

Bush Burning and Soil Fertility in Kisoro District: A Case Study of Kisoro Municipality**Amutuheire Apollo¹, Babirye Shamirah²****1,2 Metropolitan International University.****ABSTRACT**

The major objective of this study lied in finding out whether there was a relationship between Bush Burning and Soil Fertility in Kisoro Municipality, Kisoro District. Other objectives included: To ascertain the extent of Bush Burning in Kisoro Municipality, Kisoro District and to find out the level of Soil Fertility in Kisoro municipality, Kisoro District. The researcher found out that there is a very strong positive relationship between Bush Burning and Soil Fertility at $r = 0.935$ and since the sig. value (.000) was far less than 0.01, which is the maximum level of significance required declaring a significant relationship between Bush Burning and Soil Fertility, this implies that bush burning greatly influences the soil fertility of the area. The researcher also found out that the mean percentage of concerning the level of soil fertility in Kisoro municipality was 8.67%. The mean percentage is high hence indicating the high-level soil fertility in Kisoro municipality, Kisoro district. The high level of soil fertility in the area is witnessed by the dark-soils all over Kisoro municipality, these are well drained, well aerated, well-structured and contains a lot of humus and organic matter required for crop growth. The researcher also found out that bush burning leads to effects like soil erosion, it leads to reduced rainfall, causes death of soil living organisms and destroys the soil structure. The researcher concluded on from the findings that the extent of bush burning is high and this is due to many factors which include high need for farming, settlement, road construction and high demand to get land for cattle rearing. The researcher recommended the government to provide enough support to NEMA in order to carry out the supervision of forested area all over the country by enforcing strict laws to protect forests for future generations against bush burning.

Key words: Bush Burning and Soil Fertility**Background of the study**

According to (Esther et al., n.d.), bush burning is the burning of forests, weeds and grass in uncultivated agricultural land. Bush burning, or fire, is a chemical reaction between oxygen and fuel that is heated to an ignition temperature (Derick et al., n.d.). Bush burning is the indiscriminate burning of vegetation cover and the burning of grassland and forest resources by fire (Elifaazi et al., n.d.). According to (Jim et al., n.d.), Soil fertility is the ability of soil to sustain plant growth and optimize crop yields (Collins et al., 2023). Soil fertility refers to the ability of the soil to sustain the growth of agricultural plants (Emmanuel et al., 2023). According to (Musa et al., 2023), soil fertility is the ability of the soil to supply plants with essential nutrients and water

in sufficient amounts and proportions for plant growth and reproduction. Also, soil fertility is the ability of soil to sustain plant growth by providing essential plant nutrients and favorable chemical, physical and biological conditions in the soil (Ariyo et al., 2023). Before the industrial revolution, nearly 50% of the earth's surface was covered by forests. This area was halved in 1955, and in 1980 the original forest cover before the industrial revolution was estimated to be only 20% of the earth's surface (Kilama Luwa et al., 2021). Every country has to worry about the threat of fire in its forest. When they see a fire on communal land, grassland, savannah and so on, many people may think that there is no reason to worry, that the fire can't

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damage anything and there will be no loss (Christine et al., n.d.). Conversely, every fire can be shown to cause some loss or damage to the environment and natural balance (Kazaara, 2023). According to (Collins et al., 2023) in Brazil, most Brazilian vegetation types (biomes) are more or less exposed to fires. Rainforest, semi-deciduous forest, dry forest, scrubland, savanna, and grassland are currently burned by humans for various purposes and land uses, although the natural potentials for burning vegetation are very different (Rashid et al., 2023). According to their associations with fire, classified the world's ecosystems as fire-

Statement of the problem

The problem lied in finding out whether there was a relationship between Bush burning and Soil Fertility in Kisoro Municipality, Kisoro District.

Major objective

The major objective of the study was to find out whether there was a relationship between Bush Burning and Soil Fertility in Kisoro municipality, Kisoro District.

Specific objectives

To ascertain the extent of Bush Burning in Kisoro Municipality, Kisoro District.

To find out the level of Soil Fertility in Kisoro municipality, Kisoro District.

To find out the relationship between Bush Burning and Soil Fertility in Kisoro Municipality, Kisoro District.

Research questions

What is the extent of bush burning in Kisoro municipality, Kisoro District?

What is the level of Soil Fertility in Kisoro municipality, Kisoro District?

What is the relationship between bush burning and soil fertility in Kisoro municipality, Kisoro district?

Methodology.

The researcher employed a mixed approach of both qualitative and quantitative research designs to ensure valid data collection from the field in which data were expressed and interpreted both descriptively and numerically for in depth coverage of the study objectives. The researcher used these research designs to obtain, analyze, present and describe answers to some research questions in order to collect a more in-depth data from the field. The researcher considered Kisoro municipality as a case study to find out the relationship between bush burning and soil fertility Kisoro district. The

independent, fire-sensitive, and fire-dependent. In fire-independent ecosystems, fire never or very rarely occurs, either because climatic conditions do not allow it (too dry, too wet, or too cold) or because there is not enough biomass to support the fire. Fire-sensitive ecosystems are damaged by fire, which disrupts ecological processes, kills many individuals, or even eliminates species in such ecosystems that did not evolve under this selective force (Ninsiima et al., 2023). In contrast, fire-dependent ecosystems evolved in the presence of periodic or episodic fires and depend on them to maintain their ecological processes.

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study targets a population with in the research geographical area. The studypopulation comprised of 40 farmers, 38 community members, LC1 Chairperson and a district agricultural officer. This was correlated with Slovenes formula of sample size determination to obtain a sample population of 80 respondents for this study. The study sample comprised of 80 respondents out of 100 of the total population, this was derivedfrom using the Slovenes formula. The different two methods were used to collect data which included questionnaire and interview method. These were used to collect data from all industrial workers and community members from Hima cement factory, Kasese district. The validity of the instruments was established under the guidance of the supervisor (Dr. Arinaitwe Julius). To establish the reliability of the research instruments, the researcher carried out a pilot test of the instruments using another similar group with the same characteristics as the one targeted in the study. Quantitative data analyses were carried out using a software application called Statistical Package for Social Scientists (SPSS) (Nelson et al., 2022). Cross tabulations, Pearson’s correlation coefficient, regression, and ANOVA tests and analyses were carried out on the data to examine the relationships between assessment of learning and student academic performance (Victoria et al., 2023). Qualitative data was organized according to themes identified from research questions and analyzed using content analysis. Data from interviews were organized and presented inform of report.

Results.

The extent of Bush Burning in Kisoro Municipality, Kisoro District

Table 1: The extent of Bush Burning

Valid	50
N	
Missing	0
Mean	7.567

The mean percentage concerning the extent of bush burning in Kisoro municipality was 7.567%.The mean percentage is high hence indicating the high extent of bush burning in Kisoro Municipality. This is because most farmers in Kisoro district clear land for farming, grazing animals and for settlement which makes them to practice bush burning in order to clear the arable lands (Francis, Richard, Kazaara, et al., 2023). The extent of bush burning was also analyzed and interpreted using frequency tables and percentages where the researcher found out that the extent of bush burning in Kisoro Municipalitywas found to be high because 58.0% of the total population in the study agreed that they practice bush burning at a large extent. 30.0% agreed that bush burning is at a medium extent and only 12.0% revealed that the extent of bush burning is at a small extent.

The Level of Soil Fertility in Kisoro municipality, Kisoro District

Table 2: Level of Soil Fertility

Valid	50
N	
Missing	0
Mean	8.657 (8.65%)

The mean percentage of concerning the level of soil fertility in Kisoro municipality was 8.67%. The mean percentage is high hence indicating the high-level soil fertility in Kisoro municipality, kisoro district. The high level of soil fertility in the area is witnessed by the dark-soils allover kisoro municipality, these are well drained, well aerated, well-structured and contains a lot of humus and organic matter required for crop growth like Irish potatoes growing (Francis, Richard, Nicholas, et al., 2023). The level of soil fertility in kisoro fertility was also analyzed and interpreted basing on percentages where the researcher found out that 54.0% of the respondents agreed that the Level of soil fertilityin Kisoro Municipality is high, 20.0% argued that Level of soil fertility in Kisoro Municipality is moderate/medium and 26.0% revealed that Level of soil fertility in Kisoro Municipality is low.

Relationship between Bush Burning and Soil Fertility

Table 3: Showing Pearson Correlation between Bush Burning and Soil Fertility

		Bush Burning	Soil Fertility
Bush Burning	Pearson Correlation	1.00	.935
	Sig. (2-tailed)		.000
	N	50	50
	Pearson	.935	1.00
Soil Fertility	Correlation		
	Sig. (2-tailed)	.000	
	N	50	50

Table 4.5 indicates that there is a very strong positive relationship between Bush Burning and SoilFertility at $r = 0.935$ and since the sig. value (.000) was far less than 0.01, which is the maximum level of significance required declaring a significant relationship between Bush Burning and Soil Fertility, this implies that bush burning greatly influences the soil fertility of the area (Nelson et al., 2023). This is because bush burning kills soil living organisms which have a function of soil aeration and play an important role in decomposition of organic matter which eventually adds nutrients in the soil.

Discussion.

The mean percentage concerning the extent of bush burning in Kisoro municipality was 7.567%. The mean percentage is high hence indicating the high extent of bush burning in Kisoro Municipality. This is because most farmers in kisoro district clear land for farming, grazing animals and for settlement which makes them to practice bush burning in order to clear the arable lands. The extent of bush burning was also analyzed and interpreted using frequency tables and

percentages where the researcher found out that the extent of bush burning in Kisoro Municipality was found to be high because 58.0% of the total population in the study agreed that they practice bush burning at a large extent. 30.0% agreed that bush burning is at a medium extent and only 12.0% revealed that the extent of bush burning is at a small extent. Under this research objective, the researcher went ahead and asked respondents the causes of bush burning and most revealed that they practice it in order to get land for settlement and agriculture. The Level of Soil Fertility in Kisoro municipality, Kisoro District. The mean percentage of concerning the level of soil fertility in Kisoro municipality was 8.67%. The mean percentage is high hence indicating the high level soil fertility in Kisoro municipality, Kisoro district. The high level of soil fertility in the area is witnessed by the dark-soils all over Kisoro municipality, these are well drained, well aerated, well-structured and contains a lot of humus and organic matter required for crop growth. The level of soil fertility in Kisoro fertility was also analyzed and interpreted basing on percentages where the researcher found out that 54.0% of the respondents agreed that the Level of soil fertility in Kisoro Municipality is high, 20.0% argued that Level of soil fertility in Kisoro Municipality is moderate/medium and 26.0% revealed that Level of soil fertility in Kisoro Municipality is low.

Conclusion of the findings

Objective one aimed at finding out the extent of bush burning in Kisoro Municipality, Kisoro district. The researcher concluded on this objective from the findings that the extent of bush burning is high and this is due to many factors which include high need for farming, settlement, road construction and high demand to get land for cattle rearing. Objective two aimed at finding out the level of soil fertility in Kisoro municipality. The researcher concluded on this objective that the level of soil fertility is high and this is due to fertile, dark-brown mountainous soils of Mountain Muhabura which favor crop production mainly Irish potatoes growing. The third objective aimed at establishing the relationship between Bush burning and soil fertility in Kisoro Municipality, Kisoro district. The researcher concluded that there is a very strong positive relationship between Bush Burning and Soil Fertility at $r = 0.935$ at 0.01 level of significance).

Recommendations of the study

On the basis of the findings of this study and conclusions drawn, the following are the recommendations regarding the relationship between bush burning and soil fertility in Kisoro Municipality, Kisoro District.

The researcher recommended the government to provide enough support to NEMA in order to carry out the supervision of forested area all over the country by enforcing strict laws to protect forests for future generations against bush burning.

The researcher recommends the farmers to practice good farming methods like agro-forestry and afforestation to conserve the ecosystems and environment. The farmers are also recommended to use electricity and biogas as forms of fuel energy for cooking and avoid using fire woods as fuel.

The researcher recommends community members to work together regarding the conservation of natural resources by planting trees in compounds and practicing agro-forestry.

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