
**THE EFFECT OF CROP DISEASE OUTBREAKS ON AGRICULTURAL TRADE, A CASE
STUDY OF ARINYAPI SUB - COUNTY,
ADJUMANI DISTRICT**

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ABSTRACT

The study sought to examine the effect of crop disease outbreaks on agricultural trade, a case study of Arinyapi sub county, Adjumani district. The objectives of the study included; to analyze the occurrence of crop disease outbreak in Uganda; to examine the relationship between crop disease outbreak and agricultural trade in Uganda; to assess the strategies to improve crop production and agricultural trade in Uganda. According to table 4 above, out of 80 Respondents, 35% of them forwarded that Fusarium wilt was the most affecting disease of crop in Arinyapi sub-county, as evidenced from the table. Other diseases such as fungal crop diseases (25%), bacterial crop diseases (18%) and Crop Xanthomonas wilt (22%), also affected crops in the study area. It is important to note that fungal crop diseases and bacterial crop diseases sometimes occur simultaneously on crops resulting in total damage of a plant. Basing on the research findings, out of 80 Respondents, 28% of the Respondents reported that crop diseases are mainly caused by attack by crop pests especially weevils. Planting of diseased planting materials (15%), poor cultivation methods (20%), harsh climatic conditions (19%) and continuous pollution in crop gardens (18%), were also forwarded by the respondents during interview. It is evident that crop pests rapidly cause crop diseases resulting into food insecurity in Bufumbossub-county. The study recommended that the government should establish strategies to empower the local authorities and other key stakeholders with capacity, knowledge and skills needed to boost up crop production by controlling crop diseases in Arinyapi sub-county. Also, that efforts should be made by various factors such as extension workers and the agricultural Officers to educate farmers on how to identify disease prevalence, prevent and control. This is aimed at increasing crop

production in the region. The government and all actors involved should execute comprehensive strategies and strengthen the eradication of crop diseases, and productivity in Arinyapi sub-county.

Key words: crop disease, outbreaks, agricultural and trade

Background to the Study

Loss of crops from plant diseases may also result in hunger and starvation, especially in less-developed countries where access to disease-control methods is limited and annual losses of 30 to 50 percent are not uncommon for major crops. In some years, losses are much greater, producing catastrophic results for those who depend on the crop for food (Amanor, 20. Major disease outbreaks among food crops have led to famines and mass migrations throughout history. While some diseases are so rare in a given population that a single case warrants an epidemiologic investigation (e.g., rabies, plague, polio), other diseases occur more commonly so that only deviations from the norm warrant investigation. Sporadic refers to a disease that occurs infrequently and irregularly. Endemic refers to the constant presence and/or usual prevalence of a disease or infectious agent in a population within a geographic area. Hyperendemic refers to persistent, high levels of disease occurrence (Amanor & Moyo, 2008).

Agricultural trade involves the buying and selling of products that have been produced through the forestry and farming industries. It can give consumers greater access to a variety of agriculture goods, often at more affordable prices. For example, European countries can obtain cocoa, coffee, and tropical fruits by engaging in agricultural trade. Trade also brings fresh fruits and vegetables to countries like Canada, the United Kingdom, and the United States during their cold winter months (Allan et al., 2023).

Agricultural productivity may also be measured by what is termed total factor productivity (TFP). This method of calculating agricultural productivity compares an index of agricultural inputs to an index of outputs. This measure of agricultural productivity was established to remedy the shortcomings of the partial measures of productivity; notably that it is often hard to identify the

factors cause them to change. Changes in TFP are usually attributed to technological improvements (Baglioni & Gibbon, 2013).

Statement of the problem

Investors consider Uganda's agricultural potential to be among the best in Africa, with low temperature variability, fertile soils, and two rainy seasons over much of the country - leading to multiple crop harvests per year. According to the UN's Food and Agriculture Organization, Uganda's fertile agricultural land has the potential to feed 200 million people. Eighty percent of Uganda's land is arable but only 35% is being cultivated (Cousins, 20007). In fiscal year 2020/2021, agriculture accounted for about 23.7% of GDP, and 31% of export earnings (Oscar et al., 2023). The UBOS estimates that about 70% of Uganda's working population is employed in agriculture. Uganda produces a wide range of agricultural products including: coffee, tea, sugar, livestock, fish, edible oils, cotton, tobacco, plantains, corn, beans, cassava, sweet potatoes, cassava, millet, sorghum, and groundnuts (Grace et al., 2023).

Commercialization of the sector is impeded by farmers' limited use of fertilizer and quality seeds, and a lack of irrigation infrastructure - rendering production vulnerable to climatic extremes and pest infestations. Sector growth is also impaired by the lack of quality packaging capabilities, insufficient storage facilities, poor post-harvest handling practices, shortage of agricultural credit, high freight costs, the lack of all-weather feeder roads in rural areas, a complicated and inefficient land tenure system, and limited knowledge of modern production practices . However, with the outbreak of diseases especially bacteria and fungi crop diseases affect the agricultural productivity and trade in Uganda. This study will therefore further examine the implication of disease outbreak on agricultural trade in Uganda (Pritchard, 2013).

Objectives of the Study

- 1. To analyze the occurrence of crop disease outbreaks in Uganda.*
- 2. To examine the relationship between crop disease outbreak and agricultural trade in Uganda*
- 3. To assess the strategies to improve crop production and agricultural trade in Uganda.*

Research Questions

1. *Describe the occurrence of crop disease outbreaks in Uganda.*
2. *What is the relationship between crop disease outbreak and agricultural trade in Uganda?*
3. *What are the strategies to improve crop production and agricultural trade in Uganda?*

Methodology

Research Design

The study adopted both quantitative and qualitative research approaches. The quantitative approach was adopted because the proposed study draws statistical inferences. The qualitative approach supplemented the quantitative approach by providing detailed information in form of statements from interviews for in-depth analysis (Fassinger & Morrow, 2013). Specifically, the study adopted across sectional survey design. The information collected was based on what was going on at a particular point in regard to early marriage and girl child education this design was particularly selected because it took place at a single point in time, allowing analysis of number variables at once and helped in looking at the prevalence of the research problem in the study population (Bordens& Abbott, 2011).

Study Population

The research study targeted the farmers in Arinyapi Sub county, Adjumani district totaling to 40 respondents.

Sample Size and Selection

Sample size refers to the number of items to be selected from the universe to constitute sample (Kothari, 2004). Technically, the size of the sample depends on the type of research design being used, desired level of confidence in the result the amount of accuracy wanted and the characteristics of the population of interest. Thus, it is important to note that there is no single best way that can be used to determine sample size (Singh, 2006). However, the sample was determined using the sample determination table by Kreijic and Morgan (1970).

Therefore, the sample size was 34 respondents as recommended by Kreijic and Morgan (1970)

Sampling Techniques

The study used simple random sampling to select the suitable sample. This approach was preferred because it gave each potential participant an equal chance to participate and eliminated any form of bias (Kombo and Tromp, 2006).

Data Collection Methods

Data was collected by use of a questionnaire and interview survey.

Questionnaire Survey

The study was largely a quantitative survey involving a large number of the farmers as respondents. Thus, the data collection method adopted was the survey, which involved the use of self-administered questionnaires (SAQs). The method enabled the researcher to cover the respondents quickly and at reasonable cost (Bordens& Abbott, 2011).

The Interview Survey

An interview survey also called as a face-to-face research method is a research method that is utilised when a specific target population is involved. The purpose of conducting a personal interview survey was to explore the responses of the people to gather more and deeper information. Personal interview surveys were used to probe the answers of the respondents. The method was chosen because people were more likely to readily answer live questions about the subject. Open ended questions were more tolerated through interviews due to the fact that the respondents found it more convenient to give their long answers orally than in writing (Sincero, 2012)

Data Analysis

Qualitative Data

In analyzing data, the data was sorted as per its allocated codes and entered into a statistical package known as Statistical Package for Social Scientists (SPSS) to generate both descriptive and inferential statistics that created the mean, mode and median; the variance, standard deviation, frequencies and

percentages(Nelson et al., 2022). These were arranged in tables and later explained by the researcher on what they meant as per the set objectives and their implications in the study (Oso &Onen, 2008).

Results

Gender

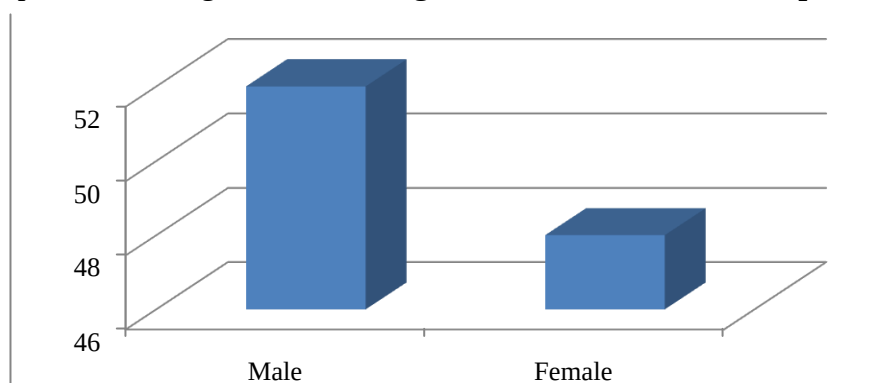
According to the findings recorded on table 2 below, the study population consisted of both male and female respondents.

Table 1: The sex of the respondents

Response	Frequency.	Percentage (%)
<i>Male (M)</i>	41	52
<i>Female (F)</i>	39	48
Total.	80	100.

Source: Primary data 2022

With reference to table 1, out of 80 respondents 52% of them were males and 48% were females. It is evident that males were engaged more in crop production than females and therefore, had more knowledge on crop diseases than their counterparts. The tabulated information was as well represented in figure 1 below; **Figure 1: Shows sex of the Respondents.**



Source: Primary data 2022

Occupation

The occupation of the Respondents was summarized as Farmers, Extension workers and District Agricultural Officer in table 2 below;

Table 2: Shows occupation of Respondents

<i>Response</i>	<i>Frequency (F)</i>	<i>Percentage (%)</i>
<i>Farmers</i>	<i>69</i>	<i>86</i>
<i>Extension workers</i>	<i>08</i>	<i>13</i>
<i>District Agriculture Officer</i>	<i>01</i>	<i>01</i>
Total	80	100

Source: Primary data 2022

According to table 2 above, out of 80 Respondents, 86% of them were farmers (both ordinary farmers and contact farmers), 13% of them were extension workers while 01% were the Agriculture Officers. This shows that farmers were more active in crop production as well as identifying various diseases that have devastating effect on crop plants.

Common diseases affecting crop plantations

Basing on research findings, wilt diseases included *Fusarium wilt*, fungal crop diseases, bacterial crop diseases, and Crop *Xanthomonas wilt* and they were represented using table 4 below;

Table 3: Shows common diseases affecting crops

<i>Response</i>	<i>Frequency</i>	<i>Percentage</i>
<i>Fusarium wilt</i>	<i>28</i>	<i>35</i>
<i>fungal crop diseases</i>	<i>20</i>	<i>25</i>
<i>bacterial crop diseases</i>	<i>14</i>	<i>18</i>
<i>Crop Xanthomonas wilt</i>	<i>18</i>	<i>22</i>
Total	80	100

Source: Primary data 2022.

According to table 3 above, out of 80 Respondents, 35% of them forwarded that *Fusarium wilt* was the most affecting disease of crop in Arinyapi sub-county, as evidenced from the table. Other diseases such as fungal crop diseases (25%), bacterial crop diseases (18%) and Crop *Xanthomonas wilt* (22%), also affected crops in the study area. It is important to note that fungal crop diseases and

bacterial crop diseases sometimes occur simultaneously on crops resulting in total damage of a plant.

Various causes of crop diseases on crop farmlands

According to the research conducted, a number of causes of crop diseases were forwarded by respondents and were summarized in table 5 below;

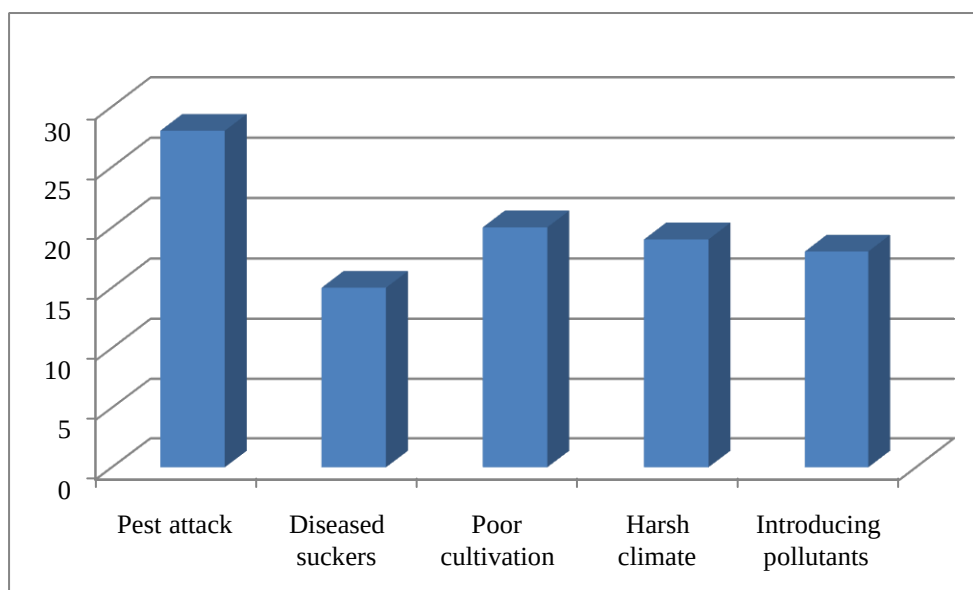
Table 4: Shows various causes of crop diseases on crop farmlands

Response	Frequency	Percentage
<i>Attack by crop pests such as weevils, which introduce pathogens to crop plants.</i>	23	28
<i>Planting diseased sucker in crop farmlands resulting in buildup of diseases.</i>	12	15
<i>Poor cultivation methods causing wounds on crop suckers which provide pathways for entry of pathogens.</i>	16	20
<i>Harsh climatic conditions reducing the water content of crop plants, eventually resulting into wilting of crop plants.</i>	15	19
<i>Introducing pollutants into crop fields reducing plant resistance and enhances disease outbreak.</i>	14	18
Total	80	100

Source: Primary data 2022

Basing on the research findings, out of 80 Respondents, 28% of the Respondents reported that crop diseases are mainly caused by attack by crop pests especially weevils. Planting of diseased planting materials (15%), poor cultivation methods (20%), harsh climatic conditions (19%) and continuous pollution in crop gardens (18%), were also forwarded by the Respondents during interview. It is evident that crop pests rapidly cause crop diseases resulting into food insecurity in Bufumbossub-county. This data was presented using column chart below;

Figure 2: Shows representation of various causes of crop diseases



Source: Primary data 2022.

Magnitude of the effect caused by crop diseases on crop plants

A number of effects due to diseases were registered during interview conducted from different respondents and they were summarized in table 6 below;

Table 5: Shows the magnitude caused by crop diseases on crops

<i>Response</i>	<i>Frequency</i>	<i>Percentage</i>
<i>Crop diseases have caused very serious loss in crop yields</i>	18	23
<i>Serious destruction of crops in the gardens leading to total loss in production causing food insecurity.</i>	24	30
<i>Poor quality crop yield/ produce harvested leading to low nutrient value obtained.</i>	16	20
<i>Loss of crop plant condition leading to reduced tolerance to harsh environmental conditions.</i>	22	27
<i>Total</i>	<i>80</i>	<i>100</i>

Source: Primary data 2022.

According to table 6 above, out of 80 Respondents, 23% of them reported that crop diseases caused very serious loss in yield in Arinyapi sub-county. 30% of them reported of destruction of crops by different diseases, 20% of them talked of poor quality harvest while 27% documented loss of plant condition which as well as reduced tolerance to climatic conditions. With the evidence from table 6, plant destruction by diseases had the highest magnitude and therefore, contributed a lot to food insecurity in Arinyapi sub-county.

Possible ways of controlling crop diseases on crop gardens**Table 6: Shows possible ways of controlling crop diseases.**

Response	Frequency	Percentage
<i>Creating awareness about various diseases by educating farmer on their cause, prevention and control.</i>	20	25
<i>Advising farmers on use of cultural methods of controlling crop diseases such as use of clean planting materials.</i>	16	20
<i>Extension services implementing adoption of good farming methods such as crop-rotation.</i>	22	28
<i>Breaking off male-buds from crops to control wilt diseases in crop farmlands.</i>	14	17
<i>Genetic engineering to improve on the breeding breeding efficiency of crop plants.</i>	08	10
Total	80	100

Source: Primary data 2022.

According to table 6, out of 80 Respondents, 25% of them emphasized on creating awareness on the cause, prevention and control of crop diseases as one of the possible ways of controlling crop diseases from the study area. Other Respondents talked of use of cultural methods (20%), extension services to be brought closer (28%), breaking off male-buds from crops (17%), while 10% of the Respondents advocated for genetic engineering so as to improve the nature of crop genes due to genetic variation.

Conclusions

Currently, Plant diseases in Uganda are a major concern. The government and most nongovernmental organizations have struggled to root out this vice from society since many people have lacked food due to damage caused by crop diseases. Crop diseases are mainly caused by poor cultural methods of cultivation, including use of diseased planting materials and government authorities ought to

carry out crack down of these practices if Uganda is to attain its vision 2040. The study has confirmed and therefore concludes with no doubt that; “Management and control of crop diseases is possible”. Provided remedial measures are implemented and existing legislations are enforced from the village level.

Recommendations

The government should establish strategies to empower the local authorities and other key stakeholders with capacity, knowledge and skills needed to boost up crop production by controlling crop diseases in Arinyapi sub-county. Efforts should be made by various Actors such as extension workers and the agricultural Officers to educate farmers on how to identify disease prevalence, prevent and control. This is aimed at increasing crop production in the region.

References

- Allan, K., Charles, N., Moses, N., Kazaara, A. G., & Nelson, K. (2023). *The Effect of Operation Wealth Creation on Youth Farmers Development : A Case Study of Labongo Layamo Sub County , Kitgum District.* 7(2), 50-63.
- Grace, M., Kazaara, A. G., & Kazaara, A. I. (2023). *Factors Associated With Potato Yields ' Variations In South Western Of Uganda . Case Study : Kanungu and Kisoro Districts.* 7(3), 198-205.
- Nelson, K., Christopher, F., & Milton, N. (2022). *Teach Yourself Spss and Stata.* 6(7), 84-122.
- Oscar, O., Kazaara, A. G., Kazaara, A. I., & Micheal, T. (2023). *Impacts of Farmer ' s Cooperative Societies in Marketing of Agricultural Produce . A Case Study of Loro Sub County , Oyam District.* 7(3), 272-278.