

**PLANTING TIME OF COWPEA LIVING MULCH EFFECT ON SOIL
MOISTURE FLUXES AND MAIZE GROWTH IN THE NORTHERN REGION,
GHANA**

By

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DECLARATION

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma at Kwame Nkrumah University of Science and Technology, Kumasi or any other educational institution, except where due acknowledgement is made in the thesis.

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DEDICATION

I dedicate this thesis first to the Lord Jesus Christ who through His grace, mercy, protection and provision has made my MPhil study successful, and to all who have supported me in one way or the other.

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ABSTRACT

The Northern Region of Ghana is vulnerable to weather variability especially uneven rainfall distribution patterns. This compromises soil moisture availability for optimal crop growth. The objective of this study was to assess the effect of cowpea living mulch as a soil and water conservation measure on soil moisture fluxes and maize growth in the Northern Region of Ghana. Four different maize-cowpea intercrop systems were combined with three maize varieties in four different communities and their effect on soil available moisture content and maize growth as well as yield were monitored and analyzed. The cowpea living mulch as well as maize varieties had effect on soil available moisture and maize growth. The presence of cowpea living mulch resulted in a maximum increase in available moisture of 8.81 %, its effects however differed with cowpea planting time. The system where cowpea was planted one week after planting maize yielded the highest improvement in available moisture content. Abontem maize also had higher available soil moisture conserved than the other varieties. The differences in effect of the cowpea living mulch systems on maize growth and grain yield was however not significant except for stem girth which was significantly bigger under the sole maize compared to the other three systems. Yield of maize increased with higher moisture availability. Highest maize grain yield was 3.13 t/ha under NLM, followed by 3.09 t/ha and 3.05 t/ha under A2WK and A1WK respectively. The results indicate that cowpea living mulch system is beneficial in conserving soil water which improves crop yield, and therefore should be encouraged in ensuring sustainable land use and management for maize production especially in arid and semi-arid areas.

LIST OF ABBREVIATIONS

A1WK	Cowpea planted 1 week after planting maize
A2WK	Cowpea 2 weeks after planting maize
ANOVA	Analysis of Variance
EEM	Extra-early maize
EM	Early maize
ET	Evapotranspiration
CLM	Cowpea Living Mulch
FAO	Food and Agriculture Organization
FC	Field Capacity
IITA	International Institute of Tropical Agriculture
MM	Medium maize
MV	Maize Variety
NLM	No Living Mulch
PWP	Permanent Wilting Point
RAW	Readily Available Water
SD	Cowpea planted same day as maize
SWAT	Soil and Water Assessment Tool
SWC	Soil and Water Conservation
TAW	Total Available Water
TDR	Time Domain Reflectometer
WOCAT	World Overview of Conservation Approaches and Techniques

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