

Moderate Use Of External Inputs And Food Security Of Small Holder Farmers: A Case Of Kiruhura

District. Uganda

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Abstract

The study investigated the effect of farming practices on food security of small holder farmers: A case of Kiruhura District. Uganda. The key objective that guided the study was to assess the effect of moderate use of external inputs on food security of small holder farmers in Kiruhura District. A cross-sectional design using mixed methods approach was used to answer the study questions. The sample size for the study was 327 with 310 respondents participating in the study hence giving the average response rate of 91.4%. Stratified random sampling and purposive techniques were used to select the participants. Data analysis involved frequencies, means and inferential statistics such as correlations and the coefficient of determination. Findings revealed low adoption of small irrigation schemes and seed multiplication technology, along with limited access to quality seeds. The study concluded that moderate external input use affects food security. The study therefore recommends establishing model farms in each Sub- County in Kiruhura District, facilitated by the Government of Uganda through the Ministry of Agriculture Animal Industry and Fisheries (MAAIF).

Key Words: Farming Practices, External Inputs, Food Security And Seed Multiplication Technology.

Introduction

Enhancing food security remains a major goal for policymakers worldwide because it is the baseline of human needs and without it human beings cannot thrive, let alone survive (Udmale, Pal, Szabo, Pramanik & Large, 2020; Yazdanpanah, Moghadam, Savari, Zobeidi, Sieber & Löhr, 2021). Food insecurity continues to be a major development challenge in Uganda, despite its well-endowed natural resource base with adequate rainfall (Zizinga, 2017). A report by the Food and Agriculture Organization shows that 12% of the total population in Uganda was chronically food insecure in 2021 (FAO, 2021). Additionally, in Kiruhura District, a report by the NAADS District Coordinator also states that 33% of households face food insecurity, which manifests as limited availability, lack of availability and instability

(Allan et al., 2023). Poor agricultural practices as well as low and declining yields are the primary causes of this condition.

This level of food insecurity, if left unchecked, could not only exacerbate the problem of malnutrition, especially among children, but could undermine the country's efforts to achieve Sustainable Development Goal One (SDG 1c), which is to halve the proportion of people who suffer from chronic hunger and extreme poverty. as stipulated by the National Development Plan (NDP II) and UBOS (2020). Although there are studies on the effects of improved technologies such as crop varieties on household nutritional security (Oromo et al., 2023) and on commercialization (Muriithi & Matz, 2015), the impact of agricultural practices on food security of smallholder farmers in

Received: 22.01.2024

Accepted: 25.01.2024

Published on: 31.01.2024

Kiruhura District. The study is therefore conducted to investigate how agricultural practices affect the food

security of smallholder farmers in Kiruhura District, Uganda (Francis et al., 2023).

Problem Statement

The study aimed at moderate use of external inputs and food security of small holder farmers with a case of Kiruhura district Uganda

Main Objectives

To determine the relationship between moderate use of external inputs and food security of small holder farmers

Literature review

The study followed the induced innovation theory developed by Hayami and Ruttan as early as 1970. This theory states that factors and product price relationships lead to the use of various technological innovations that can maximize agricultural productivity leading to food security (Christopher et al., 2022). Furthermore, (Collins et al., 2023) argues that the theory states that factors and product price relationships induce the use of various kinds of technological innovations that can maximize agricultural productivity leading to food security. The theory is anchored on the assumption that to achieve long-term and sustainable food security for farming households, production must be linked to sustainable agricultural practices, such as the adoption of improved seeds as well as moderate or high use of external resources. inputs to agriculture.

The study adopted this theory because it skilfully explains the relationship between agricultural practices and food security and provides solutions to what smallholder farmers need to do to deal with the problem of food security.

Methodology

A cross-sectional design was adopted. As guided by Creswell (2014), this research study design involved collection of data from different households at a single point in time. This design was preferred because it helps the researcher take a snapshot of a sample population at a single point in time, allowing conclusions to be drawn about phenomena across a wide population.

A mix of qualitative and quantitative approaches enabled one approach to compliment the other in the study. To quantify the number of respondents, a quantitative approach was used while qualitative will be used to explore in-depth how rewards affect employee performance (Alex & Kazaara, 2023).

The sample size of the study was selected using the Krejcie & Morgan's (1970) table, as cited by Amin (2005) for sample section. A total of 339 respondents were picked across all sub groups and both purposive and simple random sampling methods were to select respondents for the study.

The researcher used both probability and non-probability sampling techniques including simple random sampling technique. The study utilized stratified sampling technique to select small holder farmers. The technique was used because it minimizes selection bias by providing an equal and independent chance to all elements from that population category of being selected into the sample population (Berndt, 2020). Conclusively, the technique helped the researcher to obtain a proportional representation of smallholder farmers from each of the main farming activities in

Received: 22.01.2024

Accepted: 25.01.2024

Published on: 31.01.2024

Kiruhura district. Additionally, purposive sampling was used to select NAADS Coordinators and top leadership of farmers groups. This technique enabled the researcher to identify and select respondents who have knowledge and experience on the subject matter and provided the best information that was needed for the achievement of the objectives study (Taherdoost, 2016).

The researcher carried out both quantitative and qualitative data analysis. Sheard, (2018) defines quantitative data analysis as the process of presenting and interpreting numerical data using statistical or mathematical models (Sheard, 2018). Descriptive statistics were used to analyze quantitative data using frequencies, percentages, mean and SD from all of the study variables. ‘Strongly agree’ and ‘agree’ responses was merged to mean ‘agree’ while ‘strongly disagree’ and ‘disagree’ were merged to mean ‘disagree’ when analysing descriptive data. In order to test for hypothesis and to answer the research objectives, the researcher used inferential statistics to investigate the effect of farming practices on food security of smallholder farmers. Correlation coefficient was used to indicate the degree to which variables are related to one another. This enabled the researcher to find out the direction whether positivity or negativity. Regression analysis was carried out to establish the linear relationship between farming practices and food security of small holder farmers. Qualitative data that was collected using interviews and scrutinized using content analysis where information was arranged in major theme of moderate use of external inputs. These were then be presented using the narratives as presented by respondents. Implications, conclusions, and inferences of qualitative information on moderate use of external inputs was drawn. Efforts were made to cross-examine qualitative data with the quantitative findings to find agreement and disagreement (Amin, 2005). Data was analyzed inform of tables, frequencies and percentages using SPSS & STATA (Nelson et al., 2022)

Discussion of findings

Table 1 Moderate use of inputs and food security of smallholder farmers

Statements regarding moderate use of inputs	Disagreement		Not Sure		Agreement	
	Freq	%	Freq	%	Freq	%
Smallholder farmers in Kiruhura District use organic pesticides in order to control the spread of diseases among crops and animals	0	0.0	0	0.0	300	100.0
Smallholder farmers in Kiruhura District use organic fertilisers in order to increase agricultural productivity	69	23.0	0	0.0	231	77.0
Smallholder farmers in Kiruhura District have small irrigation schemes in order to boast agriculture production	300	100.0	0	0.0	0	0.0

Smallholder farmers in Kiruhura District have adopted the use of seed multiplication technology in order to increase agriculture production	300	100.0	0	0.0	0	0.0
Smallholder farmers in Kiruhura District have access to quality seeds as a result of seed multiplication technology.	297	99.0	0	0.0	3	1.0

Source: Primary data (2023)

Results from table 1 above reveal that all the respondents, 100%, were in agreement with the statement that smallholder farmers in Kiruhura District use organic pesticides in order to control the spread of diseases among crops and animals. This implies that there is high use of organic pesticides to control spread of diseases.

In respect to whether smallholder farmers in Kiruhura District use organic fertilizers in order to increase agricultural productivity, majority of the respondents, 77%, were in agreement to the statement. This means that farmers use organic fertilizers to be able to increase agricultural productivity.

On whether smallholder farmers in Kiruhura District have small irrigation schemes in order to boost agriculture production, the majority, 100%, were in disagreement. This indicates that the majority respondents were of the view that they do not have small irrigation schemes to boost agriculture production.

Furthermore, on whether smallholder farmers in Kiruhura District have adopted the use of seed multiplication technology in order to increase agriculture production, majority respondents, 100%, were in disagreement. This implies that farmers have not adopted the use of seed multiplication technology to increase agriculture production.

In addition, on whether smallholder farmers in Kiruhura District have access to quality seeds as a result of seed multiplication technology, the majority of the respondents, 99%, were in disagreement with the statement. This indicates that farmers do not have access to quality seeds due to failure to implement seed multiplication.

The above descriptive findings were supplemented by findings from a qualitative data. From interviews, a question was posed regarding smallholder farmers in Kiruhura District having small irrigation schemes in order to boost agriculture production. Generally, the views of the key respondent indicated that smallholder farmers have not yet adopted the use of irrigation and this is hindering agricultural production. This view was represented in the voices of one of the respondent who narrated that;

The usage of small irrigation requires some resources which most of the smallholder farmers in Kiruhura cannot afford. This relegates them to depend on rainfall only which is unreliable sometimes. This gravely affects agricultural production and leads to food insecurity (KII5).

This implies that smallholder farmers do not use irrigation in Kiruhura district.

Furthermore, regarding seed multiplication technology, one of the key informant intimated that

“Seed multiplication technology is very good and once used by farmers, it can lead to production of high quality seeds. However, in Kiruhura, such kind of technology is still missing. Farmers harvest crops and spare some for planting next season which has a bearing on the quality of seeds (KII6)”.

This implies that smallholder farmers in Kiruhura do not use seed multiplication technology

The interpretation from both quantitative and qualitative data indicate that majority of the smallholder farmers in Kiruhura District use organic pesticides in order to control the spread of diseases among crops and animals and farmers in Kiruhura District still use organic fertilizers in order to increase agricultural productivity. However, the study also discovered that farmers in Kiruhura have not yet adopted the usage of small irrigation schemes to boost agriculture production, there is limited adoption of the use of seed multiplication technology in order to increase agriculture production and farmers do not have access to quality seeds due to failure to implement seed multiplication technology.

Discussion of findings

From the findings, it is realized that smallholder farmers in Kiruhura District do not use organic fertilisers in order to increase agricultural productivity. This study is in agreement with the wide spread argument that, achieving agricultural productivity growth will not be possible without developing and disseminating improved agricultural technologies that can increase productivity to smallholder agriculture (Asfaw et al., 2012).

The finding is also supported by past studies on relationship between farm sizes, factor of production and output which found out those larger farms are more likely to use advance farming inputs such as fertilizers, irrigation and improved seed varieties when compared to small farms, (Feder, Just & Ziberman, 1985) as cited in Betz (2009).

The findings reveal smallholder farmers in Kiruhura District use organic pesticides in order to control the spread of diseases among crops and animals. Improved farming technologies such as high yielding crop varieties, chemical fertilizers, and irrigation techniques have been central in raising yields in other parts of the world; however, African farmers have been much slower in adopting these new methods. Reasons farmers cite is lack of information on how to apply the improved inputs, (Morris et al., 2007).

Consequently, if improved inputs are not applied correctly, yield will be low and farmer will abandon the new technology, (Betz, 2009). The above scenario is expected amongst small holder farmers who are not being supported by any public or private agricultural extension service providers.

Agricultural technology development among smallholder farmers is very uneven and the effectiveness and relevance of agricultural services are key explanatory factors (Friis-Hansen, 2003). This signifies that there is a positively significant influence between farming practices and food security of smallholder farmers in Kiruhura District therefore providing support for this study hypothesis.

This is supported by evidence from key informant interviews that reveal increase in productivity to be due to soil fertility, acquired knowledge on soil maintenance, increase acreages cultivated and to some extent use of improved seeds and good hybrid of cattle.

Conversely, vast literature exist showing an inverse relationship between land productivity and farm size (Sen., 1962; Berry & Cline,1979) suggesting that small farms are more productive and would be better target for available resources. Similar studies in Zimbabwe using stochastic frontier model revealed significant impact of the programme on smallholder farmers due to effective use of productive factors and land, (Obi & Chisango. 2011).

Conclusions

The study therefore concludes that small hold farmers in Kiruhura are not adopting the usage of small irrigation schemes to boost agriculture production, there is limited adoption of the use of seed multiplication technology in order to increase agriculture production and farmers do not have access to quality seeds due to failure to implement seed multiplication technology.

Recommendations

- There is need for Government Uganda through Ministry of Finance and Economic Planning (MoFEP) to start up a farmer's bank where farmers can borrow money at a subsidized rate. Through this, they will be able to purchase modern equipment that are needed to increase agricultural production.
- The Government of Uganda through the Ministry of Agriculture Animal Industry and Fisheries (MAAIF) should establish model farms in every Sub- County in Kiruhura District to carry out seed multiplication. Through this effort, small holder farmers will be able to borrow a leaf and implement the same

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