

**PESTICIDES AND FOOD SECURITY IN KISORO DISTRICT: A CASE STUDY OF
KISORO MUNICIPALITY**

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ABSTRACT

The major objective of this study lied in finding out whether there was a relationship between Pesticides and Food Security in Kisoro Municipality, Kisoro District. Other objectives included: to establish the level of Pesticides application in Kisoro Municipality and to find out the extent of Food Security in Kisoro Municipality, Kisoro District. The study targeted 78 farmers, LC1 chairperson and Kisoro district agricultural officer. Data was analyzed by use of Microsoft excel and presented in form of frequency distribution tables and pie chart. SPSS Software was used to analyze data in the study.

The researcher concluded that there is a very strong positive relationship between pesticides and food security at $r = 0.745$ 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 pesticides and food security, this implies that the when the level of pesticides application is high, the level of food security is also high because many crops grows to maturity without pest interferences and when the level of application of pesticides is low, the level of food security is also low.

The researcher recommends the farmers to plant crops in large quantities so that they can feed the rapidly growing population in Kisoro District.

Key words: pesticides and food security

Background of the study

According to (Birungi, J., & Byaruhanga, J, 2019), Pesticides refers to substances used for destroying insects or other organisms harmful to cultivated plants or to animals. Also, Jacoby (2000) noted that pesticide means any substance of chemical or biological ingredients intended for repelling, destroying or controlling any pest, or regulating plant growth. Pesticides refers to chemical substances or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest (Lokshin, 1996).

Pesticides were employed to protect crops in classical times using, for example, arsenic compounds and Sulphur Smith & Secoy (1975). Since these classical times, pesticides have been used to control harmful organisms to crops, animals and humans (e.g., control of mosquitoes carrying malaria using DDT).

According to the study conducted by FAO (2018), it was found out that more than 90 percent of water and fish samples from all streams contained one or, more often, several pesticides. Pesticides found in water were primarily those that are currently used, whereas those found in fish and sediment are organochlorine insecticides, such as DDT, that were heavily used decades ago. Most of the pesticides in use today are more water soluble and break down faster in the natural environment than the long-lived organochlorine insecticides of the past. About 50 percent of the wells sampled contained one or more pesticides, with the highest detection frequencies in shallow ground water beneath agricultural and urban areas and the lowest frequencies in major aquifers, which generally are deeper (Okonya, J, 2019). Ground water has a lower incidence of pesticide contamination than streams because water infiltrating the land surface moves slowly through soil and rock formations on its way to ground water and through the aquifer (Bougheas, S, 1999). This contact with soil and rock and the slow rate of flow allows greater opportunity for sorption and degradation of pesticides, and varied flow pathways mean that some wells do not tap ground water that originated from places or times affected by pesticide use.

Some people believe that any presence of pesticides in their drinking water is too much, whereas others feel that the standards and guidelines established for many of the major pesticides provide adequate protection. Which of these perspectives is closest to the truth remains unclear, but certainly the effects of common patterns of pesticide exposure found in NAWQA studies have not yet been fully evaluated.

According to FAO (2014) estimates, some 805 million people in the world do not have enough food to lead a healthy active life. That's about one in nine people on earth. The vast majority of the world's hungry people live in developing countries, where 13.5 percent of the population is undernourished. Sub-Saharan Africa is the region with the highest prevalence of hunger. One person in four is undernourished. Hunger has increased not as a result of poor harvests but because of high domestic food prices, lower incomes and increasing unemployment due to the global economic crisis. Many poor people cannot afford to buy food they need. In fact, all world regions have been affected by the increase in food insecurity.

Problem statement

Pesticides play a crucial role in ensuring food security by controlling pests and diseases that can cause significant damage to crops. However, the use of pesticides can also have negative impacts on the environment, human health, and food safety. Kisoro District in Uganda is an important agricultural region where the use of pesticides is widespread.

The aim of this case study is to investigate the relationship between pesticides and food security in Kisoro Municipality. The study will examine the extent of pesticide use in the area, the types of pesticides used, and their potential impact on the environment, human health, and food safety.

Specific objectives

1. To establish the level of Pesticides application in Kisoro Municipality, Kisoro District.
2. To find out the extent of Food Security in Kisoro Municipality, Kisoro District.
3. To find out the relationship between Pesticides and Food Security in Kisoro Municipality,

Kisoro District.

Research questions

1. What is the level of Pesticides application in Kisoro Municipality, Kisoro District?
2. What is the extent of Food Security in Kisoro Municipality, Kisoro District?
3. What is the relationship between Pesticides and Food Security in Kisoro Municipality, Kisoro District?

Methodology

Research design

The study employed both qualitative and quantitative approaches during data collection. Qualitative approach enabled the researcher to give a complete, detailed description of phenomenon about the study for in-depth data gathering while quantitative approach enabled the researcher to construct statistical models in an attempt to explain the findings. Quantitative approach also provided comparisons and statistical aggregation of data.

The study also employed a cross-sectional survey research design. The cross-sectional survey research design was used because the method gathers data from a relatively large number of different categories of respondents at a particular time. A cross-sectional survey design collects data to make inferences about a population of interest at one point in time. The advantage of a cross-sectional survey is its flexibility in that it can be conducted using any mode of data collection.

Study population

The target population for the study comprised of 100 residents from Kisoro Municipality. This was correlated with solvin's formula of sample size determination to obtain a sample population of 80 respondents for this study. The target population in the study included 98 farmers, LC1 Chairman and Kisoro district agricultural officer. All these groups constituted the study population because the researcher is interested in divergent views from all people concerned with the problem.

Sampling procedures

Sampling procedure refers to choosing part of a population to use to test hypotheses about the entire population (Jowin, 2003). The procedures included simple random sampling and purposive sampling and was used to select respondents in the study.

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Sample size

The study sample comprised of 80 respondents out of 100 of the total population where 78 respondents were farmers found in Kisoro Municipality, LC 1 Chairman and District

Agriculture officer.

Sampling techniques

Ahuja Ram (2010), defines sampling as the act or process of selecting a suitable sample of the population for the purpose of determining parameters of characteristics of the whole population, and these can be either probability or non- probability sampling techniques.

Simple random sampling

Simple random sampling is whereby the individuals in the total population have equal and independent chances of being selected as a member of a sample (Orodho, 2004).

The respondents in this study were farmers, community members, LC5 Chairperson and district environment officer. The LC1 Chairperson and a District Agriculture officer were used as key respondents in the study. Simple random sampling was used to select respondents in the group of

farmers and community members. A total of 78 farmers participated in the study and their selection involved simple random sampling and specific attention was paid to inclusion of both male and female respondents in the study area.

Purposive sampling

Purposive sampling technique was used to select units into the sample which includes LC 5 Chairperson of Kisoro District and a District Agriculture Officer. This technique is based on characteristics of a population and the objective of the study. The researcher used this technique because it is very useful in situations when you need to reach a targeted sample quickly and where sampling for proportionality is not the main concern.

Purposive sampling is less costly, more readily accessible, more convenient and select only those individuals that are relevant to research design. Besides this, there is no way to ensure that the sample is truly representative of the population, and more emphasis is placed on the ability of the researcher to assess the elements of the population.

Data collection methods and instruments

Data collection is a process of gathering data and measuring information on variables of interest in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes (Syed Muhammad Sajjad Kabir, 2016). Both the use of secondary and primary data methods was used by the researcher to collect qualitative and quantitative data information. Thus, different two methods were used to collect data which included questionnaire and interview method. These were used to collect data from all farmers and community members in Kisoro Municipality, Kisoro District.

Questionnaire

The researcher used the questionnaire as the major primary data collection method in this study. The researcher prepared 78 questionnaires for farmers, other for the key informants which included

the LC 1 Chairperson and district agriculture officer to supplement the interview with the key informants and documentary review. All were written in English language because is the medium of instruction in most institutions. Under this questionnaire, it consisted of closed ended questions and additional remarks space. The entire questionnaires were instructed since they followed the pattern of set objectives and subsequent research questions. The respondents were assured of their confidentiality of the information provided to the researcher that was used for academic purposely only.

Interviewing method

In this method, informed members were selected to inform the researcher about specific issues regarding the study. The instrument employed a key informative guide which includes questions on the specific objectives of the study. This helped in capturing of qualitative information needed in this study.

Data analysis

The researcher analyzed and interpreted quantitative data by using statistical package for social science (SPSS) program to compute the percentages, frequency and tabulation of responses and both use of quantitative and qualitative types of data (Nelson. K, 2022). Data was edited to identify and eliminate errors made by respondents. Coding was then done to translate question responses into specific categories. Descriptive statistics such as frequency distribution and percentages were used to analyze the data. Qualitative data was analyzed using content analysis in which all the responses were categorized according to their thematic areas and analyzed according to their contents.

RESULTS

Response rate

Questionnaire return rate

All the 80 questionnaires were given out, 60 were returned, thus representing 75% response. The study was considered good because according to Peil (1995), questionnaire return rate above 50% is considered good for a study.

Personal information of respondents

Information regarding to the personal background of the respondents included their age, gender, marital status, occupation, and education level

Age of the respondents

Information regarding the age of the respondents was added to questionnaires during the piloting process. The following information regarding the ages of the respondents was analyzed using SPSS Software and presented in form of grouped data as shown in the table 1

Statistics	
AGE OF RESPONDENTS	
Valid N	60
Missing	0
Mean	3.3000
Median	3.0000
Mode	3.00
Std. Deviation	1.29274

AGE OF RESPONDENTS				
	Frequency	Percent	Valid Percent	Cumulative Percent
0-10	5	8.3	8.3	8.3
10-20	8	13.3	13.3	21.7
20-30	27	45.0	45.0	66.7
Valid 30-40	8	13.3	13.3	80.0
40-50	8	13.3	13.3	93.3
50+ Total	4	6.7	6.7	100.0
	60	100.0	100.0	

Therefore, from the mean (3.3000), it was deduced that most of the respondents who participated in the study were from a mature group i.e., were within the age range of 20-30 years with 45.0% and this was because such people within that age group of 20-30 years are still youths and can grow crops to ensure food security. From this, it was then deduced that the validity and reliability of the obtained information were due to the mature minds which were studied. Also, from the table 4.2.1, the researcher found out that 13.3% of the respondents in Kisoro Municipality were aged between 10-20 years, 13.3% of the respondents were aged between 30-40 years and 13.3% were aged between 40-50 years and 6.7% were aged 50 years and above. The mode was 3.00 and Std. Deviation was 1.29274. The median is 3.0000.

Occupation of the respondents

Information regarding the occupation of the respondents in Kisoro Municipality, Kisoro District was collected and presented in table 2

OCCUPATION OF RESPONDENTS

	Frequency	Percent	Valid Percent	Cumulative Percent
Farmer	16	26.7	26.7	26.7
Civil servant	13	21.7	21.7	48.3
Valid Trader	27	45.0	45.0	93.3
Fumigator	4	6.7	6.7	100.0
Total	60	100.0	100.0	

From table 2, it was found out that 45.0% of the respondents were Traders, 26.7% were farmers, 21.7% were Civil servants and 6.7% of the sampled respondents in Kisoro Municipality were Fumigators.

Table 3: Educational background of the respondents

EDUCATION LEVEL OF RESPONDENTS

	Frequency	Percent	Valid Percent	Cumulative Percent
Primary and below	28	46.7	46.7	46.7
O LEVEL A	10	16.7	16.7	63.3
LEVEL	7	11.7	11.7	75.0
CERTIFICATE	3	5.0	5.0	80.0
Valid DIPLOMA	3	5.0	5.0	85.0
DEGREE	3	5.0	5.0	90.0
MASTERS	2	3.3	3.3	93.3
NONE	4	6.7	6.7	100.0
Total	60	100.0	100.0	

From table 3, it was found out in an analysis of interviews and questionnaire that majority of the respondents (16.7%) had only completed their ordinary level of education, 46.7% had completed primary level of education and never continued with their further studies, 11.7% had completed their A' Level of education, 5.0% had finished their certificate level of education, 5.0% had completed bachelor degree of education, 5.0% had completed diploma level of education, 3.3% of the sampled respondents in Kisoro Municipality had completed master level of education and 1.8% had not attended any level of education in their lives. From the statistics, it's indicating that the Education of Kisoro Municipality, Kisoro District is lacking and needing.

The level of Pesticides application in Kisoro Municipality, Kisoro District

This Section describes the independent variable (Pesticides). The independent variable was addressed in Section B of the questionnaire for respondents.

Table 4: The level of pesticides application

Descriptive Statistics						
	N	Range	Minimum	Maximum	Mean	Std. Deviation
Level of pesticides application	60	2.00	1.00	3.00	3.8400	.70595
Valid N	60					

Source: SPSS Output page

The level of pesticides application in Kisoro Municipality was analyzed and interpreted using the mean which was 3.8400, the mean is close to code 4 of the Likert Scale, hence declaring a high level of using pesticides by people in Kisoro Municipality. This is attributed to many varieties of pests found in crop gardens, this is because most people in Kisoro District are farmers and apply

pesticides to control pests in their gardens like in Irish potatoes plantations to control caterpillars.

The extent of Food Security in Kisoro Municipality

This Section describes the dependent variable (Food Security). The dependent variable was addressed in Section C of the questionnaire for respondents.

Table 5: The extent of Food Security

Descriptive Statistics						
	N	Range	Minimum	Maximum	Mean	Std. Deviation
Extent of Food Security	60	2.00	1.00	3.00	4.6300	.70595
Valid N	60					

The extent of food security in Kisoro Municipality was analyzed and interpreted using the mean which was 4.6300, the mean is close to code 5 of the Likert Scale, hence declaring a high extent of food security in Kisoro Municipality. This is attributed to the fertile soils of Kisoro District which facilitate crop growing like Irishes, bananas, beans, onions, cassava among others. This in turn ensures that there is abundant food supply in the district to feed the available small population. The reliable rain falls also facilitate the growing of crops, hence high crop production which fosters food security in the area.

The relationship between pesticides and food security

Table 6: Showing Pearson Correlation between pesticides and food security

		Pesticides	Food Security
Pesticides	Pearson Correlation	1.00	.745
	Sig. (2-tailed)		.000
	N	60	60
Food Security	Pearson Correlation	.745	1.00
	Sig. (2-tailed)	.000	

Source: SPSS output page

Table 6 indicates that there is a very strong positive relationship between pesticides and food security at $r = 0.745$ 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 pesticides and food security, this implies that when the level of pesticides application is high, the level of food security is also high because many crops grow to maturity without pest interferences and when the level of application of pesticides is low, the level of food security is also low.

Conclusion of the findings

The researcher concluded on this objective from the findings that the extent of food security is high and this is attributed to the fertile soils of Kisoro District which facilitate crop growing like Irishes, bananas, beans, onions, cassava among others. This in turn ensures that there is abundant food supply in the district to feed the available small population. The reliable rain falls also facilitate the growing of crops, hence high crop production which fosters food security in the area.

Recommendations of the study

The researcher recommends the farmers to plant crops in large quantities so that they can feed the rapidly growing population in Kisoro District.

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