

IMPACTS OF SOIL EROSION ON CROP PRODUCTIVITY IN UGANDA

ACASE STUDY OF KIBUGA DIVISION BUTAMBALA DISTRICT

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ABSTRACT

The purpose of the study was to investigate the impact of soil erosion on the crop productivity in Kibuga Division in Butambala District. The study was based on the findings from 260 respondents presented results that were accurate and basing on the objectives of the study. The objectives of the study were to examine the impacts of soil erosion on crop production, to find out how soil erosion affects crop productivity, to establish the measures of soil erosion on crop production.

The findings of the study showed that almost all of participants told the investigator that one of the main negative effects of soil erosion on crop output was the loss of top soil. A small percentage of the participants updated the investigator that soil erosion would also result in poor drainage of the soil, and 10% of the people surveyed provided results showing that soil erosion would also result in compacting the soil decreasing on the yields. Several participants provided results showing that soil erosion would decrease the soil's fertility in the gardens. The study's findings showed that the majority of those who participated told the investigator that mulching was the primary strategy used to stop soil erosion. A small number of participants also showed results showing that cover crops were another strategy used by landowners to stop soil erosion. Finally, a few of the people surveyed submitted results showing that soil erosion was also eliminated through the use of organic fertilizers. Some of the participants submitted results showing that soil erosion will be eliminated in gardens by forest restoration. Finally, the outcomes of the research showed that many participants told the investigator that soil erosion had a greater impact on crop yields, accompanied by some who gave the investigator results showing that soil erosion had

a lesser impact on crop profitability, followed by a few who gave the investigator results showing that they were unsure whether soil erosion had a greater or lesser impact on crop yields.

Key words: soil erosion, floods and crop productivity

Background of the study

The vast majority of the population in East Africa depend on agricultural and live in rural areas. Depleted soils that lead to decreasing yields are one of the most significant issues facing regions of agriculture today. One explanation for this is soil erosion, which results from both historical and natural contexts. It causes major issues together with nutrient loss, particularly in intensive agriculture in humid climates (Lai 1995). The largest rates of production reduction are found in hilly places, cropping dry land, irrigated land, and rangeland (Scherr & Yadav 1996). The key biophysical parameters impacting the productivity of soils were looked at in this study. Soil productivity is also influenced by other variables, including economic and geopolitical ones, in various ways. Since they serve as the foundation for agriculture, environmental elements have an impact on an area's economic and socio-political factors (Kazaara et al., 2023). It can be challenging to determine whether a component, like demographics, is socio-political or economical because of the close linkages between economics and socio-political elements (Journal et al., 2023).

In this example, the offered factors include biophysical ones like geology, soil type, drainage, topography, rainfall, and temperatures as well as human history. On the other hand, several factors, such labor, capital, input, tenure security, politics, culture, knowledge, demographics, and trees and shrubs, are subject to short-term human change. All of these elements have an impact on the productivity of soils and agriculture because they either directly or indirectly affect the breakdown of soil and land usage. The main focus of this study is the relationship between the productivity of soil and topography, soil type, trees and shrubs, rainfall, soil nutrients, land use

and administration, and soil erosion. Environmental and livelihood are impacted by productivity of soils. Consequently, equitable growth is impacted. The results of the current study, which was conducted on farmers' fields, have been contrasted with those of studies from field test plots.

Statement of the problem

In Butambala district, soil erosion has an immediate effect on crop productivity. For instance, loss of soil fertility coupled with flash floods results in low crop yields that cannot support the expanding population in Kibuga division (Willies et al., 2022). It is hoped that this study will help policymakers and NEMA officials comprehend the various effects of soil erosion, including its consequences on the people in the Kibuga division in the Butambala district, and help them lay methods to stop it.

Specific objectives

- 1. To examine the impacts of soil erosion on crop production.*
- 2. To find out how soil erosion affects crop productivity*
- 3. To establish the measures of soil erosion on crop production*

Research questions

- 1. What are the impacts of soil erosion on crop productivity in Kibuga Division in Butambala district?*
- 2. What are the effects of soil erosion on crop productivity?*
- 3. What measures should be established on soil erosion in order to improve crop productivity?*

Methodology

Research design

In order to triangulate and improve the quality of the study's findings, a descriptive cross-sectional research design was used utilizing both qualitative and quantitative methodologies (Amin, 2005; Creswell, 2009). According to Creswell (2009) and Neuman (2011), the qualitative approach was used in ethnographic investigations to better

comprehend social phenomena and instances in their sociocultural context. In order to grasp respondents' thoughts and opinions on the climatic shifting patterns and pupils' accomplishments in Kibuga Division in Butambala District, it was necessary for the investigator to employ open-ended inquiries or terms. The study also employed a descriptive research design. Descriptive design was a design where the researcher described the status of affairs as they existed. This was a method of collecting information by means of interviews or administering questionnaires.

Sample size and sampling procedures

To choose the subjects for the study, stratified and deliberate sampling approaches were used. A stratified sampling technique involved the investigator identifying sub-groups within the target population. The investigator employed a deliberate technique to select individuals from various neighborhoods to be included in the sample.

To take part in the study, respondents were chosen at random from each of them from neighborhoods in the Kibuga division where soil erosion occurs.

Table 1: Sample Size

<i>Respondents</i>	<i>Target Population</i>	<i>Sample Size</i>
<i>Farmers</i>	<i>300</i>	<i>260</i>
<i>Agriculture officers</i>	<i>80</i>	<i>50</i>
<i>Total</i>	<i>380</i>	<i>310</i>

The researcher used a sample size of 260 farmers and 50 Agriculture officers in all the different villages in Kibuga Division using stratified sampling technique because it was the most effective when handling heterogeneous populations. Respondents from different villages will then be selected using simple random sampling technique to make the results objective.

Research instruments

Surveys and interviews were used to gather data. The kind and quality of the data that was gathered served as the basis for the choice of these technologies.

In this study, organized interview guides and surveys were the primary data collection tools. For the purpose of triangulation, the investigator analyzes the data produced using these two types of devices in accordance with the goals of the study. The use of several questionnaires is advised by researchers (Tashakkori & Teddlie, 2013; Bryman, 2016) to give a richness of data that satisfies the goals of the investigation and improves the degree to which the results of the research are trusted and conclusions can be drawn from them.

Data collection procedures

The Metropolitan International University's Faculty of Education and Humanities sent the investigator an introduction letter. After receiving permission from the farmers and agricultural officials, the investigator gave the study tools and followed the interview schedules to the participants who were sampled. The questionnaires were personally given to the responders by the investigator. Prior to the investigator collecting the questionnaire from participants on the same day as possible for the final analysis, each item in the questionnaires were fully completed.

Data analysis techniques

The procedures employed to evaluate and interpret the data gathered in order to confirm the fundamental research questions and arrive at a reasonable conclusion appeared to be determined in this part. It included describing the procedures that were involved and defending the appropriateness of the statistical methods employed. In order to prevent judgments based on incomplete sets of facts, this was done methodically. In order to analyze the data, both quantitative and qualitative methodologies had to be applied.

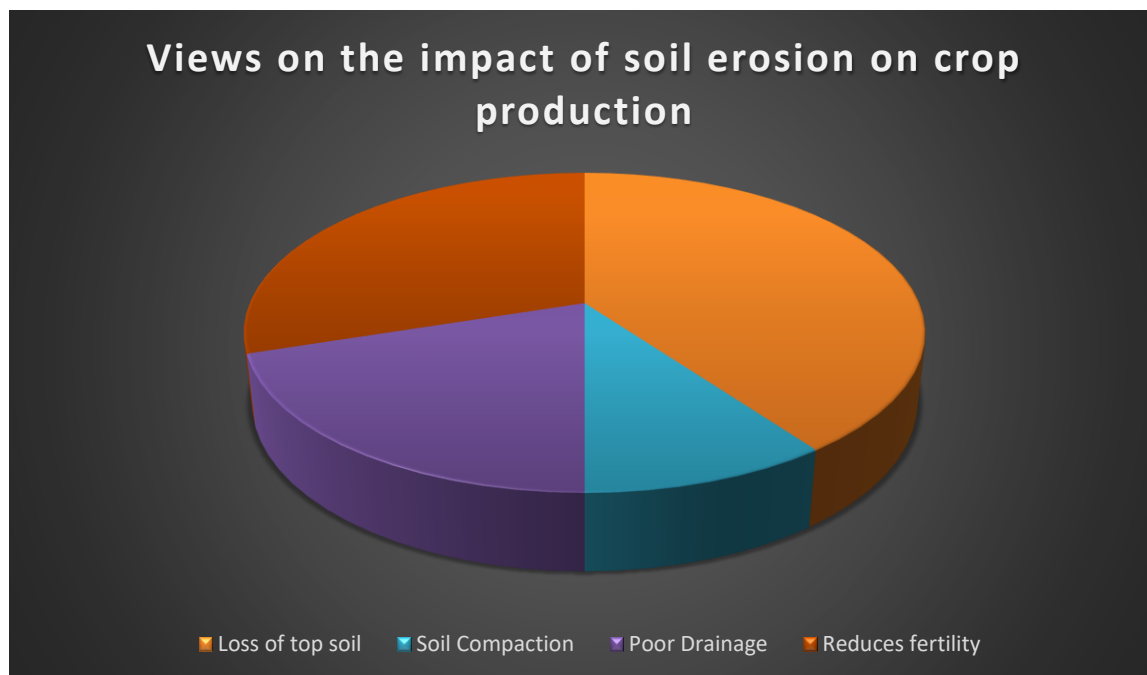
A descriptive evaluation was performed during the procedure. Categorical variables that were described using SPSS as frequencies and percentages were subjected to descriptive analysis (Nelson et al., 2022).

To quantify and describe the connections as well as variations between the specified variables in the numeric data, a qualitative approach was in the research topic.

RESULTS

Impacts of soil Erosion on Crop Production

Figure 1: Impacts of soil erosion on crop production

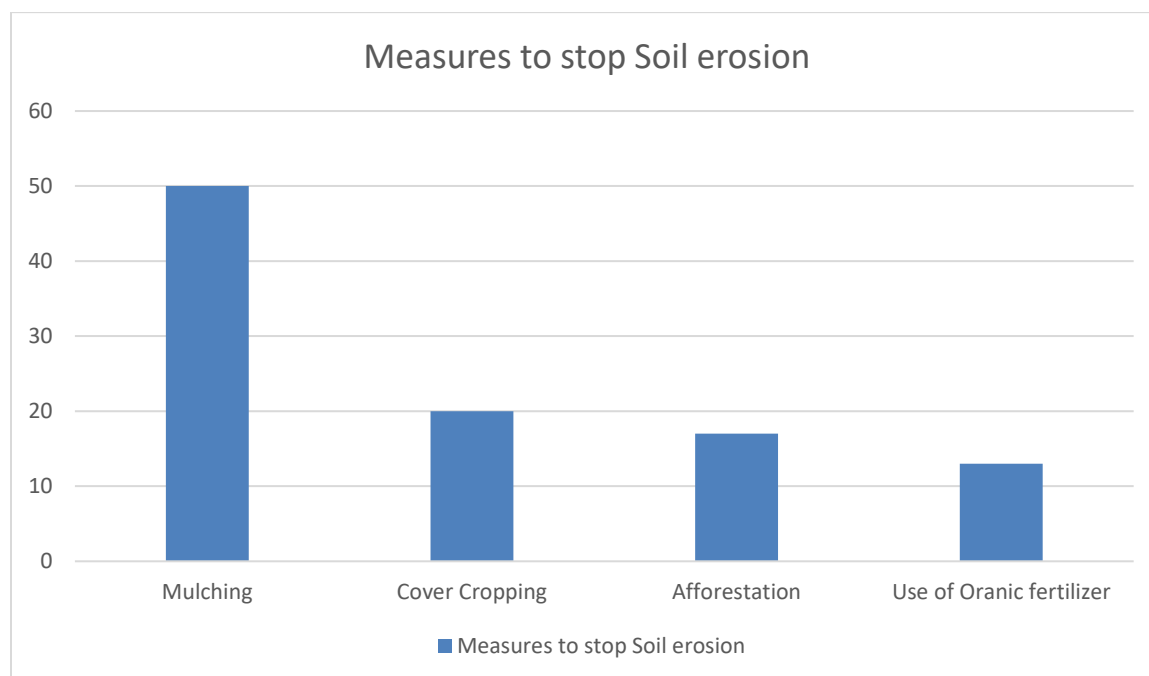


Research Data: 2022

The study's findings are depicted in the figure above, and they show that 40% of the participants told the investigator that one of the biggest negative effects of soil erosion on crop output was the loss of top soil. In addition, 20% of the participants told the investigator that soil erosion would additionally result in poor drainage of the soil, and 10% of the participants provided results showing that soil erosion would also result in compacting the soil and reducing on yields. Of the people who participated, 30% provided results showing that soil erosion would reduce soil fertility in the gardens.

Measures to stop Soil Erosion

Figure 2: Measures to stop Soil Erosion

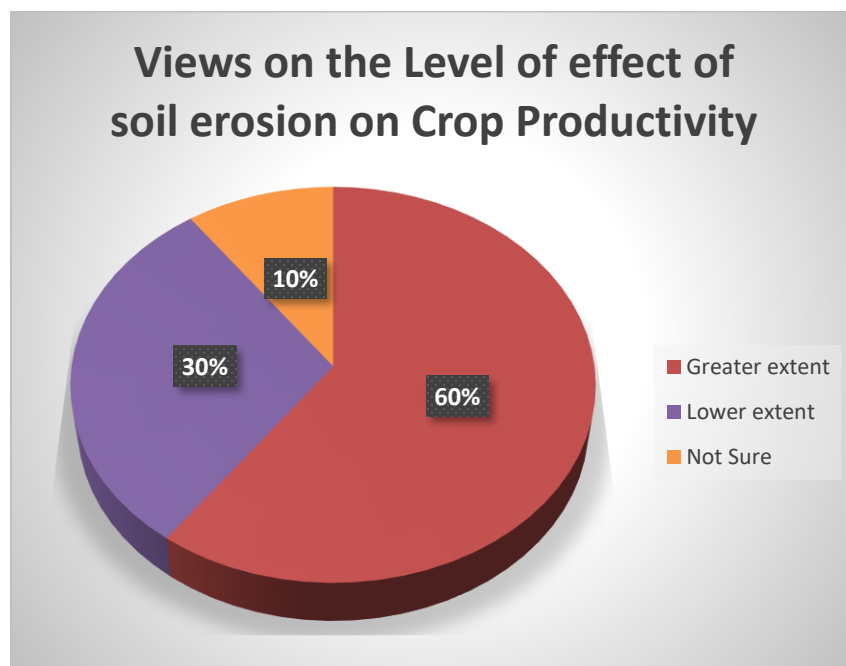


Research Data: 2022

The outcomes of the research are depicted in the figure above. In accordance to the conclusions, 50% of the participants told the investigator that mulching was the primary method used by farmers to stop soil erosion, and 20% of participants also provided results demonstrating that cover crops were another method. In gardens, 17% of the participants gave results showing that planting trees would eliminate soil erosion, and 13% of participants showed results showing that usage of organic fertilizers similarly eliminated soil erosion.

Level of effect of soil erosion on crop productivity

Figure 7: Level of effect of soil erosion on crop productivity



Research Data: 2022

In accordance with the outcomes of the research, 60% of the participants told the investigator that soil erosion had a greater impact on the productivity of crops, followed by 30% of participants who gave the investigator results showing that soil erosion had a lesser impact on crop profitability, and finally 10% of participants gave

the investigator results showing that they weren't sure whether soil erosion had a greater or lesser impact on crop yields.

Table 1: Relationship between soil erosion on crop productivity

		<i>crop productivity</i>	<i>soil erosion</i>
<i>crop productivity</i>	<i>Pearson Correlation</i>	1	.876**
	<i>Sig. (2-tailed)</i>		.000
	<i>N</i>	309	309
<i>soil erosion</i>	<i>Pearson Correlation</i>	.876**	1
	<i>Sig. (2-tailed)</i>	.000	
	<i>N</i>	309	309

****.** *Correlation is significant at the 0.01 level (2-tailed).*

Source; Primary Data, 2022

Bivariate means are used to show that there is an association between production of crops and soil erosion of $(r) = 0.606$. Both variables may have a weakly positive correlation because the p-value is 0.000, which is less than 0.05 ($p < 0.05$), and the p-value is significant enough to support this claim. The positive r value suggests that there is a reciprocal association between an increase in yields of crops and a commensurate decrease in soil erosion.

Conclusions

The findings of the study showed that the majority of those who participated told the investigator that one of the main negative effects of soil erosion on crop output was the loss of top soil. A small percentage of the participants updated the investigator that soil erosion could additionally result in poor drainage of the soil, and 10% of the people surveyed provided results showing that soil erosion would also result in compacting the soil reducing on the yields. Some of the participants provided results showing that soil erosion would reduce the fertility of the soil in the gardens.

Recommendations

The researcher recommends the farmers on Kibuga Division should emphasize the use of good farming methods like mulching.

The researcher also recommended that the farmers in Kibuga Division should attend agricultural seminars in order to learn more about modern farming.

The researcher also recommended the agricultural officials in Kibuga Division to always teach the farmers on the best ways how to prevent soil erosion.

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