

# **EFFECTS OF DEVOLVED AGRICULTURAL FUNCTIONS ON FOOD SECURITY AMONG SMALLHOLDER FARMERS IN NYAMIRA COUNTY, KENYA**

**Ogato Mercy Mochere.**

Master's Student, Department of Public Policy and Administration, Kenyatta University, Kenya.

**Patrick Mbataru.**

Lecturer, Department of Public Policy and Administration, Kenyatta University, Kenya.

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## **ABSTRACT**

This study looked at small-holder farmers in Kenya's Nyamira County in order to determine the impact of agricultural devolved responsibilities on food security. The study examined four goals, which included evaluating the impact on food security of extension services, finance services, agricultural inputs, and market and marketing services. Neo-Malthusian and Souffle theory were the foundation for the research study. Explanatory research design was employed in the study. It targeted 83 agricultural and field extension officers from all five of Nyamira County's sub-counties, as well as 15,296 small-holder farmers in total. The agricultural officials were chosen using a purposive sample strategy, while the farmers were chosen using a stratified and simple random selection method. Using the Bridget and Lewin formula, a sample size of 390 was obtained, of which 281 was collected. To get qualitative data, an interview guide was utilized whereas questionnaires were employed to gather quantitative data. Tables were utilized to depict the examined data and the data was analyzed by both descriptive and inferential statistics. In terms of research ethics, the researcher upheld respondents' rights by maintaining the anonymity of the information they gave. The study was voluntary, and there was a guarantee that the information collected would only be used for educational purposes. Then, using the SPSS V22 program, descriptive data were displayed in tables while inferential statistics

were examined using correlation, chi-square, and logical regression analysis. With a score of 0.9, the research tool was accurate. With evidence of  $p=0.001$ ,  $0.05$ , logical regression analysis demonstrated a positive significant linear association between market and marketing services and food security in Nyamira County. However, there was a weak, non-significant connection between agricultural inputs and food security in Nyamira County ( $p=0.995$ ,  $>0.05$ ), financial services ( $p=0.406$ ,  $>0.05$ ), and extension services ( $p=0.687$ ,  $>0.05$ ). The study found that while extension services, financial services, and agricultural inputs were not shown to have a substantial impact on food security in Nyamira County, market and marketing services did have a positive and significant impact. According to the report, the Nyamira County Government should host more public forums on economic development, assist cooperatives that give farmers the ability to collectively bargain for their produce, and enhance market information systems for more visibility. The study's conclusions may be helpful to policymakers at the federal and county levels of Nyamira County as well as in harmonizing or changing agricultural policies and frameworks to improve food security status at the county level. Future research should give more consideration to other concerns that may affect food security and a larger target population.

## **INTRODUCTION**

Globally, food security is a perennial human challenge. Many countries in the world especially those from the Asian and African continents are struggling to manage the food insecurity problem in order to curb the consequences of malnutrition for their ever-growing population (FAO, 2020). Commonwealth Secretariat and Commonwealth Local Government (2001) posit that the main reason to devolve government functions is to enhance effective and efficient service delivery to the public. According to Gundersen, Kuhn, Offutt and Morehart (2014), the move to devolve agricultural activities in USA for instant, especially in the area of commodity production enhanced food productivity to a very great extent across the states.

In Ghana, Tsado and Ajayi (2014) established that the livelihood of small-scale farmers in Ghana were improve as a result of increased food productivity after devolving agricultural functions. While focusing on plantain farmers in Nyakaina village in Uganda, Ninsiima (2018) wanted to establish the impact of extension services in relation to food security. From the findings, it was revealed that food insecurity still remained relatively high despite adopting the practices as offered by the extension service providers.

Originally, all agricultural activities were under the central government in Kenya. However, the 2010 constitution ushered in a new era where various functions including agricultural functions were devolved. Devolution in Kenya is implemented by the 47 county governments each headed by a governor given the mandate by the citizens. The head of the various counties are mandated to address the food status at the county levels (Richards & Smith, 2015).

Nyamira which is among the 47 county governments in Kenya is within the great Lake region. According to KNBS (2015), the county occupies 899.4 square kilometers and is 91% arable. Nevertheless, like many agricultural potential areas in Kenya, farmers rely largely on rain fed agriculture and farming is majorly practiced by small holder farmers. Therefore, this study aims at investigating how the devolved agricultural function has contributed to the food status at the county level.

### **Statement of the Problem**

Agricultural sector is very key in ensuring both food safety and improvement of livelihoods of the citizens as 80% of Kenyans source their livelihoods from the sector (Root Capital, 2014). According to Othieno (2012), problems like economic stagnation, corruption, inequalities together with lack of adequate food were perceived to be a thing of the past with the advent of devolution. However, food security as well as eradication of hunger and poverty in Kenya is still a challenge despite devolution (FAO, 2012).

Studies on devolution have been undertaken in Kenya, for instance Muhumed and Minja's (2019) investigation into the impact of devolution on Wajir County residents' quality of life. Mutuga (2018) also carried out a study to establish how transfer of agricultural functions affected fish farming in Laikipia County. However, due to differences in climate, economy, policies and culture, the researcher cannot generalize the study findings and apply to Nyamira County. This study thus, intended to fill this knowledge gap.

### **Objectives of the Study**

- i. To assess effect of extension services on food security a case of small-scale farmers in the County of Nyamira.
- ii. To examine effect of agricultural inputs on food security among smallholder farmers in the County of Nyamira.

## **LITERATURE REVIEW**

### **Theoretical Review**

Neo-Malthusian theory of population and Souffle theory of decentralization served as the study's guiding principles.

### **Neo-Malthusian Theory of Population**

The pioneers of Neo-Malthusian theory were concerned with the same situation of having to worry of the balance between population and natural resources. The theorists were aware that if the world population reached two billion in 1914 the depletion of resources such as coal, iron and fertile agricultural land was a problem that would have taken some time to emerge, but which future generation would be forced to deal with.

The theorists further hoped that the growing population on the planet could produce enough food for its usage and not to commercial food production. The challenge however has remained since then, where the population keeps on growing and the demand to feed the population continuously presents challenges amidst advanced technologies (Scanlan, 2003). Thus, the neo-Malthusian theory extends its relevance to the study variables of extension services, financial services, agricultural input services and market and marketing services, as some of the preempted environmental and sociological efforts to bridge the gap created by uncontrolled population (Wolfgram, 2005).

## **Souffle Theory of Decentralization**

Parker (1995) is credited with the souffle theory. The three primary decentralization domains, according to the theory, are political, administrative, and fiscal. According to Farooq, Shamail and Awais (2008), the three fundamental areas need to be implemented to similar degree in order to balance the decentralization strategy and thereby affect expected system outcomes, results and optimize development impact.

The promulgation of the 2010 constitution transferred political, administrative, and financial powers of various sectors for example agricultural functions to the county level. The devolved governments, therefore, have the mandate to deliver services to the grass root. Souffle theory gives an insight of dimensions of devolution being examined in this study that is financial, political and administration decentralization and this makes relevant to the study.

## **Empirical Review**

### **Extension Services and Food Security**

Ninsiima (2018) conducted a study to establish how food security is affected by agricultural extension services. The study was carried out in Nyakaina village in Uganda, a case study of plantain farmers. The study was aimed at examining how extension services influence food security among farmers growing plantain. The study was based on the following variables: extension services accessibility, socio-economic factors, inputs adoptability and extension services practices.

The study findings revealed that even though farmers adopted the practices as offered by the extension service providers, food insecurity still remained relatively high. It was found that majority of the households' accessed information through radio broadcasts and field demonstrations.

Raidimi and Kabit (2022) conducted a study to examine how extension services and training affect food productivity of smallholder farmers in South Africa. The study findings revealed that training and dissemination of relevant information ensure informed decision making that positively influence food security. Further, it also revealed that there is need to equip field extension officers with modern agricultural knowledge so as to effectively disseminate information to smallholder farmers. The study thus recommended that education should be integrated into extension services which will not only enhance farmers' productivity but equip the educators with modern technology for improved food security.

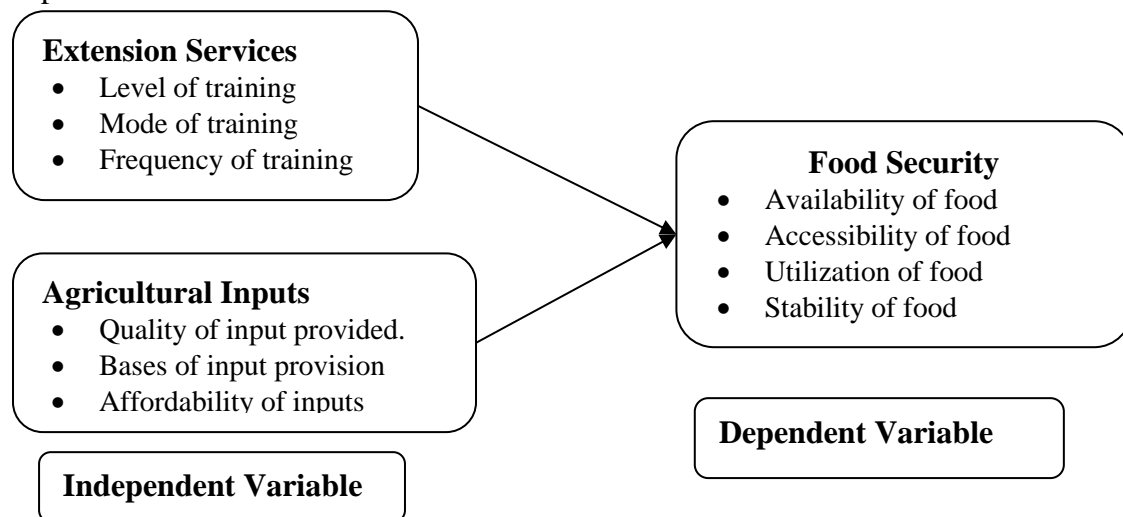
## Agricultural Inputs and Food Security

In an effort to establish how food security was affected by agricultural input subsidies, Obayelu *et al.*, (2021) reviewed secondary data from a number of scholars on agricultural input subsidies to study the linkage between the input subsidies and food security. The evidence from the secondary literature analysis revealed that the subsidies leverage the farmers hence increase input use, productivity which in turn leads to food security. The evidence further pointed to the fact that if smallholder farmers were efficiently targeted with input subsidies, greater steps would be realized towards food security.

In 2020, Andohol, Doki, and Emmanuel conducted research on the relationship between Nigerian agricultural input governance and food security. The results of the investigation showed that there was evidence of a long-term equilibrium relationship between the variables that were being examined. Empirical evidence of the study established that despite the negative consequences of corruption on food security, its ripple effect although strong, does not cause some agricultural inputs to experience negative impact on food security. The report also suggested that in order to enhance productivity, there should be substantial support for the provision of farm inputs, such as agricultural machinery and loan facilities to realized food security.

### Conceptual Framework

The study postulated that there existed correlation in respect to the two variable, independent and dependent.



### RESEARCH METHODOLOGY

The study's research design was explanatory. This method was chosen because it tries to anticipate future events in addition to providing an explanation for why things occurred. Explanatory

research designs are used to extrapolate conclusions from data obtained from a sample to a larger population (Cooper & Schindler, 2014).

Nyamira County is found within the Lake Victoria region. It occupies 899.4km<sup>2</sup> and 91% arable. The sub-counties that make up Nyamira county include: Masaba North, Borabu, Nyamira North, Manga, and Nyamira South (CIDP, 2022). The arable land is utilized for agricultural activities covering both food and cash crop. These activities include livestock and crop farming. The study was conducted in entire county of Nyamira.

All smallholder farmers who produced both crops and cattle in the five sub-counties of Nyamira County were the focus of the study, as well as the county agricultural and field extension officers. The target population was 15,296 smallholder farmers and 83 agricultural and field extension officers in the entire county (CIDP, 2022). The target population was further distributed across smallholder farming activities

Both stratified and straightforward random sample strategies were used in the investigation. The classification of farmers into those who raise cattle, cereals, vegetables, tea, bananas, and poultry was done using stratified sampling in the beginning. This ensured that all farmers were all proportionately represented in the study. Within the strata, every categorized smallholder farmer had the same probability to participate and for equal representation of respondents across the categories. Purposive sampling was used to choose the county agricultural and field extension officers, while simple random sampling was used to select a representative sample from each group of smallholder farmers.

The questionnaire was given to the respondents by the researcher right there at their site after receiving approval from all necessary authorities. The researcher informed the respondents of the study's goals and purpose before they filled out the questionnaire. Respondents who for one reason or another were not able to fill the questionnaire by themselves, the researcher assisted them where necessary.

To ensure consistency of the results, the collected data was first cleaned and categorized. Descriptive analysis (frequencies and percentages) was then used to analyze quantitative data. Additionally, logistic regression analysis, chi-square analysis, and inferential statistics such as correlation were employed to show the interrelationship between the independent and dependent variables.

Logistic regression is used to predict the categorical dependent variable. This statistical method is used to forecast the link between the predictors (independent variables) and the predicted variable (the dependent variable) when the dependent variable has a binary or dichotomous nature. According to the study's goals, qualitative data was discussed and presented in a narrative format.

## **RESULTS AND FINDINGS**

There were 390 responders in total for the survey. A return rate of 72% was attained by 281 of the surveys, which were correctly completed and returned. The response rate was adequate because, in accordance with Kothari's (2007) examination of empirical studies, a response rate of more than 70% provided a realistic threshold for statistical generalization that was acceptable in any reliable

data for data analysis. On respondents' gender, men made up the majority of respondents (67%), while women made up only 33%. This showed that among farmers, men outnumbered women, indicating that this was a largely male-dominated field. For the sake of evoking thoughtful answers, this was thought to be important.

On the participants' highest level of education, 46% of respondents had completed their primary school, while 14% had finished their secondary education. Only 13% reported having post-secondary education, while 27% said they had none. These depictions showed excellent literacy levels of the respondents that assisted in achieving quality answers.

On the period engaged in farming activities, 35% of respondents had been actively engaged in farming for between five and 10 years, while 47% had been doing so for more than ten. Fewer than a year, 1-2 years, and 3-4 years in farming, respectively, were represented by 9%, 6%, and 2% of respondents.

### **Devolved Agricultural Functions**

According to the pertinent tables, the survey sought the respondents' devolved agricultural functions, specifically the extension services, finance services, agricultural inputs, market and marketing services, and food security.

### **Extension Services**

The study's primary goal was to determine how extension services affected the food security of small-scale farmers in Nyamira County. The discussions were presented after the analysis. The study evaluated respondents' opinions on a variety of claims made concerning extension services, as shown in the results in table 1.

*Table 1: Distribution of Respondents by Extension Services*

<b>Statements</b>		<b>f</b>	<b>%</b>
Do you get visits from extension staff from the county government?	Yes	107	38
	No	174	62
	<b>Total</b>	<b>281</b>	<b>100</b>
If yes, how many times in a year?	Once	69	64
	Twice	32	30
	Thrice	5	5
	Four Times	1	1
	<b>Total</b>	<b>107</b>	<b>100</b>
Do you easily access agricultural information?	Yes	108	38
	No	173	62
	<b>Total</b>	<b>281</b>	<b>100</b>
If yes, where do you get the information from?	Extension Officers	30	28
	Farmers Organizations	31	29
	NGOs	39	36
	Media	8	7
	<b>Total</b>	<b>108</b>	<b>100</b>



The respondents were asked if they got visited from extension staff from the county government. Majority of the respondents at 62% said no while 38% indicated yes. For those who were visited, the study sought to know how many times in a year where they visited. Therefore, out of 281 respondents, only 107 respondents were visited. In this regard, majority of the respondents at 64% said they were visited only once while 30% of the respondents indicated to have been visited twice. 5% and 1% of the respondents were visited thrice and four times respectively.

On whether the respondents easily accessed agricultural information, the study revealed that 62% said no while 38% agreed to have access. Again, for those who easily accessed agricultural information, the study sought to know where they got the information from and out of 281 respondents, only 108 participants responded. As a result, 29% of respondents received their agricultural information from farmers' organizations, whereas 36% of respondents received it from non-governmental organizations (NGOs). Extension agents and the media were the sources of agricultural information for 28% and 7% of the respondents, respectively.

### **Farmers Workshop Training**

The survey requested respondents if they would accept an invitation to a farmers' workshop training, and the results are shown in table 2.

*Table 2: Distribution of Respondents by Farmers Workshop Training*

<b>Training</b>	<b>Frequency</b>	<b>Percent</b>
Very Often	13	5
Often	60	21
Rarely	124	44
Never	84	30
<b>Total</b>	<b>281</b>	<b>100</b>

The results displayed in table 4.5 showed that majority of the respondents at 44% had been invited to attend farmers' workshop training, followed by 30% of the respondents who had never been invited. 21% and 5% of the respondents had been invited to attend farmers' workshop training often and very often respectively. The agricultural officer alluded to the fact the seminars/trainings are not very frequent from the interview.

### **Farmers Involvement**

The survey additionally sought out the participants if they had ever participated in on-farm demonstrations and, if so, who had arranged them, as well as if they considered the knowledge, they had learned during training was beneficial. Besides, if they had ever participated in farmers benchmarking tours and if so, who had sponsored the tour? The findings were displayed in table 3.

**Table 3: Distribution of Respondents by Farmers Involvement**

<b>Statements</b>		<b>f</b>	<b>%</b>
According to you, do you think the knowledge gained during training is useful?	Yes	232	83
	No	49	17
	<b>Total</b>	<b>281</b>	<b>100</b>
Have you ever taken part in on-farm demonstrations?	Yes	102	36
	No	179	64
	<b>Total</b>	<b>281</b>	<b>100</b>
If yes above, who organized it?	NGOs	57	56
	Farmers Organizations	27	26
	County Government	18	18
	<b>Total</b>	<b>102</b>	<b>100</b>
Have you ever participated in farmers benchmarking tours?	Yes	79	28
	No	202	72
	<b>Total</b>	<b>281</b>	<b>100</b>
If yes above, who sponsored the tour?	NGOs	57	71
	Farmers Organizations	14	18
	County Government	9	11
	<b>Total</b>	<b>80</b>	<b>100</b>

From table 3, the respondents were asked if they thought the knowledge gained during training was useful and majority of the respondents at 83% agreed it was while 17% disagreed. Additionally, the respondents were asked if they had ever taken part in on-farm demonstrations and majority of the respondents at 64% said no while 36% indicated yes. For those who took part, the study sought to establish who organized it. Hence, out of 281 respondents, only 102 respondents had taken part. In this respect, majority of the respondents at 56% said it was organized by NGOs while 26% of the respondents indicated it was organized by the Farmers Organizations. 18% of the respondents said it was organized by the County Government.

When asked if they had ever gone on a farmers benchmarking tour, the majority of respondents, 72%, claimed they had not, while 28% said they had. The investigation attempted to determine who supported any farmers benchmarking visits for those who had ever taken part. As a result, just 80 of the 281 responders had taken part. In this respect, majority of the respondents at 71% said it was sponsored by NGOs while 18% of the respondents indicated it was sponsored by the Farmers Organizations. 11% of the respondents said it was sponsored by the County Government. From the interview with the agricultural officer, he stated that farmers participated in on farm demonstrations, trainings and the extension staff would do a follow up to increase the rate of adoption of the gained knowledge.

## **Training and Knowledge**

The purpose of the study was to find out from the respondents whether they had received training to view farming as a business, whether they were familiar with effective post-harvest management techniques, and whether they believed the county government was making an effort to promote value addition. Similarly, if they had adopted and used the knowledge gained from the extension services offered, and if so, explained why? The findings were exhibited in table 4.

*Table 4: Distribution of Respondents by Training and Knowledge*

<b>Statements</b>		<b>f</b>	<b>%</b>
Have you been trained to take farming as a business?	Yes	102	36
	No	179	64
	<b>Total</b>	<b>281</b>	<b>100</b>
Do you have knowledge on good post-harvest management practices?	Yes	228	81
	No	53	19
	<b>Total</b>	<b>281</b>	<b>100</b>
Do you think there is an effort from the county government to promote value addition?	Yes	134	48
	No	147	52
	<b>Total</b>	<b>281</b>	<b>100</b>
Have you adopted and used the knowledge gained from the extension services offered?	Yes	153	54
	No	128	46
	<b>Total</b>	<b>281</b>	<b>100</b>
If yes, kindly explain why?	Inadequate Resource	27	10

According to the research from table 4, 64% of the respondents had received training to pursue farming as a company, compared to 36% who had not. Also, 81% of the respondents had knowledge on good post-harvest management practices while 19% had no knowledge. While 48% thought there was an effort from the county government to promote value addition, 52% of the respondents did not think so. Further, 54% of the respondents said they adopted and used the knowledge gained from the extension services offered while 46% did not. For those who said they did not adopt and used the knowledge gained from the extension services offered, the study sought to establish why they did not. Therefore, out of 281 respondents, only 27 respondents had participated. In this regard, the said respondents at 10% claimed it was because of inadequate resources.

## **Source of Information on Extension Services**

In order to convey extension service information to the respondents in a way that will be helpful, the study sought their ideas on how this should be done. Table 5 summarizes the findings.

**Table 5: Distribution of Respondents by Source of Information on Extension Services**

<b>Information</b>	<b>Frequency</b>	<b>Percent</b>
Brochures	41	15
Radio	138	49
Television	90	32
Pamphlets	12	4
<b>Total</b>	<b>281</b>	<b>100</b>

According to the study's findings, 49% of respondents said that extension service material should be packed for radio broadcast in order to benefit farmers, while 32% said they preferred it to be broadcast on television. Pamphlets and brochures were noted by 15% and 4% of the respondents, respectively.

### **Language on Information**

The study sought information concerning the respondents' preferred language to be used on the information on extension services. The results were as displayed in table 6.

**Table 6: Distribution of Respondents by Language on Information**

<b>Language</b>	<b>Frequency</b>	<b>Percent</b>
English	44	16
Vernacular	138	49
Kiswahili	99	35
<b>Total</b>	<b>281</b>	<b>100</b>

The study's findings indicated that 49% of respondents preferred speaking in their native tongue, whereas 35% mentioned Kiswahili. The use of English was chosen by 16% of the respondents.

### **Training of Farmers**

The study sought the opinion if the respondents thought that training farmers on modern methods of farming influenced food security in Nyamira County as displayed in table 4.10.

**Table 7: Distribution of Respondents by Training of Farmers**

<b>Statements</b>		<b>f</b>	<b>%</b>
In your opinion, do you think that training farmers on modern methods of farming influence food security in Nyamira County?	Yes	255	91
	No	25	9
	<b>Total</b>	<b>281</b>	<b>100</b>
Kindly explain your answer above?	Leads to high yields/Increased productivity	29	71
	Help in sustainable use of resources	4	10
	Farms are very small	5	12
	Efficient post-harvest management practices	3	7
	<b>Total</b>	<b>41</b>	<b>100</b>

From table 7, the study findings revealed that majority of the respondents at 91% said yes to the thought of training farmers on modern methods of farming that influenced food security in Nyamira County while 9% said no. Supplementary, the respondents were asked to explain in regards to their response to this aspect of training farmers on modern methods of farming that influenced food security in Nyamira County and with only 41 respondents out of the 281, majority of the respondents at 71% said it led to high yields/increased productivity while 12% said the farms were very small. 10% and 7% said it helped in sustainable use of resources and efficient post-harvest management practices respectively.

### **Agricultural Inputs**

The study's third goal was to investigate how agricultural inputs affected the food security of small-holder farmers in the County of Nyamira.

### **Farm Size and Inputs**

According to the findings in table 8, the study asked the respondents for their opinions on the percentage of their farms that were utilized for growing food crops and the main inputs they needed for farming.

**Table 8: Distribution of Respondents by Farm Size and Inputs**

<b>Statements</b>		<b>f</b>	<b>%</b>
What fraction of your farm is used for growing food crops?	Quarter	163	58
	Half	94	33
	All	24	9
	<b>Total</b>	<b>281</b>	<b>100</b>
What primary inputs do you require for your farming activities	Fertilizer	193	56
	Seeds	150	44
	<b>Total</b>	<b>343</b>	<b>100</b>

The study's findings showed that 33% of respondents stated using half of their farm for food crops, while 58% of respondents said they utilized a quarter of their farm for such crops. Only 9% of the respondents said all of it that is 100% portion of the farm was used for growing food crops. Further, majority of the respondents at 56% said that they required fertilizers for their farming activities while 44% of the respondents mentioned seeds.

### **Agricultural Farm Activities**

The study sought the views of the respondents' if they used water for irrigation brought about through the county government in their farm, if they had accessed farm mechanization services offered by the county government, if they had accessed the subsidized seeds provided by the county government for their farm, if they had accessed the subsidized fertilizer from the county government, if they got assistance from the county government in pest and disease control in their farm, if they accessed the agroforestry seeds and seedlings from the county government and finally, what kind of preservation they used to maintain quality of their farm produce as presented from the outcomes in table 9.

**Table 9: Distribution of Respondents by Agricultural Farm Activities**

<b>Statements</b>		<b>f</b>	<b>%</b>
Do you use water for irrigation brought about through the county government in your farm?	Yes	18	6
	No	263	94
	<b>Total</b>	<b>281</b>	<b>100</b>
Have you accessed farm mechanization services offered by the county government?	Yes	25	9
	No	256	91
	<b>Total</b>	<b>281</b>	<b>100</b>
Have you accessed the subsidized seeds provided by the county government for your farm?	Yes	90	32
	No	191	68
	<b>Total</b>	<b>102</b>	<b>100</b>
Have you accessed the subsidized fertilizer from the county	Yes	83	30

government?	No	198	70
	<b>Total</b>	<b>214</b>	<b>100</b>
Do you get assistance from the county government in pest and disease control in your farm?	Yes	61	22
	No	220	78
	<b>Total</b>	<b>281</b>	<b>100</b>
Have you accessed the agroforestry seeds and seedlings from the county government?	Yes	200	71
	No	81	29
	<b>Total</b>	<b>281</b>	<b>100</b>
What kind of preservation do you use to maintain quality of your farm produce?	Drying	225	80
	Pesticides	55	20
	Chemicals	1	0.4
	<b>Total</b>	<b>281</b>	<b>100</b>
If yes, please specify the type of preservation used for quality maintenance of your produce	Pesticides	46	100
What is the basis for offering preservation and storage facilities to farmers in your county?	If you know somebody in the county	21	29
	Availability of Resources	40	55
	Registration by provincial administration	12	16
	<b>Total</b>	<b>73</b>	<b>100</b>
Is the quality of the inputs provided by the county government suitable for your farming needs?	Yes	231	82
	No	50	18
	<b>Total</b>	<b>281</b>	<b>100</b>
Do you find the inputs provided by the county government affordable?	Yes	172	61
	No	109	39
	<b>Total</b>	<b>281</b>	<b>100</b>
In your opinion, how do post-harvest management practices influence food security among small holder farmers in Nyamira County?	Make food available during shortage	18	90
	Avoid wastage of food	2	10
	<b>Total</b>	<b>281</b>	<b>100</b>

According to the study's results, 94% of respondents said they didn't use water for irrigation on their farm that they got from the county government, while only 6% did. Again, majority of the respondents at 91% said they had not accessed farm mechanization services offered by the county government while only 9% had accessed. Additionally, majority of the respondents at 68% said they had not accessed the subsidized seeds provided by the county government for their farm while 32% said yes. Equally, majority of the respondents at 70% said they had not accessed the subsidized fertilizer from the county government while 30% had accessed.

Likewise, majority of the respondents at 78% said that they did not get assistance from the county government in pest and disease control in their farm while 22% said yes. On the other side, the majority of respondents (71%), although disagreeing with 29%, indicated they obtained their agroforestry seeds and seedlings from the county government.

Further study results revealed that 80% of respondents claimed they utilized drying as a kind of preservation to retain the quality of their farm products, whereas just 19% of respondents indicated they used pesticides. Only 0.4% of the respondents used chemicals as a kind of preservation to maintain quality of their farm produce. Besides, 46 out of the 281 participants indicated pesticides as the type of preservation used for quality maintenance of their produce.

Additionally, the majority of respondents (55%) said that the availability of resources was the reason why farmers in their county were offered preservation and storage facilities, while 29% said that it wasn't necessary unless you knew someone in the county. Only 16% of the respondents mentioned registration by provincial administration as the basis for offering preservation and storage facilities to farmers in their county.

With only 18% disagreeing, 82% of respondents said the county government's inputs were of a caliber that matched their farming demands. On the other hand, 61% of the respondents said yes, they found the inputs provided by the county government affordable while 39% said no. Lastly 90% of respondents felt that providing food during times of scarcity was one of the post-harvest management methods that influenced small-holder farmers' ability to feed their families in Nyamira County, while 10% ascribed this to preventing food waste.

In his response during the interview regarding farm inputs, the agricultural officer said that the county government is working in partnership with other organizations to avail liming materials and other inputs. He cited an instance of how the county administration, ASDSP, and Kisii University worked together to purchase and distribute 20 solar conduction dryers to dry and preserve fruits and vegetables in order to reduce post-harvest losses during a period of high output.

## **Food Security**

The dependent variable for this study was on food security in Nyamira County.

## **Meals and Kinds of Food**

The research examined the respondents' observations on how many meals their families consumed each day, the types of foods they consumed, and the principal food crop grown on their farms over the previous ten years, as seen by the findings in table 10.



**Table 10: Distribution of Respondents by Meals and Kinds of Food**

<b>Statements</b>		<b>f</b>	<b>%</b>
How many meals do your family access in day?	3	221	79
	2	50	18
	1	10	4
	<b>Total</b>	<b>281</b>	<b>100</b>
Kindly indicate the types of food in your family diet	Balanced	24	24
	Carbohydrates	39	39
	Vitamins	7	7
	Proteins	31	30
	<b>Total</b>	<b>101</b>	<b>100</b>
	What is the main food crop grown in your farm in the past 10 years?	Maize	167
Beans		65	23
Bananas		26	9
Vegetables		12	4
Sweet Potatoes		11	4
<b>Total</b>		<b>281</b>	<b>100</b>

According to the study's findings (table 4.19), 79% of respondents stated their families ate three meals every day, while 18% said they only ate two. Only 4% of respondents reported eating only one meal every day. Contrarily, 39% of respondents claimed that carbs made up their diet, whereas 30% of respondents claimed that proteins did. A balanced diet and vitamins were consumed by 24% and 7% of the respondents, respectively. Moreover, majority of the respondents at 59% mentioned maize as their main food crop grown in their farms in the past 10 years, followed by 23% who mentioned beans while 9% of the respondents mentioned to have grown bananas as their main food crop. 4% each of the respondents indicated to have grown vegetables and sweet potatoes respectively.

### **Food Production and Adequacy**

The study sought the interpretations of the respondents' if they found it a challenge to provide adequate food for their families, if they had enough income to purchase adequate food for their families, if there were variety of food in the market whenever they needed, if they had adequate land for food production, if disease affected the main staple food while still in the field, if they experienced post-harvest diseases and pests, and if they had adequate storage facilities for their farm produce as shown from the results in table 11.

**Table 11: Distribution of Respondents by Food Production and Adequacy**

<b>Statements</b>		<b>f</b>	<b>%</b>
Do you find it a challenge to provide adequate food for your family?	Yes	61	22
	No	220	78
	<b>Total</b>	<b>281</b>	<b>100</b>
Do you have enough income to purchase adequate food for your family?	Yes	187	67
	No	94	33
	<b>Total</b>	<b>281</b>	<b>100</b>
Is there variety of food in the market whenever you need?	Yes	237	84
	No	44	16
	<b>Total</b>	<b>102</b>	<b>100</b>
Do you have adequate land for food production?	Yes	58	21
	No	223	79
	<b>Total</b>	<b>214</b>	<b>100</b>
Does disease affect the main staple food while still in the field?	Yes	66	23
	No	215	77
	<b>Total</b>	<b>281</b>	<b>100</b>
Do you experience post-harvest diseases and pests?	Yes	37	13
	No	244	87
	<b>Total</b>	<b>281</b>	<b>100</b>
Do you have adequate storage facilities for your farm produce?	Yes	192	68
	No	89	32
	<b>Total</b>	<b>281</b>	<b>100</b>

According to the study's findings (table 11), 78% of respondents did not think it was difficult to feed their families enough, while 22% stated it was difficult. Also, majority of the respondents at 67% said yes that they had enough income to purchase adequate food for their families while 33% said no. Once more, 84% of respondents agreed that they could find a variety of foods at the market anytime they needed them, while 16% disagreed. However, just 21% of respondents (or 79% of the total) agreed that they had enough land for food production.

Furthermore, majority of the respondents at 77% disagreed that disease affected the main staple food while still in the field and only 23% of the respondents agreed to this. And while the majority of respondents, 87%, claimed not to have experienced post-harvest illnesses and pests, 13% of respondents acknowledged having done so. Moreover, majority of the respondents at 68% mentioned yes that they had adequate storage facilities for their farm produce while 32% of the respondents said no.

### **Food Security Realization**

The survey questioned participants about their ideas on how food security might be attained, as is seen from the results in table 12.

*Table 12: Distribution of Respondents by Food Security Realization*

<b>Statement</b>	<b>f</b>	<b>%</b>
Improve extension services	11	15
Subsidize farm inputs	19	26
Diversification of farm activities	10	14
Agribusiness	4	6
Irrigation	11	15
Modern methods of farming/Farming mechanization/Smart agriculture	14	19
Lowering cost of production to encourage agriculture	2	3
Encourage youths to engage in agriculture	1	1
	<b>72</b>	<b>100</b>

According to the study's findings (table 12), 26% of respondents said that subsidized farm inputs can lead to food security. This was followed by 19% of the respondents who attributed this to modern methods of farming/farming mechanization/smart agriculture. 15% each of the respondents attributed this to improved extension services and irrigation. Moreover, 14% of the respondents said diversification of farm activities while 6% of the respondents mentioned agribusiness. 3% and 1% of the respondents attributed this to lowering cost of production to encourage agriculture and encourage youths to engage in agriculture respectively.

### **Food Storage and Income**

The study asked respondents to comment on whether they believed household food productivity had increased over the previous ten years, how much of their income they spent on food, and whether they believed food stored by farmers was easily accessible during shortages, according to the findings in table 13.

**Table 13: Distribution of Respondents by Food Storage and Income**

<b>Statements</b>		<b>f</b>	<b>%</b>
Is food stored by farmers easily accessible during shortage?	Yes	193	69
	No	88	31
	<b>Total</b>	<b>281</b>	<b>100</b>
What percentage of your income do you spend on food?	Half (50%)	58	21
	Quarter (15%)	210	75
	All (100%)	13	5
	<b>Total</b>	<b>281</b>	<b>100</b>
Is the percentage allocated adequate for food requirements for your household?	Yes	162	58
	No	119	42
	<b>Total</b>	<b>281</b>	<b>100</b>
If No, kindly explain why?	High cost of living	113	89
	There're other expensive like school fees	14	11
	<b>Total</b>	<b>127</b>	<b>100</b>
Has your household food productivity improved in past 10 years?	Yes	72	26
	No	209	74
	<b>Total</b>	<b>281</b>	<b>100</b>

The study results in table 13 exhibited that majority of the respondents at 69% said yes that food stored by farmers was easily accessible during shortage while 31% said no. Additionally, majority of the respondents at 75% mentioned a quarter as the percentage of their income they spent on food while 21% indicated half of the percentage. Only 5% of the respondents mentioned all (100%).

On the other hand, the majority of respondents, 58%, believed that the proportion allotted was sufficient to cover their household's need for food, while 42% disagreed. To explain further why the percentage allocated was not adequate for food requirements for their households, majority of the respondents at 89% attributed this to high cost of living while 11% said there were other expenses like school fees.

Similarly, majority of the respondents at 74% disagreed that their households' food productivity improved in the past 10 years while only 26% agreed.

### **Household Activities**

The results of table 14 show that the survey's respondents were asked to interpret what had transpired in their household over the previous 12 months.

*Table 14: Distribution of Respondents by Household Activities*

<b>Statements</b>		<b>f</b>	<b>%</b>
Scaled down the number of meals eaten in a day?	Yes	67	24
	No	214	76
	<b>Total</b>	<b>281</b>	<b>100</b>
Reduced the size of meals for the household?	Yes	85	30
	No	196	70
	<b>Total</b>	<b>281</b>	<b>100</b>
Resorted to cheaper foods or the food less preferred?	Yes	110	39
	No	171	61
	<b>Total</b>	<b>102</b>	<b>100</b>
Skipped food altogether for the whole day?	Yes	68	24
	No	213	76
	<b>Total</b>	<b>214</b>	<b>100</b>
At one point borrowed food from relative or friend?	Yes	92	33
	No	189	67
	<b>Total</b>	<b>281</b>	<b>100</b>
Denied adults food to allow children have more?	Yes	93	33
	No	188	67
	<b>Total</b>	<b>281</b>	<b>100</b>
Consumed crop before they mature?	Yes	60	21
	No	221	79
	<b>Total</b>	<b>281</b>	<b>100</b>
Consumed meat from dead animals?	Yes	42	15
	No	239	85
	<b>Total</b>	<b>281</b>	<b>100</b>
Purchased food on credit?	Yes	95	34
	No	186	66
	<b>Total</b>	<b>281</b>	<b>100</b>
Bought food in small quantities?	Yes	107	38
	No	174	62
	<b>Total</b>	<b>281</b>	<b>100</b>
Disposed household assets to buy food?	Yes	74	26
	No	207	74
	<b>Total</b>	<b>281</b>	<b>100</b>

The majority of respondents (76%), as shown in 14, stated that they did not reduce the amount of meals they ate each day, whereas 24% indicated that they did. Although the majority of respondents, 70%, said they had not scaled back the size of meals for their household, only 30% of respondents agreed with this assertion. Once more, 61% of respondents disagreed and 39% agreed that they had chosen less desirable or cheaper foods. Also, majority of the respondents at 76% said they did not skip food altogether for the whole day while 24% said yes, they skipped food. Further, majority of the respondents at 67% disagreed at one point they borrowed food from relative or friend while 33% said yes, they did. Similar to this, 67% of respondents said they did not withhold meals from adults so that kids might eat more, whereas 37% said they had. Likewise, majority of the respondents at 79% mentioned that they did not consume crop before they matured while 21% said they did.

Furthermore, the study revealed that 15% of respondents consented to consume meat from deceased animals, whereas the bulk of respondents, at 85%, claimed that they did not. Additionally, the majority of respondents, 66%, stated they did not buy food on credit, while 34% did. However, the majority of respondents, 62%, claimed they did not purchase food in little quantities, whereas 38% acknowledged doing so. Finally, majority of the respondents at 74% said they did not dispose household assets to buy food while 26% said yes.

## **CONCLUSIONS AND RECOMMENDATIONS**

### **Conclusion**

According to the above-mentioned assumptions, the research therefore acknowledged and established that extension services and agricultural inputs had a negative and insignificant effect on food security in Nyamira County. Hence, extension services, financial services and agricultural inputs were not found to play a significant role on food security in Nyamira County.

### **Suggestions**

Following the study's observation that there was a statistically significant relationship between the market and marketing services and food security, the following findings and recommendations might be drawn. However, there was no statistically significant relationship on extension services, financial services and agricultural inputs with food security.

In view of these findings, the study suggests that the Nyamira County Government hold more public forums for economic development, support the cooperatives that gave farmers the ability to collectively bargain for their produce, and enhance market information systems for increased visibility.

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