



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING

**DEPARTMENT AGRICULTURAL MECHANISATION AND
IRRIGATION ENGINEERING**

**APPLICATION OF GIS TO MODEL MAPS OF CEMENT DUST
POLLUTANT CONCENTRATION ON AGRICULTURAL SOIL.**

(CASE STUDY: OSUKURU SUB-COUNTY IN TORORO DISTRICT)

BY

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A project research report submitted to the department of Agricultural Mechanization and Irrigation Engineering in partial fulfillment for the award of the Bachelor of Science in Agricultural Mechanization and Irrigation engineering degree of Busitema University

DECLARATION

I KISSA DERRICK hereby declare that all the information in this report is from my tireless work.

Signature

Date

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DEDICATION

This research is dedicated to my lovely Mother and Mrs. NAMUNYOLE CATHERINE and my friends who have stood by me and always believed in me. Thank you so much..

ACKNOWLEDGEMENT

First of all, I thank the almighty God for his protection and wisdom he granted to me throughout my education life.

I forward my appreciation to my mother towards her financial support, guidance and encouragement towards my studies and for making this research possible. I would love to express my gratitude to my supervisor Dr. Musinguzi Wilson and other lecturers of Busitema University in persons of Mr. Oketcho Yoronimo, Mr. Bwire Denise among others for their advice and encouragement throughout the research period. Sincere thanks are extended to Tororo cement factory and Earth Consults for support during field works.

ABSTRACT

The main objective of this research was to model spatial variation of heavy metals concentration (Pb, Cr, Ni, Cd, Cu, Zn) produced and released by Tororo Cement industry and also determine the statistical relation between the pollution load and the organic carbonate and Ph. Samples were taken along four compass direction taking the factory as the datum and considered 0 to 15cm soil depth. The concentration of the elements was measured by the atomic absorption spectrophotometer. The data was analyzed using the ArcGIS 10 software and the Inverse Distance Weight (IDW) method of overweight interpolation technique was used. The pollution was estimated using two indices that is the pollution index and the geo-accumulation index. The results showed for Cr, Cd, Ni, Pd, Cu, Zn to be highly concentrated within the factory with values (299.78, 2.99, 95.67, 243, 80.13, 297.4) mg/kg respectively. The background or standard values used in this particular research was (100, 0.8, 35, 85, 36 and 50) mg/kg (WHO 2002). The pollution and geo-accumulation index of the study area show high concentration of the heavy metals within the villages around the factory and also shows a sweep in pollution towards the southern direction.

The descriptive statistics and t-test carried out was to compare the mean of the pollution index and geo-accumulation index. The line graph was also to easily show the effect of the pollution load in the different villages with respect to the factory. The mean values, standard deviation and variance of the heavy metals parameters was calculated and the hypothesis of the research basing on the mean values of the heavy metal parameters was determined.

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APPROVAL

This is to confirm that this report has been written and presented by KISSA DERRICK giving the details of his Research work on Application of GIS To Model Cement Dust Pollutant Concentration On Agricultural Soil In osukuru sub-county in Tororo district.

SUPERVISOR

Dr. MUSINGUZI WILLISON

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