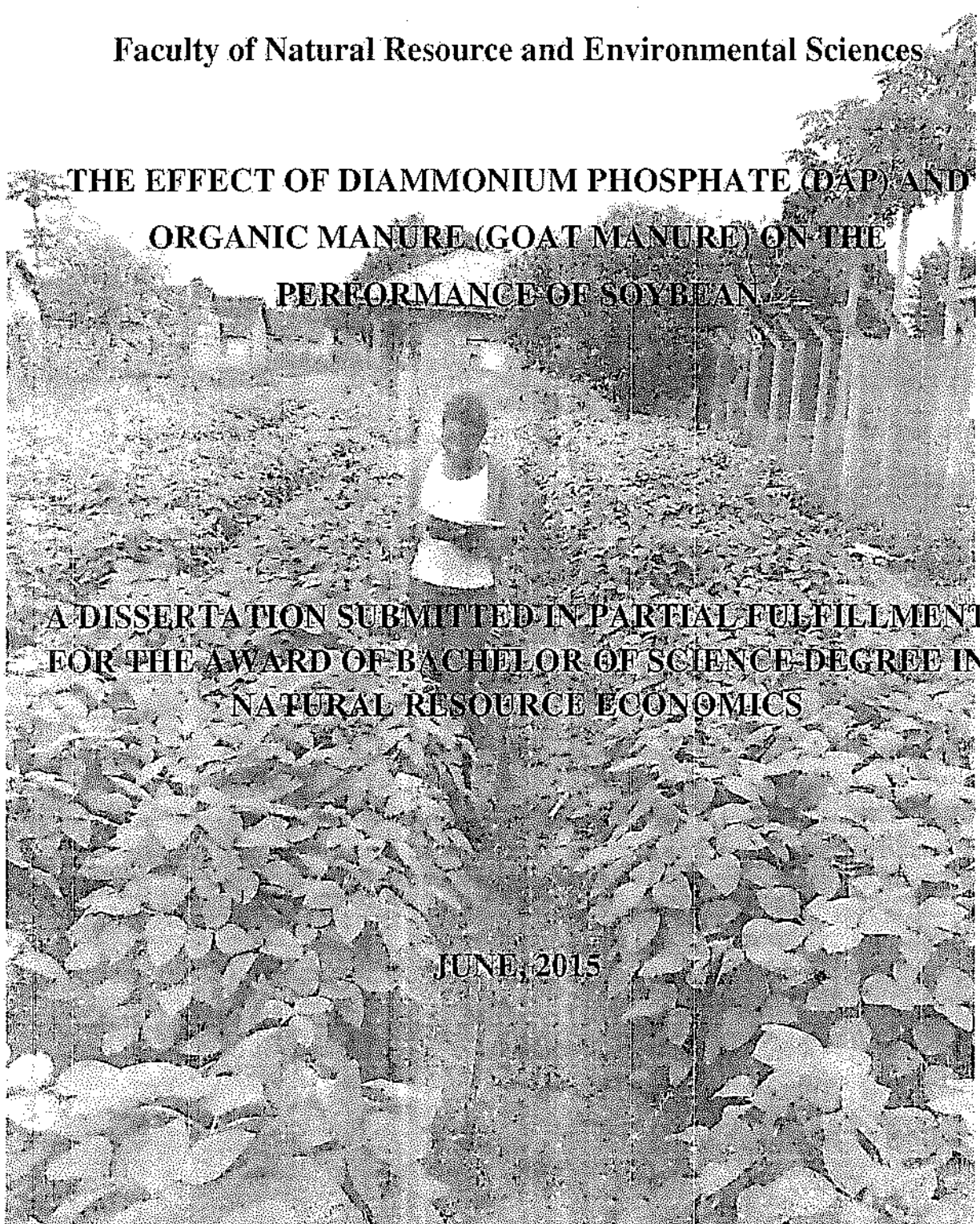
BUSITEMA UNIVERSITY

Faculty of Natural Resource and Environmental Sciences

**THE EFFECT OF DIAMMONIUM PHOSPHATE (DAP) AND
ORGANIC MANURE (GOAT MANURE) ON THE
PERFORMANCE OF SOYBEAN**

**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT
FOR THE AWARD OF BACHELOR OF SCIENCE DEGREE IN
NATURAL RESOURCE ECONOMICS**

JUNE, 2015



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Areto Dorcus

BU/UG/2012/115



Supervisor: Assoc. Prof. Moses Isabirye

**A Dissertation submitted in partial fulfillment for the award of
Bachelor of Science degree in Natural Resource economics**

JUNE, 2015

Declaration

I, Areto Dorcus do hereby declare that this research work has been through my own efforts and never has it been submitted to Busitema University or any other Institution of higher learning for the award of a degree or any other qualification.



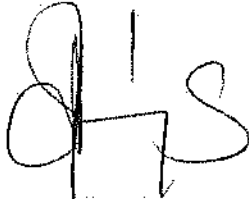
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Candidate

Approval

This is to confirm this research report is original and has only been through the efforts of Areto Dorcus after pursuing a three year Bachelor of Science degree in natural resource economics of Busitema University. She has therefore fulfilled part of her requirements for the award of the degree in Natural Resource Economics of Busitema University.

Supervisor:



ASSOC. PROF. MOSES ISABIRYE

Senior Lecturer, Busitema University

Dedication

To the Almighty father for protection and guidance he has granted me throughout my period of study, I glorify his name.

Also to my dear father Mr. Ebesu Fred and my beloved mother Mrs. Adongò Rose Mary. Without their care, support and advice, I would not have come to the completion of this course.

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To the almighty God, praise is to you Lord for your unending love and blessings that have taken me through the struggle. Even when I seemed unworthy, you gave me the courage, wisdom and determination to fight till the end. I thank you.

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Acronyms

C	Carbon
C.F	Correction factor
cm	Centimeter
cm ³	Cubic centimeter
Co ₂	Carbon dioxide
CV	Co-efficient of Variation
D	Density
d.f	Degrees of freedom
DAP	Diammonium phosphate
FAO	Food and Agricultural Organization of the United Nations
FYM	Farm Yard Manure
g	gram
Ha	hectare
i.e	That is to say
K	potassium
Kg	Kilogram
Km	Kilometer
M	Meter
mg	milligram
MS	Mean square
N	nitrogen
NAARI	Namulonge Agricultural and Animal Production Research Institute

NADP	Nicotinamide Adenine Dinucleotide Phosphate
NARO	National Agricultural Research Organization
P	phosphorus
SS	Sums of squares
SSP	Single Superphosphate
STDEV	Standard Deviation
t/ha	Tons per hectare
USAID	United States Agency for international Development

Abstract

Production of soybean in Uganda is steadily increasing but yields have remained low averaging 990- 1150kg/ha in farmers fields (FAO, 2002). These low yields are attributed to several factors including low soil fertility, inappropriate management practices and attack by pests and diseases (Oloka, Tukamuhabwa and Sengooba, 2005). Use of synthetic fertilizers is being discouraged worldwide as they are known to affect soil health by killing the important soil micro-organisms. Because of this there is increasing advocate for the use of organic manure such as goat dung to increase crop productivity and farm yields. This research investigated the effect of DAP and goat manure on the performance of soybean. It was carried out from September 2014 to January 2015 in a randomized complete block design. Goat manure (0.4-0.5 nitrogen, 0.3-0.4 phosphorous and 0.3-0.4 potassium) that is according to Chandra (2005), was applied in each block at three levels excluding the control blocks that is 0.83tons/ha, 1.7tons/ha and 2.5tons/ha. The same blocks were at the same time treated with DAP at three levels as well i.e 0.01tons/ha, 0.02tons/ha and 0.03tons/ha.

The research showed that DAP and organic manure increases soybean yield on average by 5.2% however, M_1D_3 (2500kg manure combined with 20kg of DAP) increases it by up to 25.1% and increases the profit margins by 24.9%. This implied that DAP and organic manure improves soybean performance and increases farm profits.

Key words: soybean, Diammonium phosphate, organic manure, growth, yield

REFERENCES

- B.Franklin** (1772) Introduction to Cost-Benefit Analysis: Concepts and practices
- Esther and Giller** (2013) Background information on agronomy, farming systems and ongoing projects on grain legumes in Uganda. N2Africa Putting nitrogen fixation to work for smallholder farmers in Africa
- Guriqbal Singh** (2010) The soybean botany, production and uses
- Krishau Chandra** (2005) Organic manures: Regional Centre of Organic Farming No. 34, 5th Main Road Hebbal, Bangalore-24
- Kwanchai Gomez and Arturo** (1983) Statistical Procedures for Agricultural Research; Second Edition. An international rice research institute book, Wiley-interscience Publication
- Maheshbabu et-al** (2007) Effect of Organic Manures on Plant Growth, Seed Yield and Quality of Soybean. Department of Seed Science and Technology University of Agricultural Sciences, Dharwad - 580 005, Karnataka, India
- Mukiibi K. Joseph** (2001) Agriculture in Uganda: Volume II Crops. National Agricultural Research Organization, Fountain publishers/CTA
- Oloka, Tukamuhabwa & Sengooba** (2005) Evaluation of rust resistant soybean genotypes for yield in different agroecologies of Uganda. African Crop Science Conference Proceedings, Vol. 7, pp. 1331-1333
- Piraveena and Thayamini** (2012) The Effect of Cattle Manure Enriched With ERP Fertilizer on Seed Yield of Soybean (*Glycine max*) in Sandy Regosol
- Tukamuhabwa et al.** (2005) Over view of impact indicators of soybean rust resistant varieties on Uganda's economy; Makerere University, College of Agriculture and Environment Sciences, School of Agricultural Sciences
- Tukamuhabwa et al** (2004) New Soybean Varieties resistant to soybean rust. Department of Crop Science, Makerere University; National Crops Resources Research Institute

Verde et al (2013) Effects of manure, lime and mineral P fertilizer on soybean yields and soil fertility in a humic nitisol in the Central Highlands of Kenya. Agricultural Resources Management Department, Kenyatta University Nairobi Kenya

Wikipedia, the free encyclopedia (25 April 2014). Definition of organic manure