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# FOOD SECURITY'S BROKEN LINK: THE MISALIGNMENT OF STAKEHOLDER PRIORITIES IN AGRICULTURE AND NUTRITION IN VIHIGA COUNTY, KENYA

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## ABSTRACT

Global food security will exist when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Today, about 2 billion of the 7.96 billion people on Earth are food insecure. Food insecurity is still a challenge in Kenya despite different sectors' interventions in nutrition and agriculture. This study sought to identify programs and stakeholders who are influential on food security by analyzing farmers' participation in programs, the link between agriculture and nutrition goals, factors that influence the success of programs, and the impact of policy on food security. The study adopted a descriptive cross-sectional design using mixed methods of data collection. Qualitative data were obtained from thirty purposively selected stakeholders through focus group discussions and key informant interviews. The themes formed from the qualitative data were analyzed manually, and verbatim quotes were used to explain the findings. Additionally, two hundred and seventy-three structured questionnaires were administered to farmers to collect quantitative data. The data revealed that (75%) of farmers were beneficiaries of key programs. Pearson's chi-square test gave $x^2(4, n=273)>=91.045$, with a p-value of 0.000 which is less than 0.05, indicates a strong relationship between education level and farmers' awareness of key agricultural programs. The primary motivation in agriculture production was income generation, but the nutritional value of the food was overlooked. Poor collaboration among stakeholders was shown to not only result in unequal program coverage but also pose an obstacle in aligning agricultural programs with local nutrition demands. Moreover, although food and agriculture policies are in place, gaps exist in implementing and adhering to these policies. It was revealed that budget allocation to the agriculture sector is at (2.4 %) which is still a quarter way to the international commitment of (10%). Lastly, land ownership limitations hinder smallholder farmers' ability to meet income and nutrition needs, as approximately a third of those surveyed (n=136, 35.5%) reported owning less than 0.5 acres of land. It is, therefore, necessary to build the capacity to support smart agriculture, using technological methods to increase productivity on small land. Additionally, stakeholders must create policy strategies, collaboration and program distribution mechanisms to promote nutrition and agriculture to improve food security.

**Key words:** Agriculture, Food Security, Influence, Linkage, Nutrition, Program, Policy, Stakeholders

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## INTRODUCTION

Food security is defined when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meet their dietary needs and food preferences for an active and healthy life [1]. Out of 7.96 billion people worldwide, about 2 billion are food insecure [2]. Although food security is a challenge globally, it is particularly challenging in sub-Saharan Africa [3]. As the global population grows to 9 billion by 2050, food systems will be under more significant pressure. Moreover, climate change presents additional threats to food security. It affects crop yields, the distribution of pests and diseases, weather patterns and growing seasons [4]. The Covid-19 pandemic has provided yet another challenge to the shared commitment to end global hunger and malnutrition in all its forms by 2030 [5]. The State of Food Security and Nutrition in the World estimates that between 720 and 811 million people were affected by hunger in 2020, and an additional 161 million more people were affected by food insecurity than in 2019 [2]. Improving food security continues to be a top priority on the international development agenda [6]. Many of the world's poor are smallholder farmers who depend on agriculture as the primary source of food, income and employment. Simultaneously, agricultural development is a leading pathway to improving food security [7,9].

In Kenya, expertise is frequently brought in to assist in agricultural development through training, research and facilitation of the movement of knowledge with materials [10]. The stakeholders' support of agriculture and nutrition has been reported to have highly enhanced agricultural productivity; however, the level of stakeholders' support and increase in food security are not commensurate [11]. The Kenyan agriculture sector contributes to 51% of Kenya's Gross Domestic Product (GDP) and accounts for 60% of the country's total employment [12]. Despite living in an agricultural-based economy, a quarter of the Kenyan population suffers from food security problems [13]. Implementing better agriculture and nutrition policies, in addition to continuous development programs, could improve Kenya's food and nutrition security. Investments in agriculture demonstrate a positive impact on poverty alleviation and food security [14]. Yet, policy failure and structural rigidities limit policymakers' acting ability [15].

In Vihiga County, Kenya, crop production is viewed as the most common income stream. Approximately 64% of the county's income is from agriculture [16]. However, agricultural productivity in the County is low and declining. For example, the average production of maize in Vihiga County is four bags per acre, compared to its potential of 15 bags per acre. Contributing factors to low productivity include


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declining soil fertility and low-adoption of new farming technologies [12]. Declining land sizes, inadequate affordable credit, expensive inputs, poor access to extension services, and soil erosion compound this. Lastly, climate change's impacts, including changes to rainfall and temperatures, have drastically reduced agricultural productivity for crop and livestock production [17]. Consequently, farmers cannot meet the annual food requirements and rely on neighbouring counties to fulfil the deficit. This study sought to identify the challenges and the factors influencing the constantly growing gap between policies and their implementation, which is leading to more and more hunger; despite all the efforts being put into reducing food insecurity.

## MATERIALS AND METHODS

### Study area

The study was conducted in Vihiga County. Vihiga County lies in Western Kenya, with The equator cutting across the southern part of the County [18]. It covers an area of approximately 531 $Km_2$. It borders Nandi County to the East, Kakamega County to the North, Siaya County to the West and Kisumu County to the South. The County has five sub-counties; Emuhaya, Sabatia, Luanda, Hamisi, and Vihiga. The county has a population of 590,013, according to the 2019 National Population and Housing Census, with a population density of 1,047 persons per square km [19].

### Study design

This study adopted a descriptive cross-sectional survey design, employing mixed data collection methods. This method involved the use of both qualitative and quantitative approaches.

### Sample Size and Sampling Strategy

This study purposively selected thirty stakeholders; ten (10) farmers and ten community health volunteers (CHVs) were randomly selected to participate in focus group discussions (FGD) as lower-level stakeholders. Ten (10) upper-level stakeholders were also randomly selected to take part in key informant interviews (KII). Seven sessions of (KII) were successfully conducted with individual stakeholders. Additionally, two hundred and seventy-three (273) structured questionnaires were administered to gather quantitative data. This sample was obtained through stratified sampling. Two sub-counties were randomly selected, namely Hamisi and Vihiga sub-counties. Comparable to population size, 7 and 4 wards were sampled from Hamisi and Vihiga. Consequently, about 36 and 33

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farmers were randomly sampled from a list of farmers in each ward (Tables 1 and 2).

**Data collection method**

Primary data on the socio-demographic and economic characteristics of the farmers (lower-level stakeholders) were collected using a semi-structured questionnaire. Essential informant interview tools were used to interview the top-level stakeholders. The interviews were done face-to-face with the respective officers. Date and time were scheduled depending on the day availability of the stakeholders. The researchers targeted at least two daily interview sessions for twenty minutes each. Documentation of the KII sessions was done through notes taking.

Two sessions of FGD were conducted. One group was with farmers, and the other was with community health volunteers. The researchers had a target of 10 participants in each group and conducted the interviews on separate days. The researchers had a minimum of 90 minutes for each session. Each session had two research assistants, one taking notes and the other recording the proceedings as the researcher moderated the sessions.

A triangulation design procedure was used. The researcher was involved in concurrent but separate collection and analysis of quantitative and qualitative data. The researcher typically merged the two data sets by combining the independent results in interpretation.

**Data management and analysis**

Thematic content analysis was used to analyze the qualitative data manually. This process involves analyzing transcripts, identifying themes within those data, and gathering together examples of those themes from the text. All transcripts and notes taken were scrutinized, and results were validated by seeking alternative explanations from the participants to what appeared to be research results. The researchers further looked at common themes and sub-themes related to the study. These themes and sub-themes emerged as significant findings from the qualitative data. Data from the questionnaires were cleaned, coded and entered into the statistical package for social sciences (SPSS) version 20. Descriptive statistics were used for categorical variables, while chi-squire was used to check the relationship between farmers' knowledge and programs.

**Ethical considerations**

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A research permit (No. NACOSTI/P/19/27395/31796) was obtained from National Commission for Science, Technology, and Innovation (NACOSTI), Kenya. Ethical clearance (MMUST/IERC/27/19) was granted by Masinde Muliro University Institutional Research and -ethics committee (MMUST-IREC). Permission was obtained from all the relevant administrative offices in Vihiga County. The principle of autonomy was exercised through the process of free and informed consent with all the stakeholders, and the purpose of the study was explained to them so they could make informed choices. The respondents were free to withdraw from the study at any stage and were not compensated for their willingness to participate.

## RESULTS AND DISCUSSION

### Socio-demographic characteristics

The demographics of the farmer sample were as follows. Most respondents, 61.9%, were females, while 38.1% were males. In the selection, 61.2% were aged between 36 and 45, 5.1% were aged 46-55, and 33.7% were aged 56 years and above, as detailed in Table 3. The vast majority of farmers, 89.7%, were married, while a small portion, 9.2%, were widowed. In the occupation analysis, 60.8% depend on farming as their primary source of income. Regarding their education, 26.4% of respondents were educated up to the primary level, 27.1% to the secondary level and 24.9% to the college level. Most of the sample were Christians, 94.9%, while a small percentage (5.1%) were Muslims.

### Food Security Project Access

Findings from the farmers showed that (75.1%) were beneficiaries of programs and aware of the existing agriculture programs in the county, and (66.7%) belonged to farm groups. Agricultural Rural Inclusive Growth Project (NARIGP) and Agriculture Sector Development Support Programs (ASDSP) were mentioned. Famers were able to access the NARIGP projects more than the ASDSP. The project's main focus was to increase agricultural productivity.

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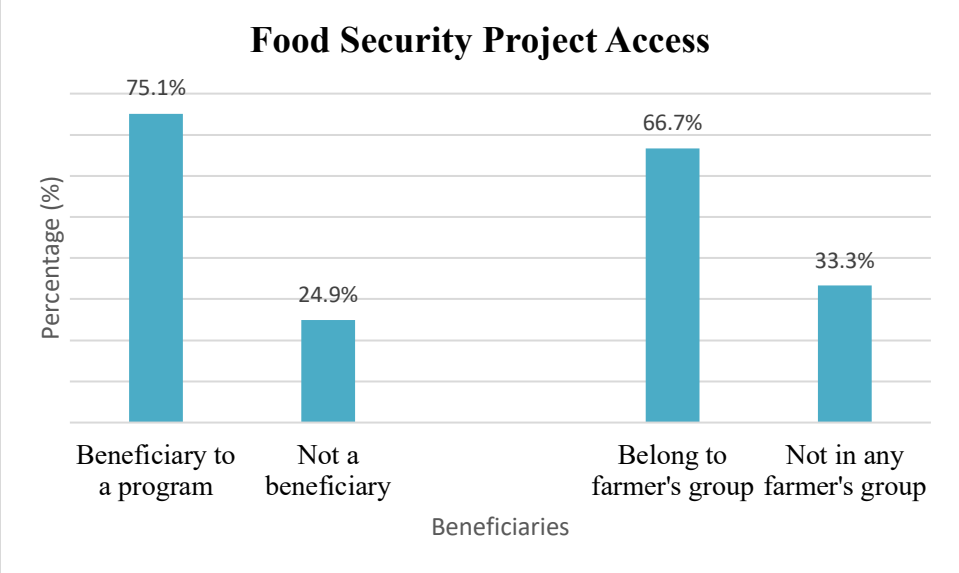


**Figure 1: Food Security Projects Access**

Findings showed that 48% of the farmers were involved in indigenous vegetable farming. Most farmers found it convenient as they could use a small portion of land. About 32% benefited from maize seeds and fertilizer. This project was not effective to some extent as the majority stated poor timing and delay of the seeds and fertilizer when it was time to plant and dress fertilizer. *We are delayed over weeks, interfering with our plans and farming seasons. We end up producing less. Table 5(f10).* Further, 16% supported poultry farming and 4% Dairy farming. Farmers were to be in groups of five. A cow was given to one group member who cared for it and benefited from milk and manure till it bore a calf given to the next member. This project was not effective for most farmers.

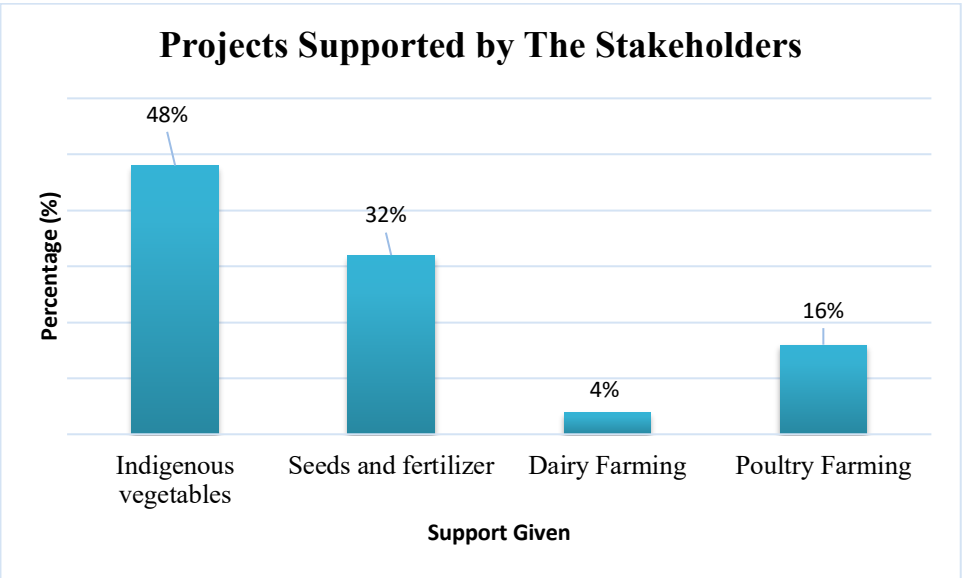


**Figure 2: Projects Value chains**

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**Relationship between Education level and farmers' knowledge of key Agricultural Program supporters**

The relationship between demographic characteristics and farmers' knowledge of key agricultural program supporters was determined using the chi-square test. Pearson's chi-square test gave $x^2(4, n=273)>=91.045$, with a p-value of 0.000 which is less than 0.05. The finding shows a relationship between education level and farmers' awareness of key agricultural program supporters in the community.

Correlation was done to check the strength of the association between education level and farmers' knowledge of key agricultural program supporters. The findings showed a strong association between the two variables at (r=0.177, P-value of 0.003, less than 0.05). It is evident from this findings that farmers' knowledge of the availability of agricultural program supporters in the community must have a certain level of education.

**Linkages of Agriculture and Nutrition Programs on food security**

The study sought whether the stakeholders understood the linkages between Agriculture and Nutrition. A stakeholder from the Ministry of Agriculture shared: "*Our agriculture department, mainly focuses on increasing agricultural production. But, the nutritional value of the food is given less consideration. Agriculture as a source of income and employment is the most frequently discussed in our projects*" Table 6 ($KII_1$).

Agricultural programs usually focus on increasing productivity because they approach the industry as an income-generating business. While increasing the quantity of food produced is crucial, it should not be done while sacrificing the quality of nutrients consumed. "*The agriculture sector does not focus much on nutrition. What they focus on in the agriculture sector is creating jobs for people and getting income from that*" Table 6 ($KII_5$).

At the World Economic Forum conference, stakeholders from Kenya, Uganda and Ethiopia pointed out that agriculture provides food and income [20]. The primary crop produced in the three countries is insufficient to meet nutrient needs. Changes in nutrition or health status are expected to affect agricultural production; conversely, changes in the farming sector can significantly affect individual health and nutritional status [21]. In this study, this is further illustrated in Table 6 ($KII_3$), where it is mentioned that agricultural activity is an indirect nutrition program because where there is cash or food crop production, it can either be converted for consumption or sold for income to purchase other varieties.

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The study found high support for agriculture programs, but the linkage to food security is not well aligned. Improving nutrition is how to make smallholder farming more nutrition-sensitive, which is a food-based approach to agricultural development that puts nutritionally rich foods and dietary diversity to curb food security issues [22, 23]. Agriculture affects the household's available food, including its variety and quality [24]. This research will help to develop informed strategies on how to connect them. The realization of the linkage will motivate stakeholders and farmers to promote and support agricultural programs that help improve food security.

Agriculture as a livelihood provides a vital income source that can affect the type of food consumed in households [25]. An increase in agricultural productivity of nutritious food would ensure the consumption of a diversified diet and affect food security outcomes; however, farmers may sell their crops but not direct the new income to purchase nutritious food for optimal health [26]. A World Bank study observes that 'production-for-own-consumption' agriculture enhances nutritional status, especially for children, through better dietary intake [27]. Therefore, exploring causal linkages between agriculture, nutrition and health has become an emerging field of research as the struggle to achieve optimal food security status becomes a key concern.

**Factors Influencing the Nutrition and agricultural programs**

There appeared to be little to no interaction among the stakeholders. This is a concern because collaboration among stakeholders from a previous study has proven to increase programs outcome. In Table 7(KII 3), a stakeholder reported they usually attempt to collaborate, but it dies at a certain level, especially when funds are involved in projects. The findings of this study correspond with those of a previous study which found that collaboration among stakeholders is a challenge, and there is a lack of coordination mechanisms to ensure multi-sectoral collaboration and implementation of programs. Many of the stakeholders want to run their programs [28]. However, the majority of the stakeholders agreed that collaboration among them can create significant improvement in the programs.

The lack of mechanisms and strategies to facilitate collaboration is a big issue. Hodge [21] stated that collaboration among stakeholders plays a significant role in supporting projects in a wide range rather than operating individually. Financial and human resources are weak and insufficient to facilitate stakeholder collaboration [29]. Mockshell [30] and Birner [31] state that improving the quality of collaboration and interaction among stakeholders has the potential to better implement

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programs. A stakeholder shared that: *The Ministry of Agriculture runs projects, but rarely do they involve the Ministry of Health. There is a sector of Agri-nutrition in the Ministry of Agriculture, but honestly, we do not work together to support any project on nutrition or agriculture*. Table 7 (KII $_2$).

While there were various meetings and consultations to discuss and review the programs, the end product appeared to develop from officials within the Ministry of Agriculture. A majority flagged the need for solid coordination at all levels; without it, they argued that planned implementation would be in jeopardy. *The Ministry of Health, through the nutrition department, was called for a meeting to discuss the performance of one of the agriculture programs so that matters to do with nutrition in the project could be well represented. Still, since that meeting, nutrition has not been involved, and the Ministry of Agriculture operates the projects*. Table 7 (KII $_3$).

Studies further show stakeholders can work together and build synergy by identifying a common goal, promoting interaction, and creating new agriculture and nutrition programs to advance food security. Whatever the outcome, the stakeholder collaboration can help a range of stakeholders' allies and opponents, the public and private sector, communities, and individuals better understand the issues and challenges involved in achieving program goals [28,32]. This research concludes that collaboration will most likely succeed when there is room for negotiation when stakeholders need each other to achieve individual and shared goals, and when there is a willingness to participate. Collaboration, on the other hand, tends to be ineffective when there is poor utilization of available resources to support programs, ignorance of agriculture and nutrition linkages, or worsened relations among stakeholders.

**Size of Land**

The study found that 35.5% of the respondents owned less than 0.5 acres of land, 17.6% owned between 0.5-1.0 acres, and 21.6% owned more than 2 acres of land, as shown in Figure 1. Farmers have small plots of land. Given the high poverty rates, they are highly dependent on agriculture for income, leading them to prioritize plants with the highest yield and market value.


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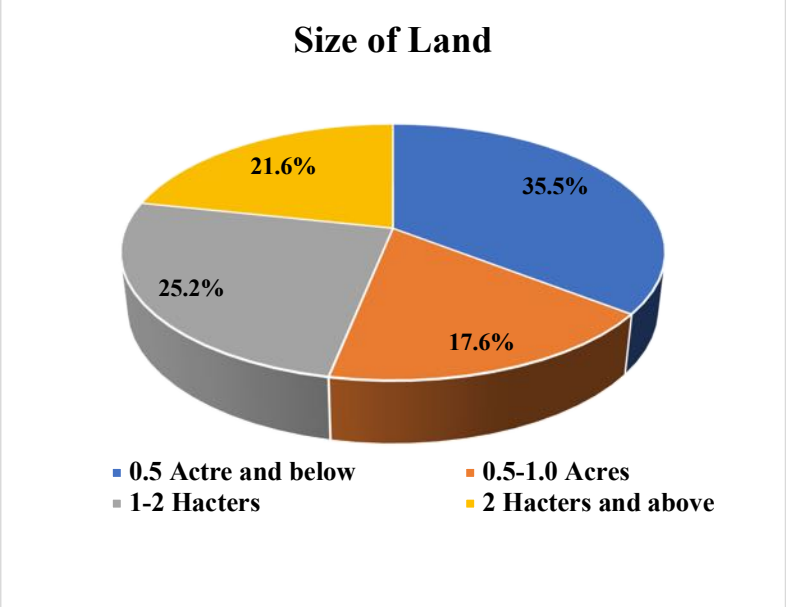


**Figure 3: Size of land**

## Access to information, knowledge and training

This study found that 18% of the farmers were trained on seeds and fertilizer options, 39.6% on new farming technologies and 23.8% on farming methods. Moreover, in the information dissemination process, 30.7% were through farm field schools, 30.4% through home visits and 17.6% used a participatory approach, as detailed in Figure 2. Knowledge and skills about agriculture, nutrition programs and farming methods will improve agriculture productivity and nutrient intake [32]. Similarly, other studies have reported that training and proper education play a significant role in influencing nutrition and agriculture programs to improve food security[33]. Findings from this study showed that most farmers had been educated and trained in different ways to improve agriculture as shown, 81.4% had undergone training on agriculture innovation, new farming technologies, methods of farming, seeds, and fertilizer options, but this knowledge is not reflected in production as the level of agriculture produce is still low. All this information is expected to boost productivity, but it is currently low and declining and the County is not self-sufficient in food production [19]. Hameed [23] said that training and proper education of farmers through farmer field school, visiting farmers in their households, and using a participatory approach will promote high agriculture production. In this study, 30.4% had training and home visits by some extension service officers, 17% used a participatory approach to train them. When all the support is given, agriculture productivity will improve, and none or less of this will prove vice versa [32]. Current and former studies confirm that knowledge and skills given to farmers and other stakeholders about agriculture, nutrition programs and farming methods will improve agricultural productivity and nutrient intake. However,


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other factors like climate change that may contribute to low and declining agricultural produce may need to be addressed because it can drastically reduce productivity despite farmers being equipped with knowledge.

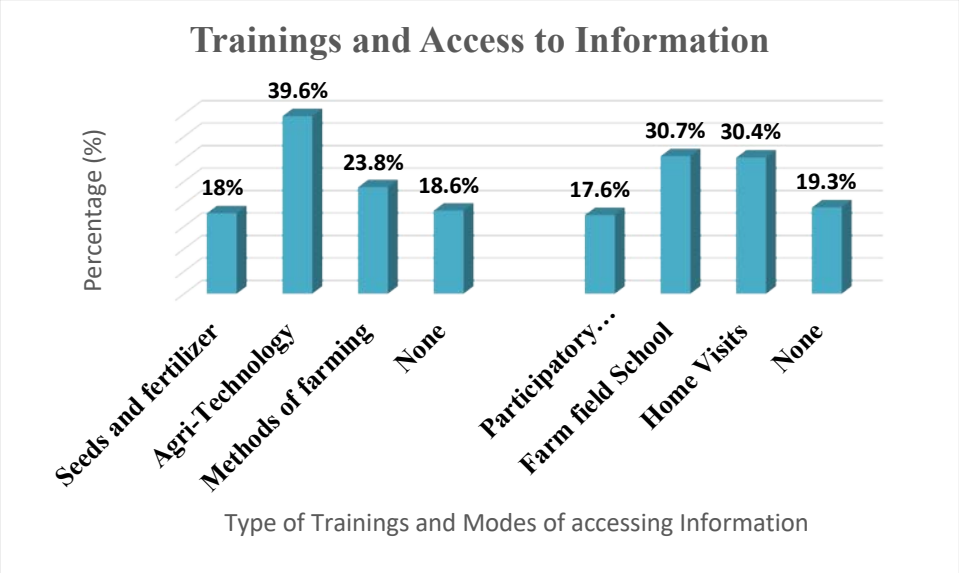


**Figure 4: Information, Knowledge and Training**

**Program distribution, Duplication and coverage**

This study found that there was a challenge in program distribution and coverage. Some farmers were found to be in more than one program, and this lack of equal distribution and range of programs causes some of the community members to miss services that could help improve their productivity. Some favouritism was to some, while others were left out. Their responses confirm this during the interviews. *Few farmers are in different projects, and others are not in any project. Some are aggressive to joining groups, and our offices are biased toward some people, especially those who show interest and active participation when called upon*" Table 8(F5). The current finding is supported by other studies that in most developing countries, the farming sector is comprised of small-scale clientele, and they are dispersed geographically; hence, the coverage and distribution of programs become tedious and a costly affair in terms of travelling to reach farmers, limited geographic range and unsustainable services leading to farmer abandonment [31].

The study further discovered that using favours and corrupt program distribution led to many potential farmers being left out. A farmer shared that: t*he program services are not equally distributed. Most of our farmers and households in this community are still poor and never benefit from these programs* Table 8(F7). There are, however, fewer former findings about program distribution and coverage, and

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this study concludes there is indeed this challenge in Vihiga County, especially in programs dealing with agriculture.

**Programs Policies**

Most stakeholders from cluster one (High power) knew the policies and supported the value chains. In contrast, stakeholders from cluster two did not learn much about the existing policies and were rarely involved in their formulation.

*We Support value chains like the supply of seeds, fertilizers, agriculture training, distribution of dairy goats and cows, poultry farming, bananas and indigenous vegetables. These aid in support of agriculture productivity and income growth for our people and improves food security at large* (KII Inter; 1, 2) Table 6.

*They neglect us who work on the ground, and yet we understand the needs of the people. We do not know much about any policy on agriculture and nutrition* Table 7 (chv 2, f3).

School feeding programs are one target to improve food security under the Food and Nutrition Security Policy. It was found to have minimum coverage and biased, targeting only one school in the whole county. Studies have found that the food security crisis is mainly connected to policy failure and structural rigidities [36]. Although various stakeholders are involved in the fight for the support of food security in Kenya, policy implementation remains a challenge in the fight against food security issues.

Various regimes have been instituting policies to achieve food security, more recently Vision 2030. The vision aims at changing the country into “a newly industrialized, middle-income nation offering a high worth of life to every Kenyan in a hygienic and protected environment [15]. The government does not adhere to the spirit of the policies. For instance, the 2003 Maputo Declaration of the A.U. dictates all African states raise venture in the agricultural sector to at least 10 % of the national budget by 2008 [37]. Kenya has not lived up to this declaration, and currently, its investment is pegged at 2.4% of the federal budget, which is still a quarter way to the international commitment of 10%. In the 2022/2023 budget, the government allocated 378.4 million USD to the sector, a decrease from 564.9 million USD in 2021-2022 [38].

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## CONCLUSION, AND RECOMMENDATIONS FOR DEVELOPMENT

Project implementation has been a significant challenge, and in this study, it was attributed to various factors, including unequal project distribution and lack of collaboration among stakeholders. Results of the research show that collaboration factors were due to a lack of synergy to strengthen the already existing collaboration efforts and a lack of fairness when engaging farmers in projects. There was a requirement for stakeholders to collaborate more to fill the missing gaps and would promote success in project implementation.

The land was found to be a significant resource for agricultural productivity. Most farmers had a small portion of land for agricultural use. The majority lacked ownership and did not have title deeds, hindering them from wanting to expand production. Further, an increasing household population led to a high division of land. Farmers and community members should be supported to produce more from their small plots through training on intensive agriculture technology and expand and access marketing nutrient-rich foods obtained through agricultural produce.

There was a challenge in pointing out the linkage between nutrition and agriculture to promote food security. Increased attention to nutrition can also enable the agriculture sector to better meet its needs in many ways, such as utilizing its produce for food intake and income to purchase other varieties. In Vihiga County, individuals struggle to access and afford food items that meet their household's nutritional needs. When they grow their food, the priority is income generation rather than household consumption. Agriculture is essential to nutrition, but often that connection is overlooked. There must not be a false dichotomy between maximizing profit and minimizing nutritional value. The quantity of food produced and the quality of nutrients produced are essential in the fight against food insecurity.

Although policymakers see the value in agri-nutrition linkages, the existing government structures hinder close collaboration between those working in agriculture and nutrition. It is noted that multi-stakeholder collaboration was inadequate back in 2019, but there have been a notable positive trend to date. The County is now collaborating with The Alliance of Bioversity International and CIAT, PELUM Kenya and the Inter-sectoral Forum on Agrobiodiversity and Agroecology (ISFAA) to develop the Agroecology policy. The policy development process has taken a multi-sectoral approach where various county departments, research institutions, academia and local organizations are involved. The County has a


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Nutrition Policy that is currently under implementation stage. All these improvements are worth noting since they work towards improving food and nutrition security in the County.

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**Table 1: Sample Size Determination**

| Stakeholders | Type | Number of stakeholders interviewed | Data collection tools |
|---|---|---|---|
| Public | Ministry of health (MOH) | 3 | KII |
| | Ministry of agriculture (MOA) | 5 | KII |
| Civil Society | Rural Outreach Program (ROP) | 1 | KII |
| Non-governmental Organization | SOFDI | 1 | KIII |
| | Totals KII | 10 | |
| Consumers/Users | Farmers | 10 | FGD |
| | Community Health Volunteers CHVs | 10 | FGD |

| Selected Sub counties | Population size | Sample size | Wards | Sample size per ward |
|---|---|---|---|---|
| Vihiga sub county | 78,048 | 78048/226307*384=132 | 4 | 132/4= 33 per ward |
| Hamisi sub county | 148,259 | 148259/226307*384=252 | 7 | 252/7= 36 per ward |
| Totals | 226,307 | 384 | 11 | |



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**Table 2: Sampling Rate**

| **Qualitative Data (KII & FGD)** | | |
|---|---|---|
| | **Targeted sample** | **Actual sample** |
| Key Informant Interview | 10 Top Level Stakeholders | 7 |
| Farmers | 10 Farmers (Lower-level stakeholders) | 10 |
| Community Health Volunteers | 10 CHVs (lower- level stakeholder) | 10 |
| | 30 | 27 |
| **Quantitative Data (Structured Questionnaires)** | | |
| | **Targeted sample** | **Actual sample** |
| Vihiga Sub County | 132 | 120 |
| Hamisi Sub County | 252 | 153 |
| | 384 | 273 |

**Table 3: Socio-Demographic characteristics**

| **Demographics** | | **n** | **%** |
|---|---|---|---|
| **Gender** | Male | 104 | 38.1 |
| | Female | 169 | 61.9 |
| **Age** | 36-45yrs | 167 | 61.2 |
| | 46-55yrs | 14 | 5.1 |
| | 56 and above | 92 | 33.7 |
| **Education level** | None | 4 | 1.5 |
| | Primary | 72 | 26.4 |
| | Secondary | 74 | 27.1 |
| | College | 68 | 24.9 |
| | Others | 55 | 20.1 |
| **Marital status** | Married | 245 | 89.7 |
| | Divorced | 2 | 0.7 |
| | Widowed | 25 | 9.2 |
| | Single | 1 | 0.4 |
| **Occupation** | Farmer | 166 | 60.8 |
| | Business | 81 | 29.7 |
| | Others | 26 | 9.5 |
| **Religion** | Christian | 259 | 94.9 |
| | Muslim | 14 | 5.1 |

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**Table 4: Quotations from top-level stakeholders, Key Informant Interviews on Stakeholder and Project roles**

| Level | Tool | Stakeholders | Interventions | Challenges |
|---|---|---|---|---|
| Top Level | Key Informant Interview (KII) | 1 Director MoA ($KII_1$)<br>2 Director MoH ($KII_2$)<br>3 County Nutritionist ($KII_3$)<br>4 County Agriculture officer (vihiga) ($KII_4$)<br>5 County Agriculture officer (Hamisi) ($KII_5$)<br>6 Rural Outreach Program (ROP) ($KII_6$)<br>7 SOFDI ($KII_7$) | 1 **NARIGP**-National Agricultural Rural Inclusive Growth Project which contains four value chains. Dairy, Local Chicken, Banana project and Local vegetables ($KII_1$, $KII_4$, $KII_5$)<br>2 **ASDSP** – Agriculture Sector Development Support Programs. This project involves three major value chains which include Dairy, Poultry and Banana Project ($KII_1$, $KII_4$, $KII_5$)<br>3 Vitamin A sup, deworming ($KII_3$)<br>4 Micro-Nutrients: iron and folic acid supplementation ($KII_3$)<br>5 School feeding program ($KII_3$<br>6 $KII_6 KII_7$) | 1 High expectation from people in the community<br>2 Less financial support from the government.<br>3 Poor coordination and collaboration from other stakeholders<br>4 Beneficiaries' expectations e.g. hand outs<br>5 Inadequate coordination<br>6 Inadequate resources<br>7 Political interferences<br>8 Climate change<br>9 Poor adoption of technology by beneficiaries<br>10 Fear by beneficiaries' access loans<br>11 Sometimes the fertilizers and seeds delays and get to the farmers very late when the season of planting and applying fertilizers is out<br>12 We have no enough human resource because most works have retired and others are still retiring but there has been no replacement<br>13 Challenges of transport to reach to the famers in the interior<br>14 There is small farm size and continuous cropping in the small farms decrease yields<br>15 High expectations from people<br>16 Less support from government and poor collaboration from other stakeholders |

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**Table 5: Quotations from lower-level stakeholders (CHVs and Farmers) of focus group discussion on stakeholder and project roles**

| Level | Tool | Stakeholders (CHVs) (FARMERS) | | Interventions | Challenges |
|---|---|---|---|---|---|
| Lower Level | Focused Group Discussion ($FGD_{1,2}$) | $F_1$<br>$F_2$<br>$F_3$<br>$F_4$<br>$F_5$<br>$F_6$<br>$F_7$<br>$F_8$<br>$F_9$<br>$F_{10}$ | $CHV_1$<br>$CHV_2$<br>$CHV_3$<br>$CHV_4$<br>$CHV_5$<br>CHV6<br>$CHV_7$<br>$CHV_8$<br>$CHV_9$<br>$CHV_{10}$ | **chvs**<br>1 program for planting indigenous vegetables<br>2 poultry farming of 'kienyei' chicken<br>3 Vitamin A supplementation, deworming and referral are the other programs<br>4 reach out to the people in the community and encourage them to take part in the programs<br>5 link them to the facilities for other programs<br>6 support them and guide them<br>7 We will also work close with the ministry of health to help link the sick, and disadvantaged people in our community to the facilities<br>**farmers**<br>8 NARGIP<br>9 ASDSP<br>10 Fertilizer and Seeds | **chvs**<br>1 Transportation to reach the community<br>2 Communication is a challenge to us<br>3 They neglected people working on the ground like us chv and we are the one knowing the people in the ground<br>4 However, there are challenges. Some households do not have land and no good health<br>5 People have expectations when we give them information, they asked you to give and yet we don't have much to give as chvs<br>6 Others have land but prefer to sell and buy foods. They are not willing to plant.<br>**farmers**<br>7 Seeds and fertilizers not always enough. First come, first served.<br>8 Farmer has to register with ksh.500 and even though one might end up missing<br>9 The program services are not equally distributed<br>10 Most of our farmers and household in this community are still very poor and they never benefit from these programs<br>11 There is usually a lot of corruption and even those who paid ksh.500 may end up missing the fertilizers and seeds<br>12 There is also no enough supply and sometimes they delay the services past the appropriate time of planting the seeds and dressing the fertilizers.<br>13 delay and poor coordination from top leadership |

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**Table 6: Quotations from stakeholders of the KII and FGDs on linkages of agriculture and nutrition programs on food security**

| Linkages | Quotations |
|---|---|
| Own production and own consumption | ❖ *"There is a great linkage between Agriculture and Nutrition. During our clinics and meetings with clients, we encourage them to practice small scale agriculture and subsistence farming to enable them produce food, fruits and vegetables that will help diversify their nutrients and reduce malnutrition" ($KII_3$)*<br>❖ *"Any agriculture activity is an indirect nutrition program because if there is food crop or cash crop production, it can be converted to food through consumption or purchase" ($KII_3$)*<br>❖ *"For the example program supporting indigenous vegetables and food diversity is an agriculture related but the produce can be used to improve nutrition" ($KII_3$)*<br>❖ *"Yes. Agriculture can improve nutrition if people practice agriculture and consum produce before thinking of selling out for income" ($KII_7$)*<br>❖ *"I think there is a close link between nutrition and agriculture because in the community, the households that practice agriculture having both livestock and cro farming are also to eat a balance diet and members from such households seems t have good nutrition status" ($F_5$)*<br>❖ *"There is a strong linkage between agriculture and nutrition. They support each other. Our chvs are so determined in supporting agriculture programs which end up improving the nutrition of our people" ($CHV_{10}$)*<br>❖ *"Agriculture and nutrition intermarry and they work together to improve health. The health sector help community to improve nutrition and malnutrition cases are going down" ($CHV_2$)*<br>❖ *"There is a strong link I can support. People have been given avocado seeds and dairy cows. We advise people to take milk from this cow to feed their family. In my area, there is a cow in every household and communication is not easy but people are health. So, agriculture and nutrition relate. Out duties as chvs is to encourage them drink the milk" ($CHV_6$)* |
| Income from farming and food intake (energy and Nutrients) | ❖ *"When there are good agricultural practices where proper methods of farming are used then the nutrition of people will not be a challenge and Vihiga county will not have the challenges of food insecurity". ($KII_4$)*<br>❖ *"Any agriculture activity is an indirect nutrition program because if there is food crop or cash crop production, it can be converted to food through consumption or purchase". ($KII_3$)*<br>❖ *"As a farmer,I am able to get a balanced diet and diverse food for my family, we are all healthy. I sale the surplus to some of my neighbors and sometimes they are not able to get all the types. I believe agriculture and nutrition has a very strong link. Without proper agriculture then good nutrition practice is a challenge" ($F_7$)*<br>❖ *"Our agriculture department, when it makes programs, mainly focuses on increasing agricultural production. But, the nutritional value of the food is given less consideration. Agriculture as a source of income and employment is the most frequently discussed in our projects" ($KII_1$)*<br>❖ *"The agriculture sector doesn't focus much on nutrition. What they focus on in the agriculture sector is creating jobs for people and getting income from that" ($KII_5$)* |


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**Table 7: Quotations from stakeholders of the KII and FGDs on collaboration and partnership among stakeholders**

| Determinant | Quotations |
|---|---|
| **Collaboration/ partnership among stakeholders** | ❖ *"Yes, sometimes when we have projects, we involve the ministry of health in the area of Agri-nutrition. The activities include: Nutrition education, Energy conservation and value addition such as training of farmers. We could have farmers who produce food from agriculture but fail to utilize for their own consumption and so we link up with the ministry of health in the nutrition department to support in training and education" ($KII_1$)*<br>❖ *"We work very well with CHVs to support the programs in our community. They are the people who reach out and meet the members of the community as close level" ($KII_3$)*<br>❖ *"We always try to collaborate and even we have done meetings to discuss programs but that dies when it comes to funds and their distribution. Collaboration with other top-level stakeholders is a challenge" ($KII_3$)*<br>❖ *"The ministry of agriculture runs projects but rarely do they involve the ministry of health, sometimes we attend the meetings at the beginning of the projects but we are not involved in afterwards progress like implementation or in allocation of funds. There is a sector of Agri-nutrition in the ministry of agriculture but truly we do not work together to support any project on nutrition or agriculture. Every ministry runs on its own, we can never say there is a collaboration or any kind of partnership" ($KII_2$)*<br>❖ *"The ministry of health through the nutrition department was called for a meeting to discuss the implementation of one of the agriculture programs so that matters to do with nutrition in the project could be well represented but since that meeting, Nutrition has not been involved and the projects are operated by the ministry of agriculture" ($KII_3$)* |

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**Table 8: Program Distribution, Duplication and Coverage**

| Determinant | Quotations |
|---|---|
| **Programs coverage** | ❖ *"We have a problem of program distribution especially in the area of agriculture. Some people are favored and others miss out. Agriculture helps the health people with IV seeds but sometimes is very little and brings a lot of conflicts during distribution" (F4)*<br>❖ *"We people are told to give out 500 to get fertilizer at subsidized price but still a challenge because even after paying the money, most people end up missing the seeds and the fertilizers "(F9)*<br>❖ *"They neglected people working on the ground like us chv and we are the one knowing the people in the ground. they concentrate on the top officials who sometimes do not reach to the people on the ground. When funds come it does not reach the people on the ground". (CHV3)*<br>❖ *"The programs are accessible to all members of the community especially if they are ready to take part when called upon. Though there is a challenge of reaching out to all the community members because some live in the interior where we need transportation. Most of the time the people at the top do don't consider that. We always volunteer serve our people but we cannot go beyond our abilities as chvs" (CHV7)*<br>❖ *"Few farmers are in different projects and others are not in any project. Some are aggressive to join groups and our offices are bias to some people especially those who show interest and active participation when called upon". ($F_5$)*<br>❖ *"The program services are not equally distributed. Most of our farmers and household in this community are still very poor and they never benefit from these programs. It's a matter of first come, first served and the friendship a farmer has with the distributors of the services which for the fertilizers and seeds are mostly chiefs then to sub chiefs and then to Wazee wa mitaa (Area elder Men). There is usually a lot of corruption and even those who paid ksh.500 may end up missing the fertilizers and seeds ($F_7$)*<br>❖ *"There is also no enough supply and sometimes they delay the services past the appropriate time of planting the seeds and dressing the fertilizers. A farmer is to receive 2 kg seeds, 10kg fertilizer for planting and 10kg fertilizer for top dressing. If a farmer has bigger land, they have to go to their pocket to add on the seeds and fertilizers. For those who use them appropriately, there is usually better yields then the rest "($F_8$)*<br>❖ *"The programs target small scale farmers but that is not what necessarily happens at the grassroots level. This leads to most of our small-scale farmers lacking knowledge, skills and information. Those trained do not train other people and some people are paid to attend the workshops, seminars and conferences."($F_2$)* |


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