Gender Analysis Report

For the Technical Assistance on:

Empowering Communities with Sustainable Agricultural Systems; Piloting a Small-Scale Hydroponics System (EMSAS-Hydroponics)

in Kubau LGA of Kaduna State, Nigeria.

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List of acronyms

AVC	Agricultural Value Chain
CTCN	Climate Technology Centre and Network
DCC	Department of Climate Change
EMSAS	Empowering Communities with Sustainable Agricultural Systems
GA	Gender Analysis
GAP	Gender Action Plan

GHI	Green Habitat Initiative
GM	Gender Mainstreaming
GRB	Gender Responsive Budgeting
LGA	Local Government Area
NGO	Non-Governmental Organisation
PSEA	Protection from Sexual Exploitation and Abuse

Executive Summary

The primary goal of the gender assessment conducted in Kubau LGA (Dutsen Wai, Zuntu, and Kubau wards) was to establish baseline data for gender mainstreaming, to be measured against the end line. The assessment adopted a mixed-methods approach and a multi-stage sampling to select a sample of 143 beneficiaries. Both qualitative methods, such as Key Informant Interviews and Focus Group Discussions, and quantitative methods, like structured questionnaires via KOBO Collect, were employed.

Key findings indicate that women are actively playing agricultural-related roles in Kubau LGA thereby actively adding to the community's economy, providing food, income, and employment. However, the study also indicates that women face more challenges in accessing agricultural resources and services as well as many other challenges such as lack of access to extension services, land ownership by women, physical insecurities, lack of access to agricultural infrastructure by many women, limited access to market intelligence, farm inputs, and insufficient financial support for farmers. There is also insufficient knowledge about hydroponic farming, and potential challenges in its implementation, such as resource availability and community acceptance, were noted. Despite these challenges, the community

views hydroponic farming as a resilient practice against climate change and conflict-related challenges, anticipating benefits such as increased production, wealth generation, food security, and employment opportunities. The community is eager and hopeful for the success of the EMSAS-Hydroponic project.

This assessment, therefore, recommends the provision of comprehensive training on modern farming techniques like hydroponic farming, increasing awareness and acceptance through community engagement, facilitating access to financial resources and support for farmers, developing partnerships to secure more funding for the project, and encouraging women and youth and people with disabilities involvement in agricultural activities to promote the transfer of knowledge and skills.

1.0 Background

Kaduna State, located in the North-western part of Nigeria, has continued to endure humanitarian emergencies due to climate disaster-related conflicts, particularly farmer-herder clashes. These conflicts have led to significant loss of lives and properties, rendering many individuals as refugees despite the government's efforts to restore peace. The North-western region remains plagued by violent conflicts caused by climate-related disasters, necessitating ongoing humanitarian assistance for basic survival needs (Adewuyi and Ezeamaka, 2023).

The economic downturn, coupled with persistent conflict and gender-based violence, has severely undermined household food security in the region. This has forced host communities to depend heavily on humanitarian aid, making it challenging to meet their food security and livelihood needs. Additionally, factors such as communication risks, climate disaster threats, inadequate disaster management knowledge, and the absence of adaptation plans have intensified the vulnerability of families (Halidu and Abdullahi, 2021). The worsening economic conditions have impacted emergency food assistance, with high staple food prices and insufficient incomes from limited livelihood opportunities further straining the region. Endemic inflation has only intensified the increase in food prices (Halidu and Abdullahi, 2021).

In response, GHI, with support from CCTN, is working in the Kubau LGA of Kaduna State to improve livelihoods, particularly for women and youth. The project promotes hydroponics as a climate-smart agricultural method for growing food. Hydroponics can be practised in available shelter, addressing challenges such as drought, desertification, lack of rainfall, and insecurity, which make arable land infertile and inaccessible. By teaching small-scale hydroponics as a practical green skill, the project empowers individuals especially women and

youth to grow food safely within their homes.. The hydroponics system of farming addresses the challenges of drought, desertification, water scarcity, and insecurity that make traditional farming difficult.

The overall impact of the project aims to improve food security and livelihoods in the region. The initiative not only provides a sustainable way to grow food but also reduces the prevalence of communal conflicts heightened by the impact of climate change. Furthermore, by scaling the project to other parts of Kaduna State and the North-western region, there is a huge potential to reduce violent conflicts caused by climate-related disasters and strengthen existing market value chains. This holistic approach addresses both the immediate needs and long-term sustainability of the affected communities.

1.1 Goal/Objective of the study

The primary goal/objective of this study is to examine and understand the differences and inequalities between men and women by assessing gender roles, responsibilities, and constraints related to agricultural practices in Kubau LGA. This study will ensure the integration of specific strategies that promote gender and social inclusion across all gender groups within the target community.

1.2 Scope of the baseline assessment/location/participants

The scope of the baseline assessment encompasses an evaluation of the requirements of farmers and institutions in Kubau LGA, Kaduna State, Nigeria, for the development of a pilot hydroponics system. This assessment involved collecting data through the administration of questionnaires, focus group discussions, and stakeholder interviews to understand the specific needs of farmers and identify existing challenges in implementing a pilot hydroponics project. The assessment covered locations of the 3 main wards in Kubau LGA; Kubau, Dutsen-Wai, and Zuntu, with a total number of 143 respondents.

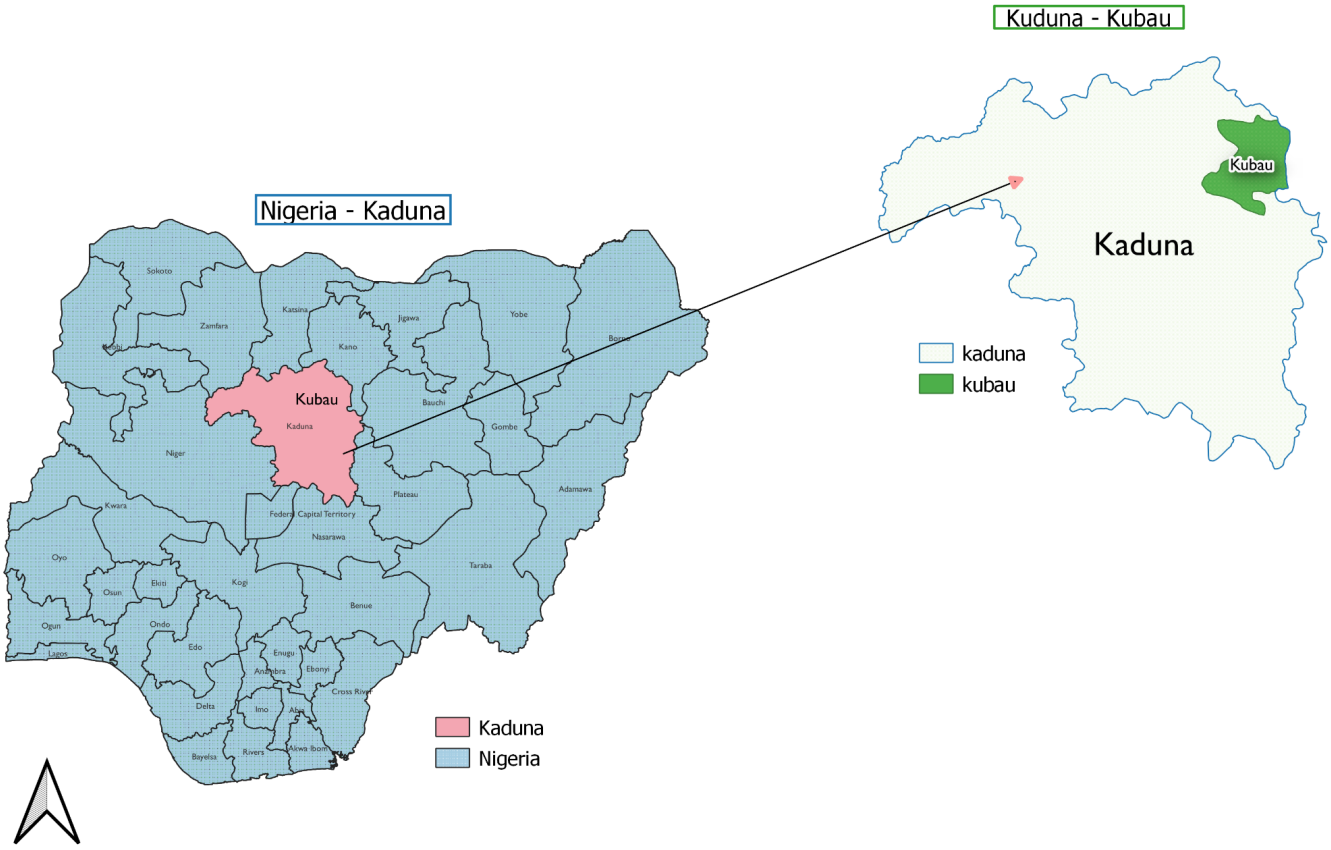

Figure 1: Map of Kaduna State with the study location in the green shade.

2.0 Assessment methodology

The assessment methodology refers to the systematic and structured approach used to evaluate, measure, and assess the data from this study. The assessment methodology gives

insight into the data collection, analysis and reporting processes in addition to data quality assurance strategies that were implemented to ensure the standardization of the study.

2.1 Qualitative assessment

The qualitative assessment employed key informant interviews (KII) with stakeholders like community leaders and extension workers, guided by a semi-structured questionnaire covering gender, farmers, and extension workers. Additionally, focus group discussions (FGD) were conducted in the 3 wards, targeting various groups and discussing topics on farming, knowledge of hydroponics, insecurity, training needs, and TA perspective.

2.2 Quantitative survey

The quantitative assessment used a questionnaire deployed through KOBO collect, covering farmers' demographics, knowledge of hydroponics, insecurity, and training needs of farmers in 3 wards of the Kubau LGA, with GHI staff and enumerators trained for data collection using Kobo collect. Program and MEAL teams validated tools before integration into the Kobo system.

2.3 Assessment focus

The assessment focused on:

1. Identifying and assessing the gender gaps and inequalities among vulnerable populations.
2. Identifying the challenges faced by farming communities across all gender groups in accessing essential agricultural services.
3. Exploring the factors contributing to these challenges.
4. Assessing current interventions in addressing identified gaps in gender mainstreaming.
5. Providing recommendations for targeted response strategies in addressing barriers and improving access to essential services.

2.4 Targeted survey

A structured questionnaire was administered to farmers at their farms, in three (3) communities across the targeted district. Key informant interviews (KII), and focus group discussions (FGD) with elderly men, women, youth and extension workers in each community with a minimum of two (2) persons in a ward were also conducted

Table 1.0 Overview of Activities Conducted

S/N	Activity description	Number
1.	Structured questionnaire administered to farmers	143
2.	Communities targeted	3
Key informant interviews (KII) / Focus group discussions (FGD)		
3.	Number of men interviewed (FGD)	61
4.	Number of women interviewed (FGD)	115
5.	Number of youths interviewed (FGD)	52
6.	Number of extension workers interviewed (KII)	27
7.	Total number of FGDs conducted	9

2.5 Recruitment of enumerators

To conduct this survey, 6 enumerators (3 female and 3 male) were employed to conduct the exercise. These enumerators underwent pre-activity training on administering the questionnaire on the 10th of June 2024. During the selection of the enumerators, people who understood both English and Hausa languages were considered to avoid language barrier issues. Topics treated during the training were the importance of collecting quality data, the methodology and understanding of the questionnaire to be used, and the usage of the KOBO tool for enumerators (getting, filling, editing and sending finalised ODK forms). A pilot survey was also carried out to test the validity of the survey instruments and further prepare the enumerators for the main survey.

2.6 Ethical consideration and limitations/risk assessment

The assessment team adhered fully to the standard ethics and principles of research, including but not limited to Protection from Sexual Exploitation and Abuse (PSEA), confidentiality, Do No Harm, and child safeguarding policy, amongst others. During the data collection exercise, the following important ethical considerations were mainstreamed:

1. A consent form detailing the purpose of the research and highlighting privacy and anonymity was used.
2. Data collection tools were designed in a way that was culturally appropriate and did not create distress for respondents.

3. The assessment team was qualified to recognize the complexity of cultural and religious identities, to recognize power dynamics between and among various groups, and to be aware of respondents' linguistic usage.
4. To reduce risk to respondents, data collection visits were scheduled at the proper times and locations.
5. The assessment team was trained in collecting sensitive information, and where the topic of the assessment may touch on violence against people, the assessment team had previous experience in this area.

3.0 Survey findings

3.1 Socio-demographic information

3.1.1 Gender of respondents

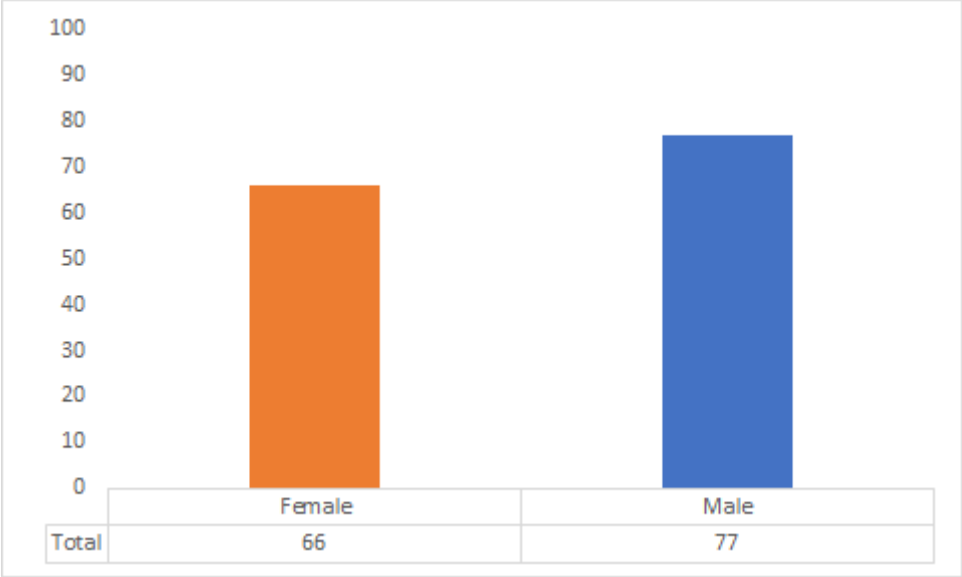

Figure 2: Gender of respondents

The data in Figure 2 indicates that out of 143 respondents to this survey, 66 of them are females and 77 of them are males. This figure shows a relatively balanced gender representation. This also shows that both men and women were selected to provide a more comprehensive understanding of the survey.

3.1.2 Age distribution of respondents

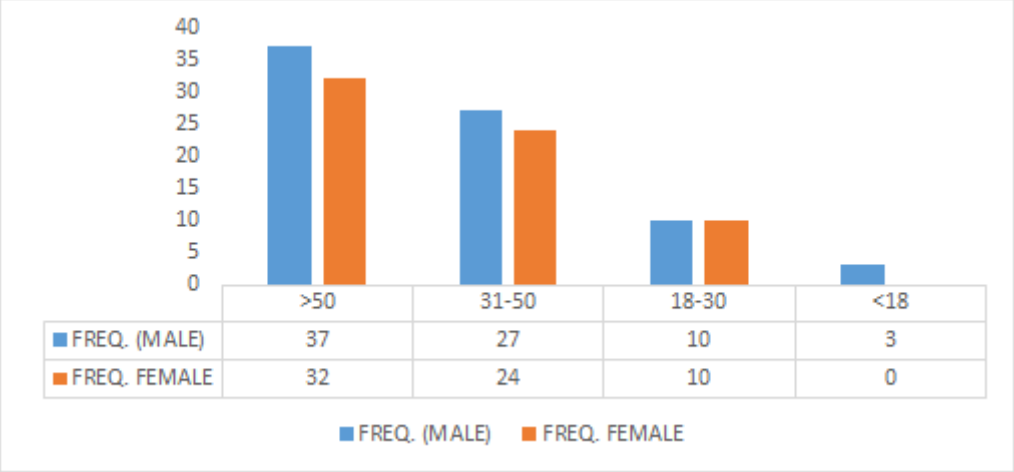

Figure 3: Age distribution of respondents

The age distribution of the respondents as presented in Figure 3, shows that there is a fair distribution of both men and women among the different age groups. Women are adequately represented in the groups ranging ages >50, 31-50 years and 18-30 years. In the study area. This age distribution indicates significant women and youth involvement. Promoting gender equity will enhance women's economic empowerment, reduce their workload, and create future opportunities for them in the planned hydroponic pilot.

3.1.3 Marital status of the respondents

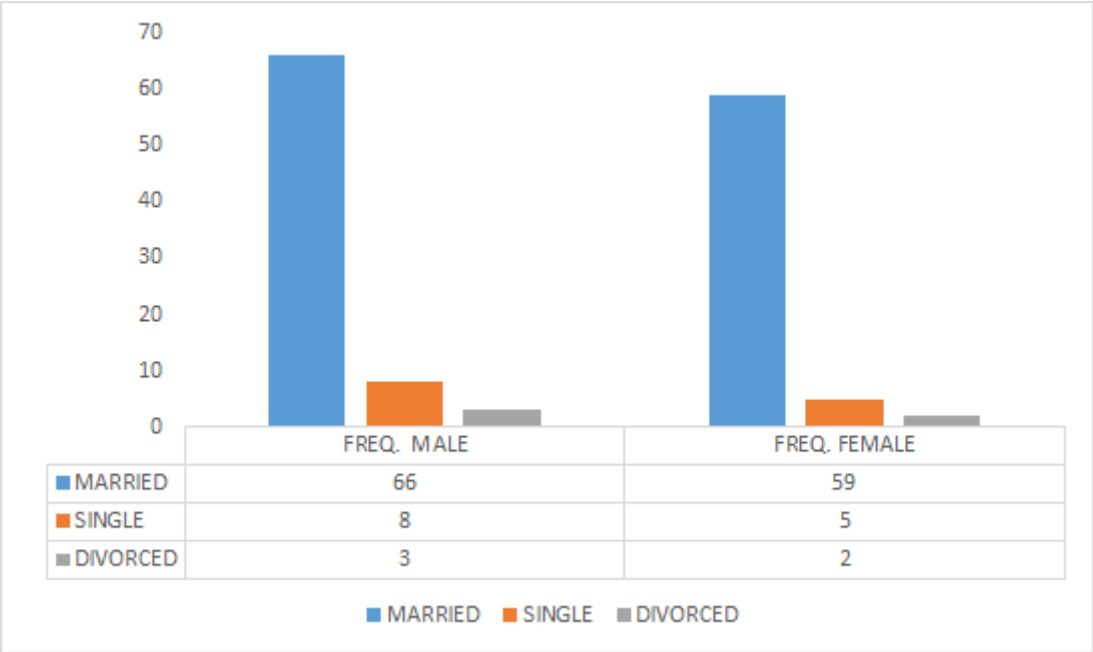

Figure 4: Marital status of the respondents

The data on marital status as presented in Figure 4 shows that 46% of women are married while 5.6% of women are single. 2.09% of the women are divorced. In some societies, marriage is seen as a marker of stability, security, and economic prosperity. In some instances, high figures indicating more married people in a study may indicate that married women may have limited access to land, credit, and other agricultural resources, as these are often controlled by their husbands.

3.1.4: Educational status of the respondents

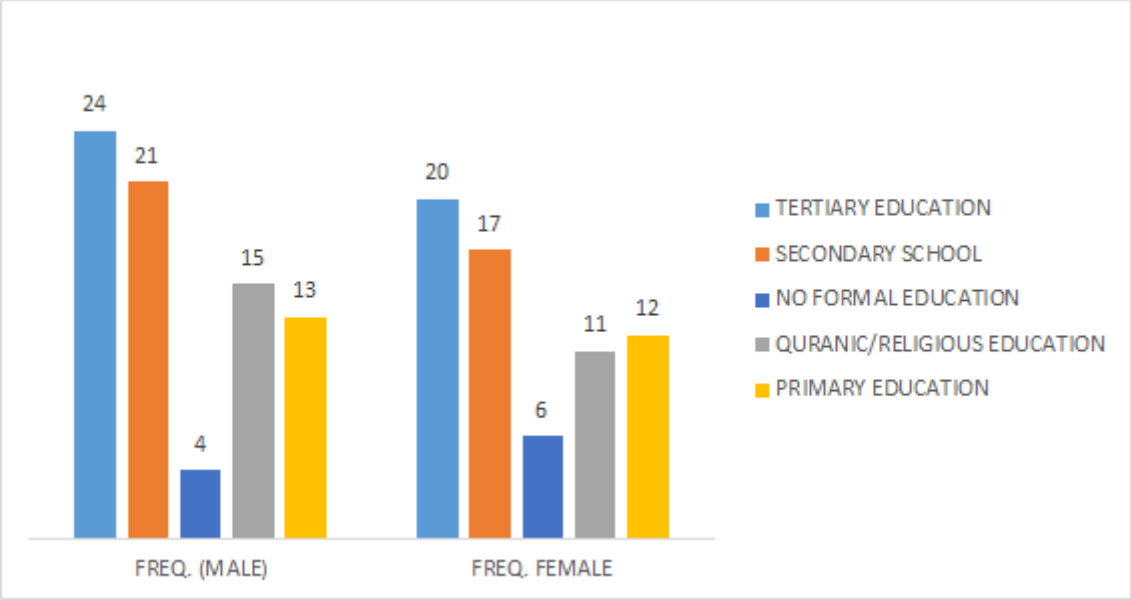

Figure 5: Level of education of the respondents

Figure 5 shows that a majority of men and women have attained some level of education. Education can significantly impact economic opportunities. 13.9% of the female respondents have tertiary education while 11.9% of the female respondents have secondary education. Women with tertiary and secondary education might have better chances of securing leadership roles, accessing financial resources, and participating in decision-making processes within the agricultural sector, especially in hydroponics, which has a lot of benefits for women and youth. Respondents with tertiary and secondary education are likely better positioned to understand and adopt modern agricultural practices, including hydroponic farming techniques.

3.1.5: Household size of respondents

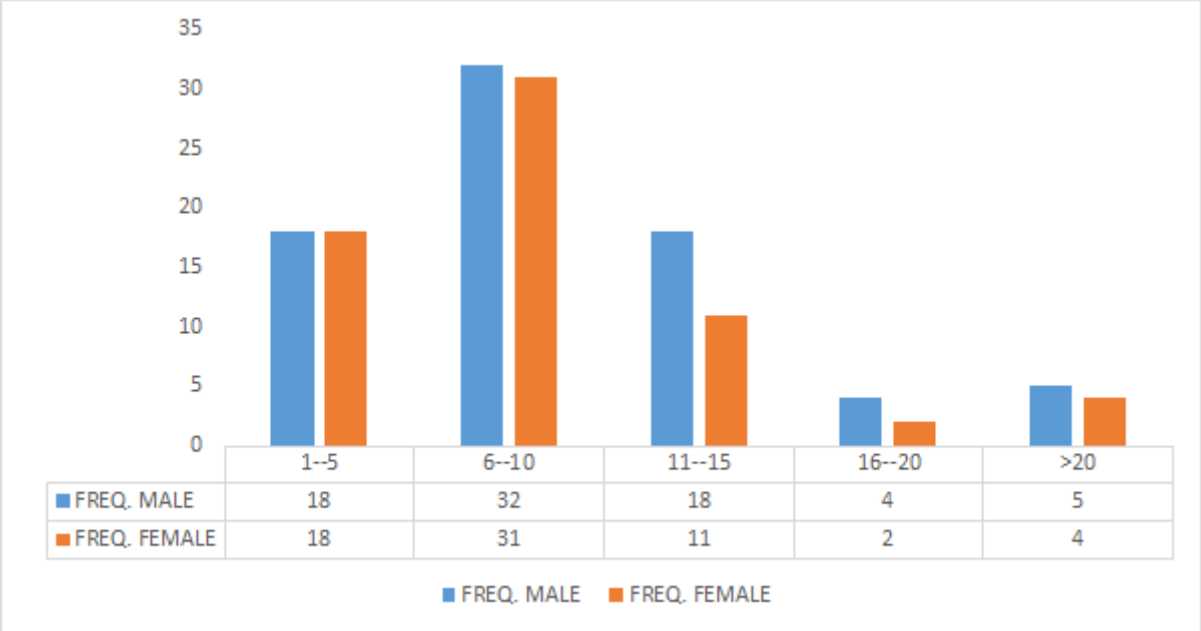

Figure 6: Household size of the respondents

The data presented in Figure 6 on household size indicates that 21.7% of the female respondents have household sizes between 6-10 members. Larger households may lead to unequal allocation of resources, such as land, credit, and training, potentially favouring men's agricultural activities. Also, women in larger households may bear a heavier burden of caregiving responsibilities, limiting their time for agricultural activities. Larger households require more labour for domestic and agricultural tasks, which can fall disproportionately on women[1].

3.1.6: Livelihood of respondents

[1] https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms_633135.pdf

Figure 7: Livelihood of respondents

Figure 7 above shows that farming is the primary livelihood for 41.9% of the female respondents. Off-farming employment such as provision of extension services, processing, packaging, storage, transportation, distribution, and sales is the main source of livelihood for 9% of the female respondents. Remittances from family and children contribute to the livelihood of 2.8% of female respondents. This means that 41.9% of the female respondents rely heavily on farming and agricultural activities as their main source of income, food, or both. Farming provides women with a reliable source of nutritious food for their families. Farming also offers women opportunities for income generation and economic independence.

3.2: Agricultural activities in Kubau district

3.2.1: Agricultural activities engaged by respondents

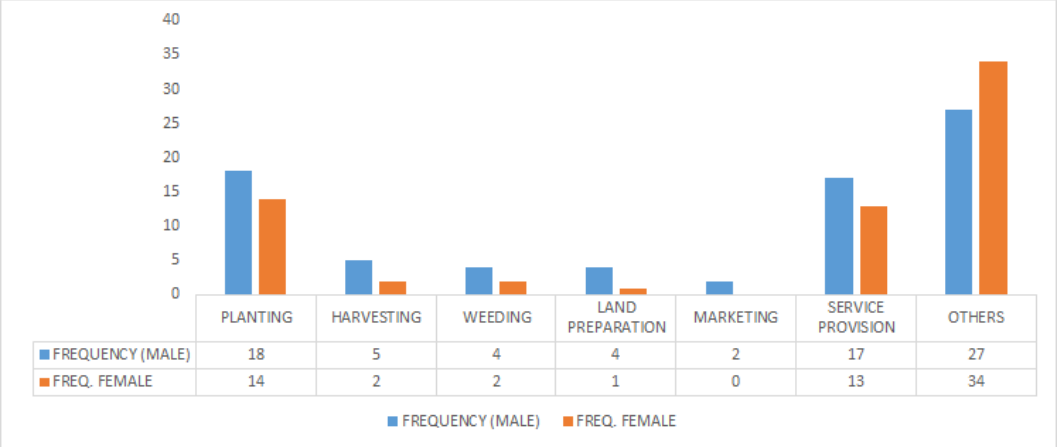

Figure 8: Agricultural activities of the respondents

Figure 8 above shows that women are involved in various forms of agricultural activities including planting, harvesting, land preparation, weeding, and service provision. 9.9% of the female respondents are into planting while 9.1% of the female respondents are into service provision. The varying farming activities from the study area may be assigned to men or women based on traditional gender roles, affecting their workload, time allocation, and economic empowerment. Women can improve their economic standing by participating in various agricultural activities.

3.2.2 Farming practice

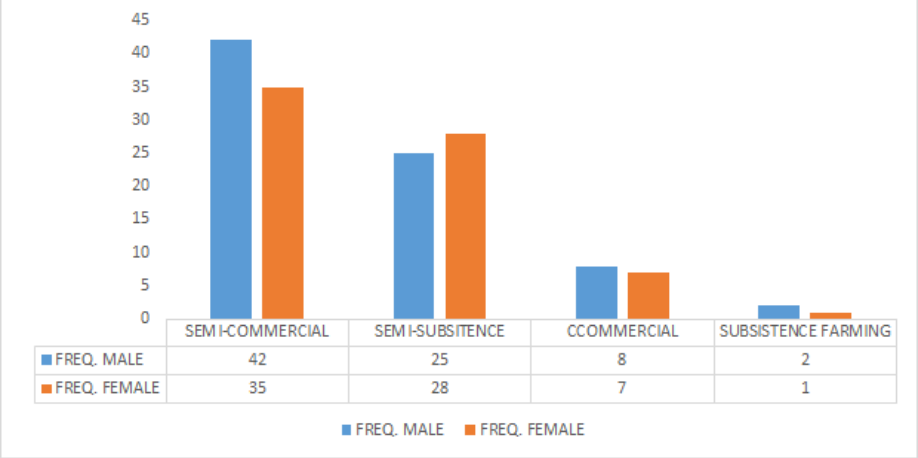

Figure 9: Farming practices by all respondents

As presented in Figure 9 above, the survey reveals that women are actively involved in different forms of farming practices such as semi-commercial, semi-subsistence, commercial and subsistence. This data shows that women are earning a steady income and improving their economic status by actively participating in different farming practices with 24.5% engaging in semi-commercial agriculture and 19.5% of the female respondents engaged in semi-

subsistence agriculture. According to World Bank 2019, on average, african women entrepreneurs earned 38% lower profits per month than men.

3.2.3 Years of farming experience

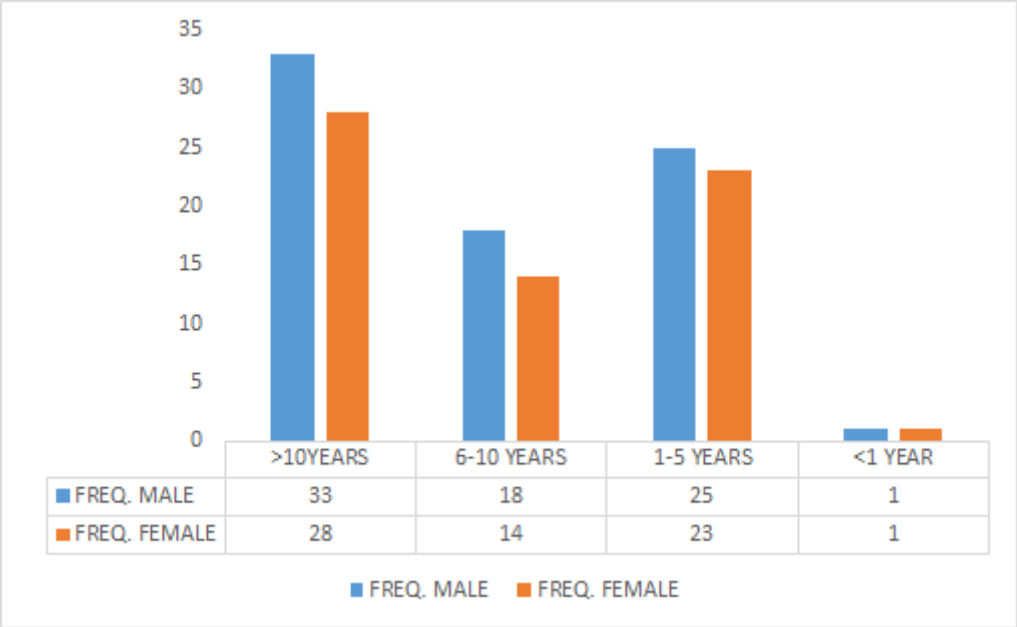

Figure 10: Years of farming experience by all respondents

Figure 10 above shows the years of farming experience of the respondents. 19.6% of female respondents have above 10 years of farming experience. 9.7% of female respondents have between 6 -10 years of farming experience. 16% of female respondents have between 1 and 5 years, and 0.67% of female respondents have less than 1 year of farming experience. This data indicates that women have varying years of farming experience and this potentially points to their interest in hydroponics farming. More experienced male and female farmers may have a deeper understanding of agricultural practices potentially affecting their access and control over knowledge and skills.

3.2.4 Crops cultivated by respondents

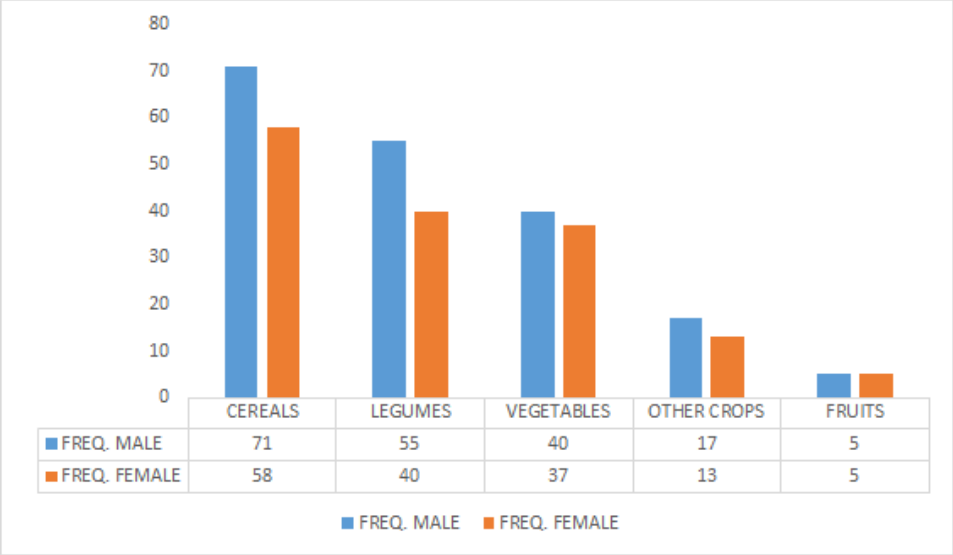

Figure 11: Types of crops cultivated by respondents

The analysis presented in Figure 11 on crops cultivated indicates that the respondents are involved in cultivating a variety of crops. Both men and women are actively cultivating cereals, legumes, vegetables and fruits. The results of the findings show a disparity in the number of men and women cultivating each crop. We have 49% of male respondents cultivating cereals and 40% of female respondents cultivating cereals. This sort of trend is noticed along all crop types identified. We have more men than women cultivating all crops as identified in the study. By considering the type of crop cultivated by the respondents, the hydroponic system can be built to be optimized to foster improved crop yields, resource efficiency, and economic sustainability.

3.2.5 Gender inclusivity in agricultural activities

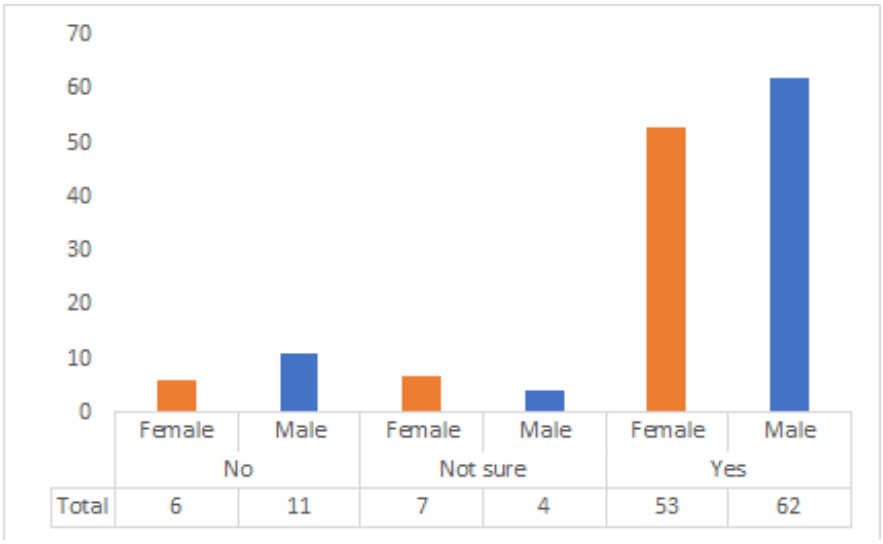

Figure12: Gender inclusivity in agricultural activities

Figure 12 above indicates that 37% of female respondents think that the community's agricultural practices are inclusive of all genders while 4.2% of female respondents do not think the community's agricultural activities are inclusive of all genders. When agricultural activities are inclusive of both men and women, agricultural productivity is bound to increase. Key constraints to women's involvement in agribusiness should be prioritized to bridge the gap between men's and women's involvement in agriculture.

3.2.6 Perception of access to agricultural resources by respondents

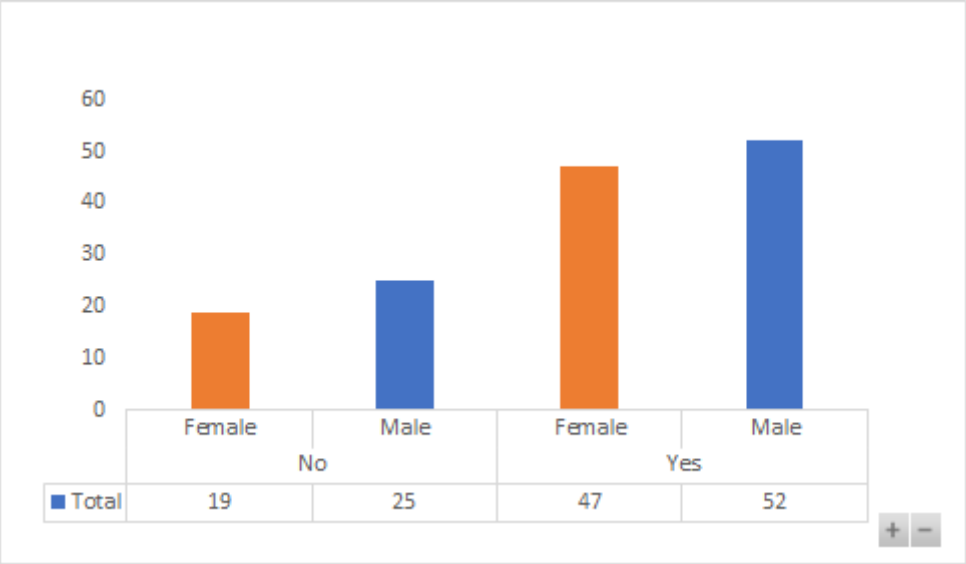

Figure 13: Perception of access to agricultural resources by respondents

As presented in Figure 13, 32% of the female respondents believe that men and women have equal access to agricultural resources seeds, fertilizer, equipment etc. In contrast, 17.5% of female respondents feel that men and women do not have equal access to agricultural resources. By ensuring equal access to agricultural resources, we can promote gender equality, improve agricultural productivity, and support sustainable development.

3.3 Women's participation in farming activities

3.3.1 Perception of gender-based challenges in accessing agricultural resources and opportunities

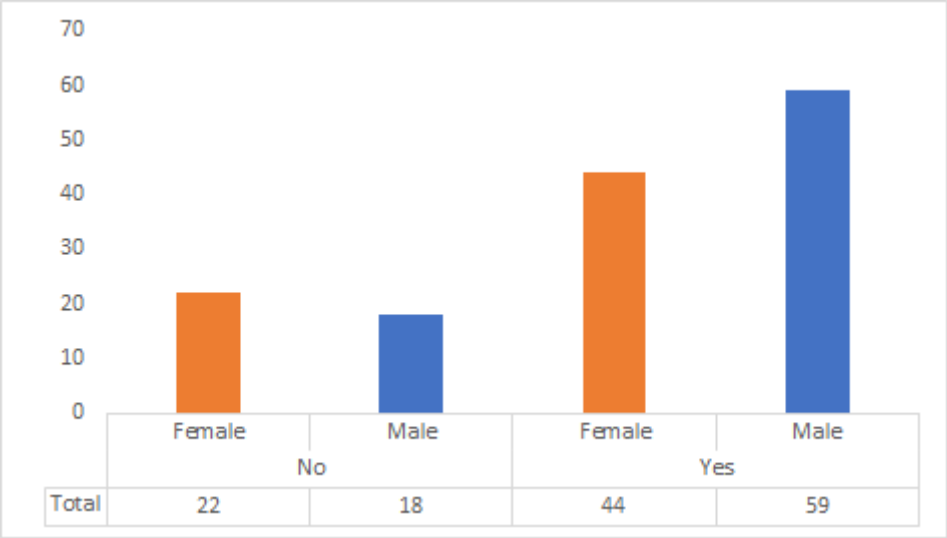

Figure 14: Perception of challenges women face in accessing agricultural resources and opportunities

Figure 14 above shows that 30.7% of female respondents agree that women face more challenges in accessing agricultural resources and opportunities such as land ownership and control, lack of input credit and finances and many others. In contrast, 15.3% of female respondents do not agree that women face more challenges than men. By accessing agricultural resources, women can break the cycle of poverty, improve their families' well-being, and contribute to sustainable agricultural development.

3.3.2 Perception of women's participation in farming activities

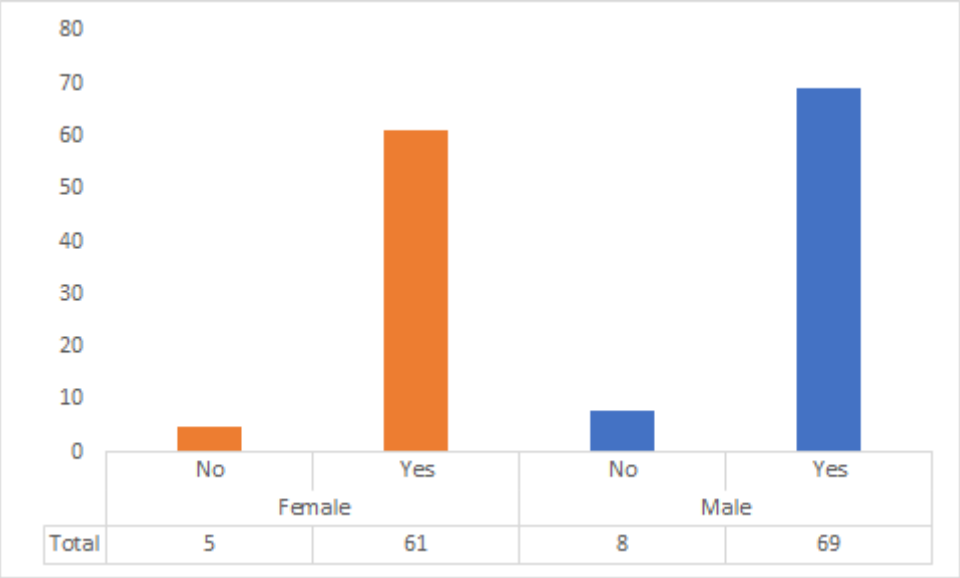

Figure 15: Perception of women's participation in farming activities

From Figure 15 above, 42.7% of female respondents agree that women actively participate in farming activities while 3.5 % of female respondents do not agree that women actively participate in agricultural activities. 42.7% of female respondents who agree that women are participating in agricultural activities indicate a cultural acceptance and support for women's involvement in farming. Recognizing women's participation in farming highlights their potential contribution to the agricultural economy. This support can encourage more women to engage in farming, thereby increasing household incomes and overall agricultural productivity. The strong backing for women's participation can influence policymakers to develop and implement supportive policies and programs. This might include access to resources, training, and financial support tailored specifically for women farmers.

3.3.3 Respondents perceived ways of improving gender equality

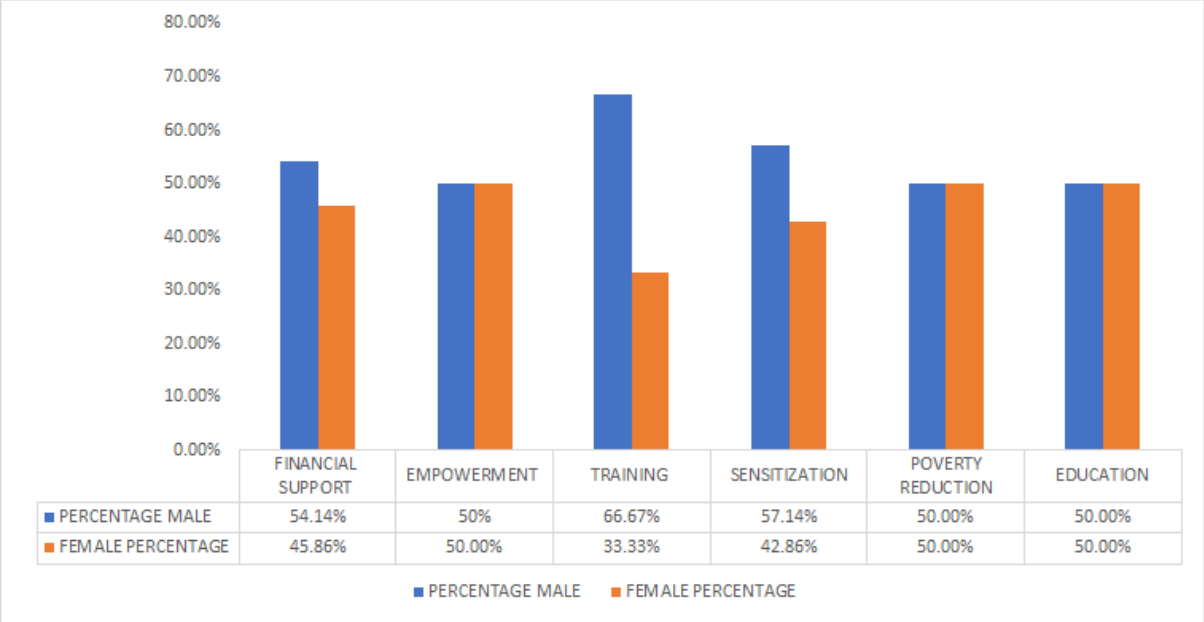

Figure 16: Respondents perceived ways to improve gender equality in Kubau district

Figure 16 above reveals that the female respondents prioritize financial support, empowerment, sensitization, poverty reduction and education as the methods to improve gender equality in the study area. The male respondents prioritize training, sensitization and financial support as the ways to improve gender equality in the study area. All strategies highlighted above will aid gender inclusion and gender equality in the study area.

3.4 Influence of cultural norms and legislation on land ownership

3.4.1 Legislation supports equal land ownership rights for women

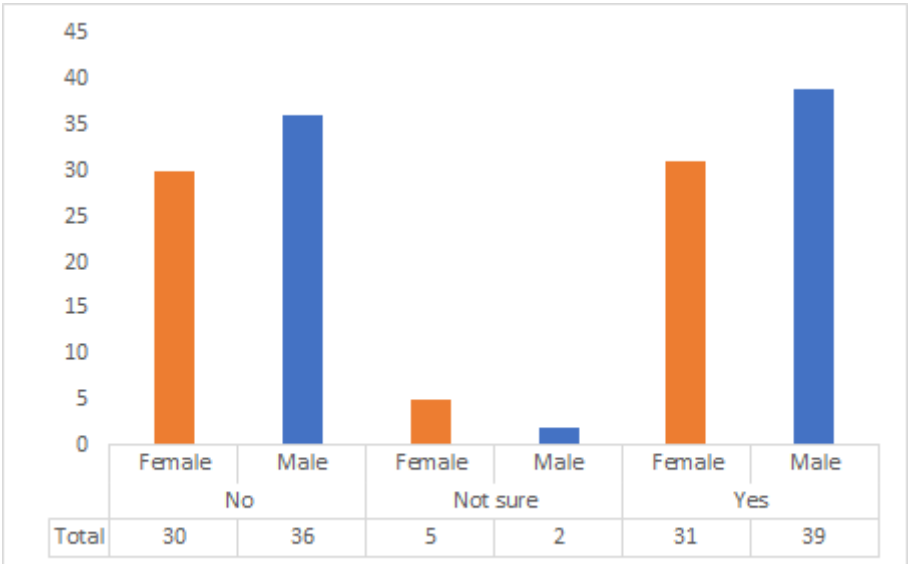

Figure 17: Legislative support for land ownership by all respondents

Figure 17 shows that 21.6% of female respondents agree that legislation supports equal land ownership rights for women, while 20.9% of the female respondents do not agree that legislation supports land ownership rights for women. The Land Use Act (1978) Section 14 recognizes the rights of women to access and control land. This reflects positively on the legal framework's inclusivity and responsiveness to gender issues. There may be a need to educate members of the community about these legislative rights and how to effectively apply them. The perception of supportive legislation can create a more encouraging environment for women to claim and exercise their land rights. This can lead to increased land ownership among women, promoting their economic independence and empowerment.

The belief that legislation does not support equal rights could indicate potential gaps in the enforcement of these laws in the community. Women may still face practical barriers and discrimination despite the existence of supportive legislation. This indicates a need for more targeted educational campaigns to ensure that everyone is informed about women's land rights. The opposition may also stem from deep-rooted cultural and social norms that resist changes to traditional land ownership patterns. Overcoming these barriers requires not only legal changes but also shifts in societal attitudes and sensitisation.

3.5 Women's participation/membership in farmers' organization

3.5.1 Women representation in farmers' organizations

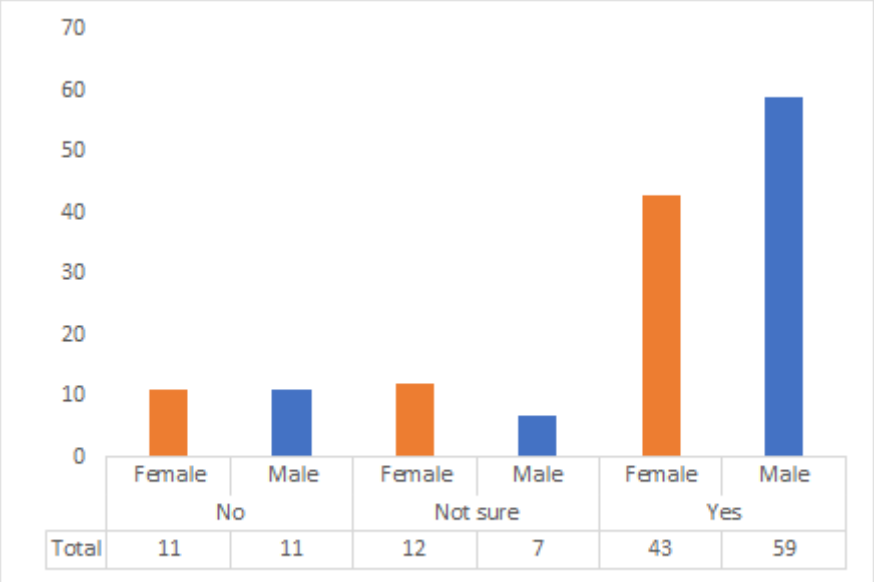

Figure 18: Women's representation in farmers organizations by all respondents

Figure 18 above shows that 30% female respondents believe that they are equally represented in farmers' organizations, while 7.69% female respondents indicated that they are not

represented in farmer's organizations. Additionally, 8.4% female respondents are unsure about the level of women's representation in these organizations.

The 30% of female respondents suggest a perception of inclusivity and gender equality within farmers' organizations, indicating that efforts to promote gender equality are recognized by a significant portion of the community. Belief in equal representation can encourage more women to join and actively participate in these organizations, leading to increased diversity in perspectives and decision-making processes, which benefits the entire community. The perceived equal representation can inspire other women to pursue leadership roles within these organizations, fostering a cycle of empowerment. However, the belief that women are not equally represented suggests potential discrepancies between perceived and actual representation. Women might still be underrepresented in key decision-making roles or face barriers to full participation. The uncertainty expressed by some of the respondents indicates that women's contributions and roles within these organizations might not be sufficiently visible or acknowledged, which can undermine efforts to promote gender equality. Additionally, the minority view and uncertainty suggest that there may be underlying barriers preventing women from fully participating or being represented, such as cultural norms, lack of access to resources, or limited opportunities for leadership training.

3.5.2 Women's access to services provided by farmers organizations

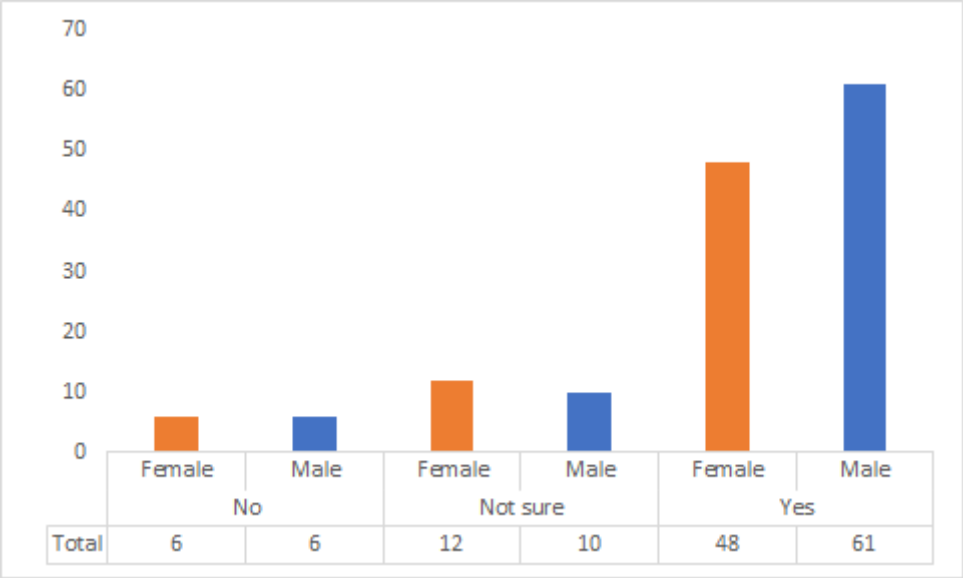

Figure 19: Women's access to services by farmer's organisation

Figure 19 above shows that a significant majority of 33.5% of female respondents agree that women have equal access to services provided by farmers' organizations. However, 4.2% of

female respondents do not share this view, indicating perceived barriers in accessing these services. Additionally, 6.99% male respondents and 8.4% of female respondents are unsure, suggesting a need for clearer communication or transparency regarding access to these services. Female farmers can enhance their agricultural productivity and efficiency with access to quality inputs, training, and technology from farmer's organizations.

3.6 Women's participation in Agricultural Value Chains (AVC)

3.6.1 Women's representation in specific functions of the AVC of the community

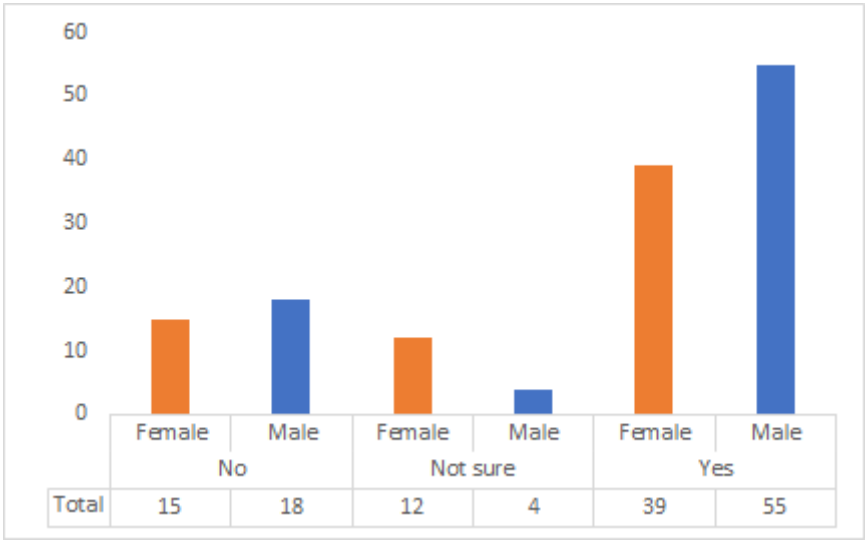

Figure 20: Women's representation in the agricultural value chain

As presented in Figure 20 above, the analysis reveals that 27% of female respondents agree that women are adequately represented in specific functions of the agricultural value chain such as planting, weeding, harvesting etc in their community. However, 10% of female respondents do not agree that women are adequately represented in the agricultural value chain. This may suggest inadequacies in women's representation across various agricultural functions. Women's participation in agriculture can increase productivity and efficiency and can also lead to increased income and economic empowerment.

3.6.2 Perceptions of the limit of gender stereotypes that limits opportunities for women in the AVC

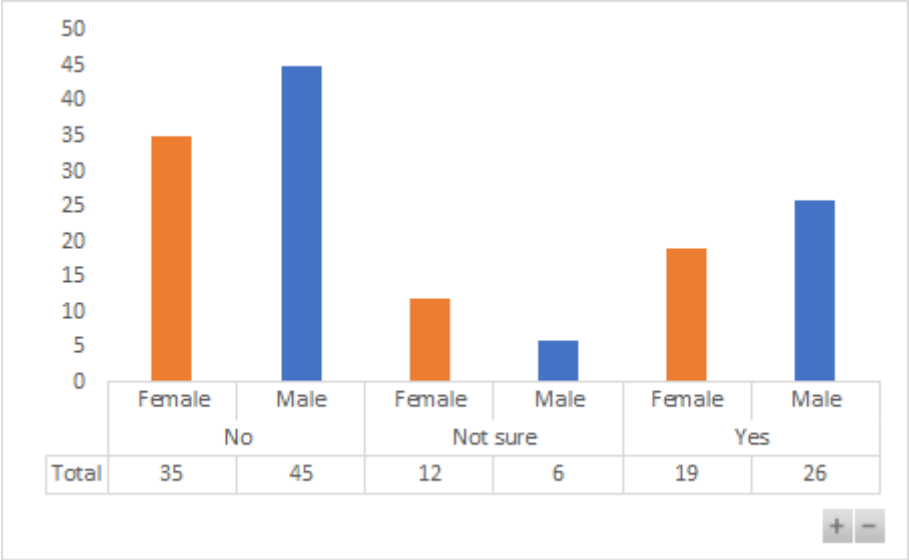

Figure 21: Perception of gender stereotypes women face in AVC

As presented in Figure 21, the analysis indicates that 13.3% of the female respondents accept that there are gender stereotypes women face in agricultural value chains while 24.5% of the female respondents do not agree that there are gender stereotypes women face in agricultural value chains. 8.4% of female respondents are unsure if there are gender stereotypes women face in agricultural value chains. Gender stereotypes can make women become underrepresented in agricultural leadership and decision-making positions.

3.6.3 Perception of women's remuneration from participating in AVC

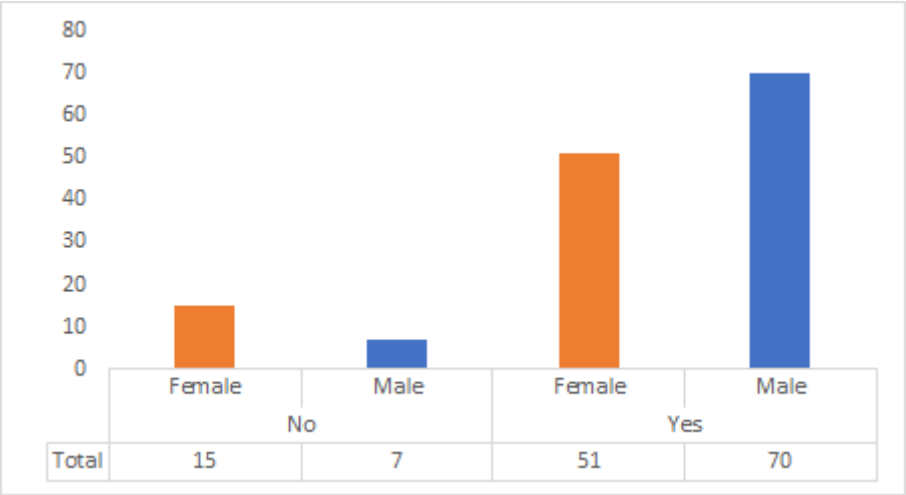

Figure 22: Women benefiting from participating in AVC

Figure 22 above shows that 35.7% of female respondents agree that women receive benefits from participating in the agricultural value chains. However, 10.5% of female respondents do not think that women receive benefits from participating in agricultural value chains. By benefiting from agricultural value chains, women can improve their lives, families, and communities, ultimately contributing to sustainable agricultural development and gender equality.

3.6.4 Perception of the inclusion of women in the AVC and productivity

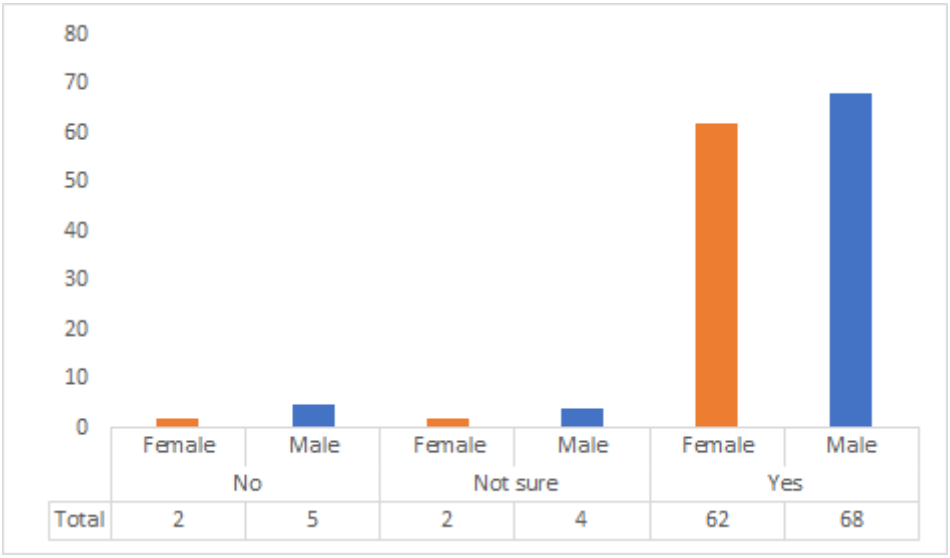

Figure 23: Women's inclusion relationship with product quality and productivity

According to Figure 23, 43.4% of the female respondents agree that the inclusion of women in the value chain improves product quality and productivity. While 1.4% of women disagree with the above statement. Alternatively, 1.4% of the female respondents are unsure. Women's

participation in agriculture leads to higher quality products, as they tend to be more detail-oriented and focused on quality.

3.7 Women's access to extension services in Kubau district

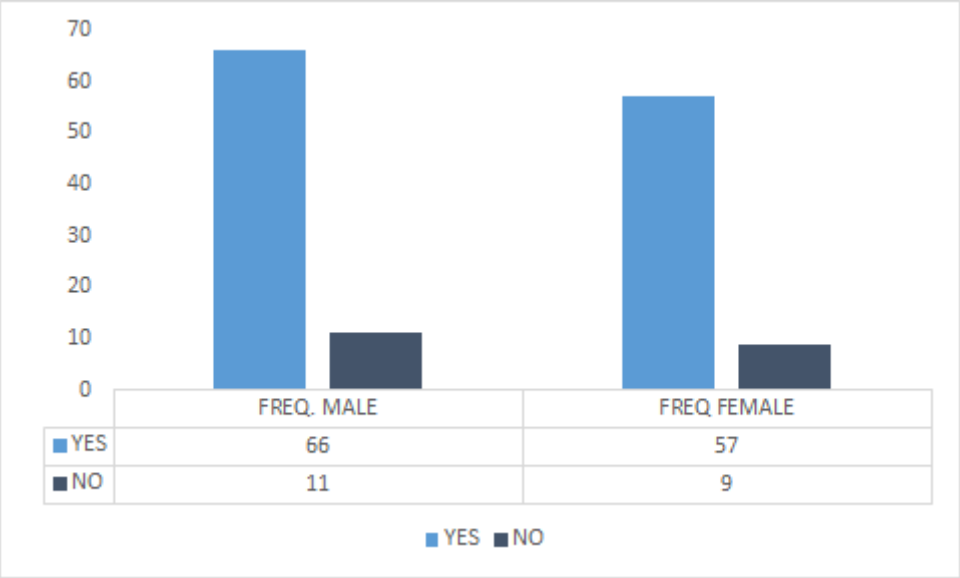

Figure 24: Women's access to extension services

As shown in Figure 24 above, 39.9% of the female respondents agree that women receive extension services, while 6.3% of the female respondents do not believe women do not have access to such services. This disparity can lead to unequal opportunities for learning about new farming techniques, pest control, crop management, and market information.

Some married women might have less access to extension services due to household responsibilities and mobility constraints. Programs should be designed to accommodate their schedules and responsibilities. Ensuring inclusive and accessible programs for all women, regardless of marital status, is essential.

Extension services must address the specific needs and challenges faced by different groups, particularly women. Farmers who receive extension services are likely to have better knowledge of modern farming techniques, pest management, and crop varieties, which can lead to increased productivity and sustainability. Access to extension services can help farmers make informed decisions that enhance their income through improved yields, reduced costs, and better market access. Farmers receiving extension services are more likely to adopt new technologies and practices that can improve efficiency and resilience to climate change.

3.8 Land availability, ownership and rentage

In many cultures, women face legal and cultural barriers to owning land. Even when they do own land, it may be less secure or smaller in size compared to men's land holdings. This impacts their ability to invest in and benefit from agricultural activities. Ownership does not always equate to control. Women may nominally own land but lack decision-making power due to traditional gender roles. This can limit their ability to decide on land use, investments, and participation in agricultural markets.

1. Land availability and ownership

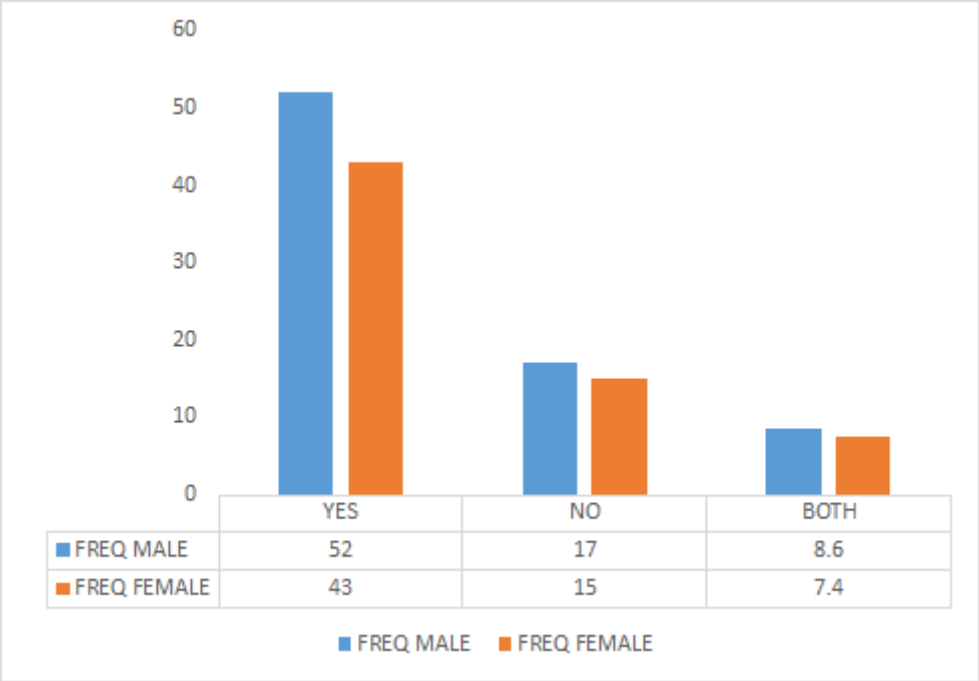

Figure 25: Land availability and ownership

As presented in Figure 25, 30% of the female respondents agree that they have access to land and in some cases own said lands. While 10.5% of female respondents do not have access to land. Land ownership by women is crucial for sustainable agricultural development, poverty reduction, and gender equality. It enables women to make decisions, access resources, and improve their livelihoods, ultimately contributing to food security and sustainable agriculture.

2. Farm rent

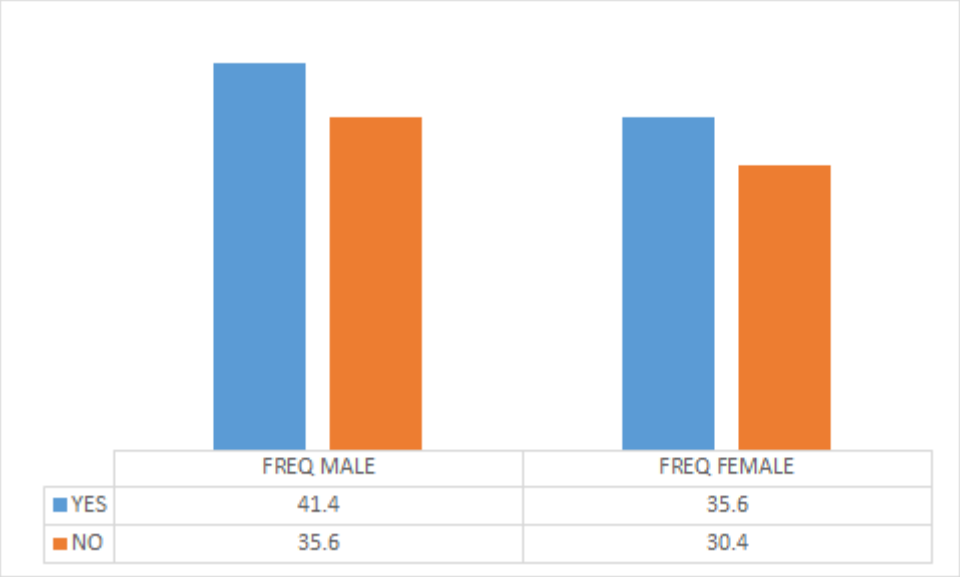

Figure 26: Farm rent

As shown in Figure 26, 24.9% of female respondents pay land rent while 21.3% of female respondents do not pay land rent. Some women who do not have access to land are often marginalized in agricultural communities. They may rely on low-paying labour or informal agreements, which can be unstable and exploitative. Economic constraints, inheritance laws, and societal norms can prevent women from acquiring land. This lack of access undermines their ability to build sustainable livelihoods and achieve economic independence.

Women who have access to land but do not own it may face insecurity regarding their rights to use the land. This can discourage them from making long-term investments in the land, such as soil improvement or infrastructure development. These women might depend on male relatives or landlords for access to land, which can put them in vulnerable positions. They may have less bargaining power and be subject to unfavourable terms or sudden loss of access.

3.9 Main challenges faced in the community and adaptive measures

Some of the most apparent challenges faced by the community are presented in this chapter and respective adaptive measures are also recommended.

3.9.1 Gender challenges faced in Kubau district

Women face a number of challenges as highlighted below:

1. Kidnapping and abduction: Risk of being kidnapped or abducted while working on farms or travelling to markets.

2. Banditry and armed robbery: Vulnerability to attacks by bandits and armed robbers, leading to loss of property and livelihoods.

3. Sexual violence and harassment: Exposure to sexual violence and harassment from farm labourers, traders, or other stakeholders.

4. Inadequate financial support and limited access to modern farming techniques.

5. Post-harvest losses from improper storage and poor harvesting practices.

3.9.2 Potential implementation challenges: Hydroponic farming

The primary concerns identified by women in implementing hydroponics include:

1. Access to water: Hydroponics farming requires constant access to clean water
2. Environmental concerns: Hydroponics farming requires careful management of water, nutrients, and waste to minimize environmental impact
3. High cost of running: Hydroponics farming requires high costs of electricity for water pumping
4. Proper management of hydroponics farm: Hydroponics farm requires proper management to prevent pest and disease outbreaks and adequate expertise of extension management.
5. High initial investment costs, concerns about sustainability or environmental impact, lack of knowledge or training, limited access to resources, cultural or social barriers, and other miscellaneous issues.

3.9.3 Adaptive measures

Hydroponics farming is a precision farming activity that can employ adaptive measures as listed below:

1. Training and capacity building: Provide women with training and capacity-building programs to enhance their knowledge and skills in hydroponics farming.
2. Women-friendly infrastructure: Design and create women-friendly infrastructure, including greenhouses and irrigation systems.
3. Safety measures: Implement safety measures to protect women from physical strain and chemical exposure.
4. Flexible work arrangements: Offer flexible work arrangements to accommodate women's caregiving responsibilities.

5. Mentorship programs: Establish mentorship programs to connect women with experienced hydroponics farmers.
6. Market access: Facilitate market access for women to sell their produce.

3.9.4 Concerns about the EMSAS-Hydroponic project: project's impact on the community

From the analysis of the study, the hydroponics system will have a number of positive impacts on the project such as job creation, local investment, and increased economic activity in the community. The EMSAS-Hydroponic project will be beneficial to the community, particularly for women through opportunities for community involvement and education. The study's findings revealed that community members perceive the hydroponic project as a viable solution to their collective needs, offering enhanced food security, job opportunities, economic growth and wealth creation which will benefit not only the community but also contribute to the country's overall prosperity.

3.10 Weather patterns and climatic conditions

This section highlights the weather patterns and climatic conditions of Kubau LGA in Kaduna State.

3.10.1 Description of observed changes

In many communities like Kubau, women are primarily responsible for water collection for many domestic uses. Reduced rainfall can increase their workload as they may need to travel further to find water sources. This additional burden can limit their time for farming and other productive activities. Reduced rainfall can lead to lower crop yields, which can affect female farmers who often have less access to irrigation and water management technologies. Ensuring that women have access to such technologies can help mitigate these impacts. They may be more reliant on small-scale farming and subsistence agriculture. Reduced rainfall can threaten their food security and livelihoods. Supporting women in diversifying their income sources can enhance their resilience.

Unpredictable rainfall patterns make agricultural planning more challenging. Women, who may already have less access to extension services and weather information, could be at a disadvantage in adapting their planting schedules accordingly. Women's limited access to resources might restrict their ability to switch to crops that are more tolerant of variable

rainfall. Extension services and support programs should provide targeted assistance to women to help them choose and cultivate appropriate crop varieties.

Increased temperatures can have direct health impacts, particularly on women who often engage in labour-intensive agricultural work. Health issues related to heat stress can reduce their productivity and well-being. Higher temperatures can affect crop growth and livestock health. Women, who might already have fewer resources for managing these impacts, need targeted support such as access to heat-tolerant crop varieties and livestock care information. Increased temperatures can also affect household energy needs, such as increased reliance on cooling. Women, who typically manage household resources, might face added challenges in coping with these changes.

Climate change can lead to new pest and disease challenges. Women, who may have less access to pest control technologies and information, need support in managing these threats to their crops and livestock. Other environmental changes, such as soil degradation and erosion, can disproportionately affect women who often work on more marginal lands. Soil conservation programs should be inclusive and provide women with the necessary tools and training.

3.11 Measures to manage climate-related changes: Hydroponic farming

From the results of the FGD, aside from the Zuntu community that utilizes water from the dam to support their farming processes, other locations do nothing to manage the impact of climate change. Also, results from the FGD group stated that all the respondents do not know what hydroponic farming is. This shows the potential impact that the pilot project will have on the communities and in the lives of the beneficiaries.

All women respondents expressed interest in hydroponics, indicating a high level of enthusiasm for this agricultural method. After proper explanation and clarification, most of the FGD members stated that they were interested in hydroponics. Many respondents (93.71%) expressed a very high interest in adopting hydroponics, indicating strong potential for widespread adoption within the community.

3.12 Resilience to climate change, conflict and weather forecast in farming:

FGD women respondents stated that hydroponic farming could be a more resilient agricultural practice in the face of climate change and conflict. They anticipate increased female

participation in farming activities, higher production levels, and improved wealth in the community. The proximity of hydroponic setups to individual compounds could also address distance challenges. The FGD group stated that they find weather forecasts useful for farming activities as they help in planning, planting, harvesting, and irrigation schedules, protecting crops from adverse weather conditions, and optimizing resource use. They believe that accurate forecasts can significantly improve productivity and reduce losses.

3.13. Recommendations for successful implementation of inclusive Hydroponic

3.13.1. Gender equality and empowerment:

A. Enhanced financial support and training programs through GRB

Gender-responsive budgeting (GRB) is an approach that ensures that the budgeting process is equitable and considers the different needs and contributions of all genders. When applied to the intended hydroponic piloting, GRB can help address gender disparities and promote inclusive participation in sustainable agriculture practices.

Based on the analysis of the data collected, it is recommended that there be enhanced financial support and training programs for women in agriculture. This includes providing targeted financial assistance such as grants and subsidies, as well as comprehensive training programs focused on modern agricultural practices, financial management, and business development. These initiatives should be accessible to both men and women to ensure equal opportunities for skill development.

B. Awareness and sensitization campaigns

Awareness and sensitization campaigns are crucial for achieving gender equality. Launching community-wide awareness programs to educate both men and women about the importance of gender equality in agriculture is therefore necessary. These campaigns should address cultural and social barriers that limit women's participation and highlight the benefits of inclusive practices. Conducting regular gender sensitization workshops for community leaders, farmers, and other stakeholders can foster a more inclusive and supportive environment for women in agriculture. These workshops should focus on dismantling gender stereotypes and promoting equal opportunities for all.

4.0 Agriculture and economic empowerment

A. Enhance extension services and training programs

Since a majority of the respondents stated that they do not receive extension services for farming activities, there is a clear need to improve the availability and accessibility of these services. Strengthening extension services can provide female farmers with essential knowledge and skills, leading to increased productivity and efficiency. Training programs should focus on modern farming techniques, pest management, and sustainable agricultural practices to support the significant portion of farmers who are engaged in semi-commercial farming.

B. Facilitate access to land and financial resources

There is a need to address land access issues. Policies and programs that facilitate land ownership, leasing options, and financial support for land acquisition can help more women engage in farming. Additionally, since 54% of respondents pay rent for farming, efforts should be made to provide affordable land rental options or subsidies to reduce the financial burden on farmers.

C. Promote diversification of income sources and crop varieties

Diversifying income sources can enhance economic stability. Encouraging the cultivation of a variety of crops, such as cereals, legumes, vegetables, and fruits, can mitigate risks associated with market fluctuations and climate change. Furthermore, promoting off-farming employment opportunities and facilitating access to remittances can provide additional income streams to female farmers, ensuring a more resilient economic base for the women and the community.

4.1 Climate resilience and sustainable agriculture:

A. Enhance pest and disease management strategies

Establishing robust pest and disease management programs i.e. involving integrated pest management (IPM) practices, the use of biopesticides, and regular training for female farmers on early detection and control methods can reduce the impact of pests and diseases on crops.

B. Develop and strengthen water management infrastructure

As only the Zuntu community utilizes dam water to support their farming processes, expanding water management infrastructure across all communities is necessary for the women and the community members. This could involve improving irrigation systems and

encouraging rainwater harvesting to ensure a stable water supply for agriculture, thereby mitigating the adverse effects of climate change on farming activities.

4.2 Monitoring and Evaluation

Establish a monitoring and evaluation framework to track the progress, impact, and outcomes of gender-responsive interventions in hydroponic farming, with a focus on women's empowerment and participation. Conduct regular assessments, focus group discussions, and participatory evaluations involving women stakeholders to gather feedback, identify challenges, and make data-informed decisions for program improvement and sustainability.

4.3 Partnerships and resource mobilization:

Strengthen partnerships with government agencies, civil society organizations, academic institutions, and private sector entities to leverage resources, expertise, and networks for advancing gender equality, women's empowerment, and sustainable agriculture in the community. Mobilize funding through grants, donations, and collaborative initiatives to support the implementation of gender-focused programs, projects, and activities that benefit women, enhance community resilience, and promote inclusive development in Kubau and Kaduna State in general.

4.4 Strategies to implement a gender-transformative Hydroponic farming

1. Engage both men and women in the planning and consultation processes to gather diverse perspectives.
2. Ensure that budget allocations address the specific needs of all genders.
3. Provide training and capacity-building programs that cater to the needs and interests of men, women, youth and people living with disabilities.
4. Ensure equal access to land, credit, technology, and markets for women, men, youth and people living with disabilities.
5. Encourage women to take leadership roles and participate in decision-making processes.
6. Collaborate with organizations that specialize in gender mainstreaming and women's empowerment.
7. Consider transportation needs and barriers that may affect the participation of different genders in hydroponic farming activities.

8. Promote and support the formation of women-led cooperatives in hydroponic farming to enhance economic empowerment.
9. Facilitate access to finance and credit for women and other underrepresented groups to invest in hydroponic projects.
10. Use gender-sensitive communication strategies to reach out to and inform all community members about hydroponic opportunities.
11. Reach out to and inform all community members about hydroponic opportunities.

5.0 Conclusion and recommendations

5.1 Conclusion

The gender assessment conducted in Kubau LGA has revealed the role of women in agriculture. The findings reveal that women add vital contributions to the agricultural economy and also play a crucial role in ensuring food security and community resilience. However, despite their significant contributions, women face numerous barriers that limit their access to essential resources, technology, land ownership, financial support, and market opportunities. These challenges are compounded by societal norms and cultural practices that often marginalize women's roles in agriculture.

The EMSAS hydroponics project presents a unique opportunity to address these gender disparities and empower women within the agricultural sector. By adopting a gender-responsive approach, the project can facilitate the inclusion of women in decision-making processes, enhance their access to training and resources, and promote equitable participation in agricultural activities. The community's positive perception of hydroponics as a sustainable farming practice against climate change and economic instability further emphasizes the potential for this technical assistance to drive meaningful change.

In conclusion, addressing gender inequalities in hydroponics farming is not only a matter of social justice but also a strategic imperative for enhancing agricultural productivity and community resilience. By implementing the recommendations outlined in this report, the EMSAS hydroponics project can unlock the full potential of women in agriculture, foster economic empowerment, and contribute to sustainable development in Kubau LGA and beyond. The commitment to gender equality will ultimately lead to a more inclusive, equitable, and prosperous agricultural landscape that benefits all members of the community.

5.2 Recommendation

Based on the findings of the gender analysis of farming activities conducted in Kubau LGA, the following recommendations are proposed to enhance gender equality and women's empowerment in hydroponics farming:

1. Comprehensive training programs: Implement training sessions focused on climate-smart agricultural practices, particularly hydroponics, to equip women and other marginalized groups with the necessary skills and knowledge to engage effectively in modern farming techniques.
2. Community engagement and awareness: Increase awareness and acceptance of hydroponic farming through community engagement initiatives. This can involve workshops, demonstrations, and information campaigns to educate community members about the benefits and viability of hydroponics.
3. Access to financial resources: Facilitate access to financial support for farmers, particularly women, by establishing partnerships with financial institutions and NGOs. This could include microfinance options, grants, and subsidies tailored to support women in agriculture.
4. Encouragement of inclusive participation: Actively encourage the involvement of women, youth, and people with disabilities in agricultural activities. This can be achieved through targeted outreach programs and by creating supportive networks that promote knowledge sharing and skill development.
5. Partnership development: Foster partnerships and collaborations with like-minded organizations, government agencies, and private sector entities to secure additional resources and support for the EMSAS hydroponics project. This will enhance the sustainability and adaptability of the initiative.
6. Monitoring and evaluation framework: Establish a robust monitoring and evaluation

framework to track the progress and impact of gender-responsive interventions in hydroponic farming. Regular assessments and participatory evaluations should involve women stakeholders to gather feedback and inform program improvements.

7. Addressing resource accessibility: Work towards improving access to agricultural resources and services for women, including extension services, land ownership rights, and market intelligence. This may involve advocacy efforts to influence policy changes that support women's rights in agriculture.
8. Promoting knowledge transfer: Create platforms for knowledge transfer among farmers, including mentorship programs where experienced farmers can share insights and best practices with newcomers, particularly women and youth.

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ANNEXES:

EMSAS Baseline Assessment (For farmers)

Informed consent:

Greetings,

We are pleased to be working on the Empowering Communities with Sustainable Agricultural Systems (EMSAS) project, focusing on piloting a small-scale hydroponics system in Kubau Local Government Area (LGA) of Kaduna State, Nigeria.

The EMSAS project aims to contribute to the resilience and well-being of communities in Kaduna State by introducing sustainable and innovative agricultural practices. Your participation is crucial in helping us understand your needs and challenges related to climate change, violent conflicts, and food insecurity in the region.

We would like to ask you some questions about your farming activities to gain insights into the situation of climate change and insecurity and how it affects agriculture and food production in your community.

*The survey typically takes about **15 minutes** to complete. Be assured that all information provided will be treated with strict confidentiality. Participation in this survey is voluntary, and you are free to choose whether or not to answer any questions. However, we highly value your input as it will help us tailor our support to better meet your needs.*

If you have any questions or concerns, please feel free to ask. Otherwise, may we proceed with the survey?

Section 1: Demographic Information	
LGA:	
Ward:	
Community:	
Gender	A) Male B) Female
Age Group	A) <18 B) 18-30 C) 31-50 D) >50
Level of Education	A) No formal education B) Primary education C) Secondary education D) Quran/Religious education
Occupation: Are you a farmer?	Yes or No (If No, discontinue interview)
If yes, what farming activities do you engage in?	A) Land preparation B) Planting C) Weeding D) Harvesting E) Marketing F) Service provision G) Other (please specify)
Marital Status	A) Single B) Married C) Widow/Widower D) Divorced E) Separated
Aside from farming, do you have any skill or experience in any of these?	A) Carpentry B) Welding C) Plumbing D) Others?..... Specify.
What is your household size?	A) 1-5 B) 6-10

	C) 10-15 D) 15-20 E) >20

S/N	**Section 2: Livelihood, Gender, Climate Change, Conflict, Income and Food Security**	
1	What are the main sources of income for your household?	A) Farming B) Off-farm employment C) Remittance from others (Children, relatives, etc) D) Others, Specify
2	Who primarily controls the income in your household?	A) Myself B) My spouse C) Jointly with my spouse D) Other (please specify)
3	How much do you make in a single farming season?	A) <N100,000 B) N100,000 - N250,000 C) N250,000 - N500,000 D) >N500,000
4	What percentage of your income is from farming?	A) <10% B) 10% - 25% C) 25% - 50% D) >50%
5	How much do you and your household live on in a day?	A) <N1500 B) N1500 - N3000 C) N3000 - N5000 D) >N5000
6	How often do you experience shortages of food in your household?	A) Rarely or never B) Occasionally C) Frequently
7	Do you feel that the community's agricultural practices are inclusive of both men and women?	A) Yes B) No C) Not sure

8	What specific measures do you think should be taken to ensure gender equality in agriculture in your community?	
9	Are there any additional comments or suggestions you have regarding gender issues related to agriculture, climate change, violent conflicts, and food insecurity in your community?	

Section 3: Agricultural Practices and Resources		
S/N	**Question**	**Responses**
1	How many years have you been involved in farming?	A) <1 year B) 1-5 years C) 6-10 years D) >10 years
2	What types of crops do you mainly cultivate? (Select all that apply)	A) Cereals (e.g., maize, rice, wheat) B) Vegetables (e.g., tomatoes, peppers, lettuce) C) Fruits (e.g., bananas, oranges, mangoes) D) Legumes (e.g., beans, peas, lentils) E) Other (please specify)
3	What type of farming do you practice?	A) Subsistence (Produce to eat) B) Commercial (Produce to sell) C) Semi-subsistence (Produce to eat but sell few) D) Semi-commercial (Produce to sell but eat some)
4	Which farming season do you cultivate crops?	A) Dry-season farming B) Rain season farming C) Both
5	How do you currently access water for irrigation?	A) Rainwater harvesting B) Well or borehole C) River or stream D) Other (please specify)
6	Have you received any training or extension services related to agriculture in the past year?	A) Yes B) No

Section 4: Land Availability and Ownership		
S/N	**Question**	**Responses**
1	Do you currently own or lease land for your farming purposes?	A) Yes B) No C) Both
2	If yes, how many hectares/acres of land do you own or lease?	A) <1 hectare/acre B) 1-5 hectares/acres C) 6-10 hectares/acres D) >10 hectares/acres
3	Do you currently rent land for your farming purposes?	A) Yes B) No
4	If yes, how many hectares/acres of land do you rent?	A) <1 hectare/acre B) 1-5 hectares/acres C) 6-10 hectares/acres D) >10 hectares/acres
5	Do you encounter any challenges related to land availability or ownership?	A) Yes B) No
6	If yes, please specify the challenges you face	A) Limited availability of arable land B) Land disputes or conflicts C) Insecure land tenure D)High cost of land acquisition/lease E) Other (please specify)

Section 5: Impacts of Climate Change		
S/N	**Question**	**Responses**
1	Have you noticed any changes in weather patterns over the past decade?	A) Yes, there have been noticeable changes B) No, weather patterns have remained consistent C) Unsure
2	If yes, please describe the changes you have observed.	A) Reduced rainfall B) Frequent variation in rainfall on set C) Increased temperature D) Others

3	How have these changes in weather patterns affected your agricultural activities?	A) Crop failure B) Reduced land fertility C) Pests and diseases D) Other (please specify)
4	Have you implemented any adaptive measures to cope with the impacts of climate change on your farming practices?	A) Yes B) No
5	If yes, please specify the adaptive measures you have taken.	A) Changing planting dates to align with changing weather patterns B) Adopting drought-resistant crop varieties C) Implementing water-saving irrigation techniques (e.g., drip irrigation) D) Introducing agroforestry practices to improve soil moisture retention E) Installing rainwater harvesting systems F) Implementing soil conservation measures (e.g., terracing) G) Utilizing organic farming methods to improve soil health and resilience H) Other (please specify)
6	What support have you received to address the challenges posed by climate change in your community?	A) Improved seed varieties B) Extension advice C) Financial support D) Training programs E) Irrigation facilities F) others

Section 6: Conflict Management and Impacts		
S/N	**Question**	**Responses**
1	Have you experienced any conflicts related to farming activities in the past year?	A) Yes B) No

2	If yes, please specify the sources of conflicts you have encountered (select all that apply)	A) Land disputes B) Water access conflicts C) Livestock grazing conflicts D) Resource-sharing disputes with neighbouring communities E) Conflict over crop damage caused by animals F) Ethnic or tribal conflicts G) Conflict with nomadic herders H) Other (please specify)
3	How frequently do conflicts related to farming activities occur in your community?	A) Rarely (once a year or less) B) Occasionally (2-4 times a year) C) Frequently (more than 4 times a year)
4	Have conflicts impacted your farming activities and food security?	A) Yes B) No
5	If yes, please describe the impacts of conflicts on your farming activities and food security (select all that apply)	A) Loss of crops or livestock B) Damage to agricultural infrastructure (e.g., irrigation systems, storage facilities) C) Displacement from farmlands or grazing areas D) Reduced access to water sources for irrigation or livestock E) Loss of income due to inability to sell farm products F) Food shortages or decreased food availability G) Increased food prices H) Limited access to markets for buying or selling agricultural products I) Increased reliance on external assistance or humanitarian aid J) Other (please specify)

6	What conflict management practices are commonly used in your community? (select all that apply)	A) Traditional dispute resolution mechanisms (e.g., community elders) B) Legal interventions (e.g., involving law enforcement or legal authorities) C) Dialogue and mediation between conflicting parties D) Community meetings or forums to discuss and resolve conflicts E) Conflict resolution training or workshops F) Other (please specify)

Section 7. Technology Adoption and Needs Assessment		
1	Are you familiar with hydroponic (soilless) farming systems?	A) Yes B) No
2	Have you ever received training or information on hydroponic (soilless) farming techniques?	A) Yes B) No
3	Would you be interested in learning hydroponic (soilless) farming?	A) Yes B) No
4	What is your level of interest in adopting hydroponic (soilless) farming practices?	A) Very interested B) Somewhat interested C) Neutral D) Not very interested E) Not interested at all
5	What challenges do you foresee in implementing hydroponic (soilless) farming in your community? (select all that apply):	A) Lack of knowledge or training B) Limited access to resources (e.g., water, seeds, equipment) C) High initial investment costs D) Concerns about sustainability or environmental impact E) Cultural or social barriers F) Other (please specify)

6	What support or resources do you think would be most helpful for you to start or improve hydroponic (soilless) farming? (select all that apply):	A) Training and technical assistance B) Access to affordable hydroponic equipment and materials C) Financial assistance or grants D) Access to quality seeds or seedlings E) Infrastructure support (e.g., greenhouse construction) F) Marketing and business development support G) Access to water or irrigation systems H) Other (please specify)
7	Do you have access to suitable land or space for setting up a hydroponic (soilless) farming system?	A) Yes B) No C) Not sure

Section 8: Access to Resources and Participation in Decision-Making		
	Do you participate in community meetings or groups related to farming?	A) Yes B) No
	If yes, how often do you attend these meetings?	A) Regularly B) Occasionally C) Rarely
	Do you have access to credit facilities for farming?	A) Yes B) No
	If yes, have you ever taken a loan for agricultural purposes?	A) Yes B) No
	Do you have access to agricultural inputs (seeds, fertilizers, tools)?	A) Yes B) No
	If not, what are the main barriers to accessing these inputs?	A) Financial constraints B) Lack of availability C) Gender discrimination D) Other (please specify)

Section 9: Gender Disparities		
1	Do you believe that men and women have equal access to agricultural resources in your community?	A) Yes B) No
2	Do you think that women face more challenges than men in accessing agricultural resources and opportunities?	A) Yes B) No
3	Do you think women should participate in farming activities?	A) Yes B) No
4	In your opinion, how can gender equality in agriculture be improved in your community?	
Section 10: Influence of Cultural Norms and Legislations on Land Ownership		
1.	Do cultural norms influence land ownership practices in your community?	A) Yes B) No C) Not sure
2.	Does legislation in your region support equal land ownership rights for women?	A) Yes B) No C) Not sure
Section 11: Women's Membership in Farmers' Organizations/Cooperatives and Access to Opportunities, Products or Related Services		
1.	Are women in your community equally represented in farmers' organizations?	A) Yes B) No C) Not sure
2.	Do women have equal access to services provided by farmers' organizations?	A) Yes B) No C) Not sure
3.	Are women adequately represented in specific functions of the agricultural value chain in your community?	A) Yes B) No C) Not sure
4.	Do gender stereotypes limit the opportunities for women in the agricultural value chain?	A) Yes B) No C) Not sure

5.	Do women receive equal benefits from participating in the agricultural value chain?	A) Yes B) No C) Not sure
6.	Do women receive fair valuation and remuneration for their contributions in the value chain?	A) Yes B) No
7.	Does the inclusion of women in the value chain improve product quality and productivity?	A) Yes B) No C) Not sure