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FINAL REPORT

NEEDS ASSESSMENT CONSULTANCY

‘INTRODUCING SUSTAINABLE FARMING TO PROMOTE CLIMATE RESILIENCE AMONG SMALLHOLDER FARMERS PROJECT’

Submitted to:

Archie Hinchcliffe Disability Intervention

Prepared by:

Dr. Progress H. Nyanga and Muchimba Syamwalu

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Authors: Dr. Progress Hanzwida Nyanga and Mr. Muchimba Mukuwa Syamwalu.

Disclaimer

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Executive Summary

Climate-smart agricultural knowledge and resilient farming practices are critical for strengthening smallholder farmers' livelihoods in Zambia. To support this, Archie Hinchcliffe Disability Intervention (AHDI), a local NGO with over 32 years of experience supporting children with disabilities, conducted a study to assess the training needs and preferences of smallholder farmers, including youth, women, persons with disabilities, and households caring for children with disabilities. The study was conducted in Chifwema and Malundu Wards of Kafue District, where AHDI provides home-based education, and also provided baseline data to guide a two-year project titled "Introducing Sustainable Farming to Promote Climate Resilience Among Smallholder Farmers," implemented with support from GIZ under the International Climate Initiative.

Methodology

The study employed a mixed-methods design, starting with a literature review of Ministry of Agriculture strategic plans, national agricultural policy documents, international reports (Food Agriculture Organisation, United Nations Development Programme, World Bank, World Food Programme), and relevant academic literature. Field research included a household survey with 318 respondents across Chifwema (Chilambila, Nankanga, Old Kabweza) and Malundu (Chipapa) wards. Qualitative data were collected through 13 Key Informant Interviews (KIIs) with government extension officers, lead farmers, and traditional and civic leaders, and 10 Focus Group Discussions (FGDs) with youth, women, and persons with disabilities. Purposive, snowball, and stratified purposive sampling techniques were used to ensure representation and inclusivity. Quantitative data were collected using Kobo Toolbox Collect and analysed with descriptive statistics in Excel. Qualitative data were analysed thematically.

Results

Training needs: The study found that 45.3 percent of respondents had previously received training on climate-resilient sustainable farming practices, with slightly higher participation among males (50.4 %) than females (42.1%). Government extension officers were the main providers of training, followed by cooperatives. Livestock integration, conservation agriculture, and soil erosion prevention were the most prioritised topics. Other key areas included agroforestry, waste recycling, integrated pest management, rainwater harvesting, use of climate-resilient crop varieties, and post-harvest handling. Technical and business-oriented skills such as use of technology, marketing, financial management, and value addition were also noted, alongside cooperative-based resource sharing and village banking. Females prioritised climate-resilient farming practices, while males highlighted technical and business skills such as financial management, marketing, and cooperative-based resource sharing.

Training preferences: Field demonstrations were the most preferred training method (59%), followed by farmer-to-farmer exchanges (47%) and one-on-one mentorship (45%). Males favoured practical demonstrations, while females preferred hybrid approaches combining practical and theoretical methods. Trainings were mostly preferred on workdays (64%), in the morning

(60%), weekly (61%), and conducted at demo plots (50%). The preferred training languages were Nyanja and Tonga. Government extension officers were the preferred facilitators, though a third were comfortable with any facilitator. Small group sizes of 5–10 participants were favoured, with some females preferring women-only or disability-inclusive groups.

Recommendations

Firstly, project team, extension officers and lead farmers should ensure that agriculture and livelihood skills training are balanced by alternating agronomy-focused weeks with livelihood-focused weeks, supported by real farm data and cooperative-led market linkages.

Secondly, project implementers and all partners must apply gender-responsive approaches, including household sensitisation, mid-morning schedules, childcare support, and regular women-only learning groups.

Thirdly, training delivery should be highly participatory through monthly field demonstrations, demonstration plots, mentorship visits, and farmer field schools.

Fourthly, a blended approach using weekly radio messages, social media, and SMS reminders should reinforce in-person learning and provide timely alerts.

Fifthly, training sessions should be organised in small local-language groups of 10–15 participants, scheduled in advance, with attendance tracking to ensure inclusive and effective participation.

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List of Acronyms

AHDI	Archie Hinchliffe Disability Intervention
CBR	Community Based Rehabilitation
CSA	Climate-Smart Agriculture
FAO	Food Agriculture Organization
FFS	Farmers Field Schools
FGD	Focus Group Discussion
GIZ	Deutsche Gesellschaft fur Internationale Zusammenarbeit (German Society for International Cooperation)
HRBA	Human Rights-Based Approach
ICT	Information Communication Technology
KII	Key Informant Interviews
MEL	Monitoring Evaluation and Learning
MoA	Ministry of Agriculture
MoLF	Ministry of Livestock and Fisheries
NAP	National Agricultural Policy
NGO	Non-Governmental Organization
PwDs	Persons with Disabilities
UNDP	United Nations Development Programme
WB	World Bank
WFP	World Food Programme
ZCSAIP	Zambia Climate-Smart Agriculture Investment Plan
ZIAMIS	Zambia Integrated Agriculture Information Management System

1.0 Introduction

1.1 Background

Archie Hinchcliffe Disability Intervention (AHDI) is a local Non-Governmental Organisation (NGO) working with children with disabilities for 32 years now. In partnership with government and other organisations, AHDI provides early intervention to children with disabilities through physiotherapy and home- based education. AHDI has a holistic approach towards service delivery, guided by the Community Based Rehabilitation (CBR) Matrix.

To contribute to sustainable and inclusive development, AHDI is implementing a two-year project titled, "Introducing Sustainable Farming to Promote Climate Resilience Among Smallholder Farmers." The project which is complementary to the efforts of the Ministry of Agriculture (MoA), aims to increase resilience and livelihoods of farmers by promoting sustainable agricultural methods, fostering their active engagement and empowerment in adapting to climate change. The project approach is built upon four foundational pillars namely, Capacity Building on Sustainable Agricultural Techniques and Climate Adaptation Strategies, Implementing Climate Resilient Small-holder Farms, Establishing Smallholder Farmer-led Support groups, and Weather Forecasting Resilience.

AHDI is implementing the project with support from GIZ, specifically under the International Climate Initiative department.

1.2 Purpose and Scope of Study

The purpose for this study was to identify the training needs and preferences of smallholder farmers, including women and men (particularly those with children with disabilities), youths, and persons with disabilities, in Chifwema and Malundu Wards of Kafue District, where AHDI is currently providing home-based education. The assessment also generated baseline data that will inform and guide the implementation of the two-year project.

1.3 Study Objectives

The study objectives were to review existing policies related to agriculture and recent sector trends and to identify the training needs and preferences of youth farmers, women farmers, persons with disabilities, and men and women living with a person with a disability.

1.4 Study Site

The study was conducted in Chifwema and Malundu wards of Kafue District. Specifically, the study took place in Chilambila, Nankanga, and Old Kabweza within Chifwema Ward, and Chipapa within Malundu Ward.

2.0 Literature review

2.1 Introduction

Sustainable farming has emerged as a cornerstone for enhancing climate resilience among smallholder farmers globally. Particularly in Zambia, farmers face interlinked challenges of declining soil fertility, erratic rainfall, and limited access to adaptive knowledge and technologies (Ngoma et., 2021). Therefore, training and capacity development are pivotal to enabling farmers adopt climate-smart agricultural (CSA) practices and strengthen their adaptive capacity (FAO, 2017; FAO, 2022).

2.2 Zambia's Policy Environment

Zambia's agricultural policy environment is increasingly focused on formalising farmer training and promoting various climate-smart farming practices. The Second National Agricultural Policy (NAP) emphasises resilience, commercialisation, and climate-smart approaches. It promotes sustainable resource management, climate adaptation measures such as water harvesting and agroforestry, and strengthened farmer training systems to boost productivity and food security (MoA & MoLF, 2016). Building on the NAP, the Ministry of Agriculture's Strategic Plan (2022–2026) prioritises value chain development, irrigation expansion, water harvesting, and climate-resilient farming (MoA, 2022). Recent strategic documents (2023–2024) reinforce commitments to expanding agricultural extension, improving training infrastructure, and integrating climate adaptation into curricula (MoA, 2024).

2.3 Training Needs

Findings across national and international literature show that farmers benefit most from targeted technical training in soil health management, conservation agriculture, and integrated pest management to increase the adoption of climate-smart practices (SIFAZ Project Reports, 2022). Similarly, the Zambia Climate-Smart Agriculture Investment Plan (CSAIP, 2019) identifies key interventions such as crop diversification, agroforestry, conservation agriculture, soil and water management, and post-harvest loss reduction. These interventions are effective in farmers capacity-building to enhance their mastery of resilient farming techniques and promote sustainable land and water use (World Bank, 2019).

Phiri et al. (2022) describe CSA practices, including stress-tolerant crop varieties, small-scale irrigation, integrated soil fertility management, and crop diversification, as essential for building climate resilience. Similarly, Chavula and Chipando (2023) highlight that conservation farming has produced measurable benefits among adopters, including improved soil fertility and higher maize yields. While the World Bank (2018) identifies three priority areas for climate risk management: strengthening early warning systems, promoting CSA and diversification, and developing responsive safety nets - all of which require strong farmer training and capacity development. In addition, other studies point to effective weather adaptation strategies as key training needs. The World Food Programme (2024) emphasizes that regular production,

interpretation, and communication of localised weather and climate information are critical for enabling communities to anticipate and respond effectively to climate shocks.

Furthermore, studies show that climate-resilience training should not focus solely on agronomic techniques but also on livelihood and business skills. The World Bank (2019) highlights the need to equip farmers with competencies in post-harvest management, value addition, and market linkages to strengthen both productivity and economic resilience. Likewise, FAO (2021) and Wiafe and Yona (2016) observe that soft skills such as communication, leadership, teamwork, and farm business management enhance innovation adoption and profitability, despite them remaining underdeveloped among smallholders.

2.4 Training preference

Farmer Field Schools (FFS**)** are recognised as an effective participatory approach for building farmer capacity in CSA. FFS combine hands-on learning, demonstration plots, and peer-to-peer exchanges, thereby improving adoption of conservation agriculture, drought-resistant crops, and improved water management practices (FAO, 2022). Regional studies further highlight the effectiveness of FFS. For example, Midva et al. (2024) found in South Africa that participation in FFS significantly improved livestock farmers' knowledge and perceptions of climate change. Similarly, Van den Berg et al. (2023) in Malawi demonstrated that strong monitoring, evaluation, and learning (MEL) frameworks enhanced FFS outcomes for food security and climate adaptation. In Tanzania, Mponela et al (2022) also showed that demonstration-based training, supported by local social networks, improved soil fertility management among smallholders. The training should integrate lead farmers and extension officers as facilitators to provide continuous mentoring and creation of opportunities for knowledge transfer, hence supporting both resilience and productivity among smallholder farmers (UNDP, 2025).

While face-to-face training remains the most preferred, literature suggests that combining it with digital tools, including radio broadcasts, SMS advisories, and WhatsApp groups - broadens outreach, especially for women and youth (Alamo et al., 2022; FAO, 2022). Initiatives in Zambia especially through the Zambia Integrated Agriculture Information Management System (ZIAMIS) has emerged as a central digital platform through which the MoA deliver targeted advisory services to farmers across the country. This integrated approach allows farmers to receive relevant guidance both in the field and through digital channels, thereby improving responsiveness to climate variability and crop management challenges (FAO 2025; Nalwimba 2024).

Regional evidence highlights the effectiveness of combining traditional extension methods with digital tools to enhance the adoption of climate-smart agricultural practices. In Kenya, Ongachi et al. (2017) found that integrating FFS with video-mediated learning led to higher adoption of Striga control technologies than either method alone. Similarly, Mdhema and Zwane (2022) documented low uptake of improved agro-ecological practices among farmers in Kenya and Tanzania, emphasizing the need for targeted, context-specific training interventions.

Complementing these findings, Ayim et al. (2020) observed that information communication technology (ICT) innovations have significant potential to extend agricultural advisory services across Africa, although adoption is often limited by infrastructure, policy, and capacity constraints. In line with this, the Rural Finance and Learning Centre (2024) cautions that digital inclusion remains uneven, and low-tech channels should be used alongside ICT-based delivery to ensure accessibility for all farmers.

2.5 Barriers to Effective Training

Effective capacity-building in agriculture requires approaches that address time constraints, literacy barriers, and cultural norms that may hinder participation. Training sessions that fail to consider women's domestic workloads or mobility limitations often result in low female attendance and unequal benefits (FAO, 2024). Similarly, low literacy levels highlight the need for participatory and visual learning methods, including demonstrations, role plays, and illustrative materials, to ensure comprehension and retention (FAO, 2024). Beyond these structural barriers, cultural and gender dynamics can further limit engagement, particularly when male-dominated facilitation discourages the active participation of women and youth (Yami et al., 2024). Therefore, integrating flexible scheduling, gender-balanced facilitation, and visual learning techniques has been shown to enhance learning outcomes across diverse farmer groups, thereby supporting more equitable and effective capacity-building initiatives (Gupta et al 2023; Reeves et al 2023; SE & Partners 2023).

2.6 Conclusion

Literature shows that Zambia's agricultural policy environment increasingly supports climate-smart agriculture through formalised training, resource management, and capacity-building initiatives. Effective farmer training must go beyond technical agronomic skills to include climate-resilient practices, weather adaptation strategies, and livelihood and business skills. Participatory approaches such as FFS, especially when combined with digital tools, have been shown to improve adoption of conservation agriculture, drought-tolerant crops, and improved water management practices. Regional evidence reinforces the value of blended conservation methods tailored to local contexts. However, barriers including time constraints, low literacy, cultural norms, and gender dynamics continue to limit participation, particularly for women and youth. Addressing these challenges through flexible scheduling, gender-balanced facilitation, and visual participatory learning techniques enhances inclusivity, comprehension, and retention, ultimately supporting more equitable and effective capacity-building initiatives.

3.0 Methodology

3.1 Research Approach

This study adopted a Human Rights-Based Approach (HRBA), that ensured that the rights of the women, youths and persons with disabilities were respected, protected and promoted. Accordingly, the methodology ensured the participation of key stakeholders in the promotion and usage of climate-resilient sustainable farming practices, with particular attention to persons with disabilities.

3.2 Research Design

The study employed a mixed-methods design, combining a desk-based review with empirical field research. This approach was adopted for two main reasons: first, to capture trends in the agriculture sector through documentary review; and second, to understand the lived experiences, perspectives, and needs of stakeholders in Chifwema and Malundu wards of Kafue district. This approach strengthened the validity of the findings and ensures that the recommendations are firmly grounded in both empirical evidence and the local needs of stakeholders.

3.3 Data Collection Methods

3.3.1 Desk Review

A structured desk review was conducted, drawing on:

- **Policy Documents**: includes the Ministry of Agriculture (MoA) strategic plan, and the Second national agricultural policy
- **International Organisation Reports:** includes reports from Food Agriculture Organisation (FAO), United Nations Development Programme (UNDP) Word Bank (WB), and World Food Programme (WFP)
- **Comparative and Academic Sources:** includes both local and regional studies.

The literature was systematically reviewed according to thematic categories, including policy environment, training needs and preferences of smallholder farmers, and the barriers associated with effective training implementation.

3.3.2 Field Research

Quantitative data was collected through a survey questionnaire, while qualitative data was collected through key informant interviews (KII), and focus group discussions (FGD). A total of 318 respondents participated in the survey questionnaire, and 13 KII and 10 FGDs were conducted.

Tables 1, 2 and 3 below shows the distribution of respondents for the survey questionnaire, KII and FGD respectively:

A total of 318 respondents out of the targeted 360 were interviewed using a survey questionnaire (Table 1).

Table 1: Distribution of respondents by ward and location

Ward	Location	Actual	Targeted
Chifwema	Chilambila	74	90
	Nankanga	73	90
	Old Kabweza	91	90
Malundu	Chipapa	80	90
Total		318	360

All the 13 targeted KIIs were conducted (Table 2).

Table 2: List of key informants interviewed

Sn	Key informant	Number interviewed
1	Government Local Authority (Councillors)	2
2	Government Extension Officers	3
3	Lead Farmers	4
4	Traditional Leaders (headmen/women)	4
5	Total	13

A total of 67 out of the targeted 96 respondents participated in the FGDs. The target comprised eight participants each from the youth, women and PwDs groups (Table 3).

Table 3: Distribution of focus group discussion participants by ward, location and group

Ward	Location	Group				
		Youth	Women	PwDs	Mixed (women and PwDs)	Total
Chifwema	Chilambila	8	7	5	-	20
	Nankanga	5	-	-	7	12
	Old Kabweza	8	-	-	6	14
Malundu	Chipapa	8	8	5	-	21
Total		29	15	10	13	67

3.4 Sampling

Purposive sampling was used for key informant interviews, while snowball sampling guided the selection of households with a youth farmer, a woman farmer, a farmer with a disability, or a household with a person with a disability. Stratified purposive sampling was used for FGDs to ensure spatial representation across villages.

3.5 Data Collection

Data collection was conducted by six data collectors, supervised in the field by an information technology specialist and statistician. The lead consultant provided technical oversight and real-time backstopping. Quantitative data was collected using Kobo Toolbox Collect, an Android-based

data collection app, while each focus group discussion was facilitated by a moderator and supported by a note-taker. One-on-one KII were recorded and later transcribed by the data collectors.

3.6 Data Analysis

The collected data was inputted into a Microsoft excel sheet and data analysis commenced immediately after the data cleaning exercise was done. The qualitative data was analysed thematically, while quantitative data was analysed using a pivotal table function in excel using basic statistics. Tables and figures were used to show the percentages and frequencies in the data variables.

3.7 Ethical Considerations

A participant was informed of their rights in participating in the survey which included the right of anonymity, the right to skip questions they were not comfortable answering and the right to excuse themselves from the interview at any time. The consulting team explained to participants the purpose of the evaluation and permission was taken before commencing an interview and/or recording the interview for transcription purposes.

3.8 Study Limitation

The study fell short by 42 and 27 respondents from the targeted 360 and 96 for the survey questionnaire and FGDs, respectively. Quantitative data collection was planned for one day in each of the four-study sites; however, due to time constraints, limited resources and the sparse distribution of households, the team only reached 249 respondents at first. To make up for the shortfall, additional time was allocated during the qualitative data collection phase, which increased the total number of respondents to 318. For the FGDs, the study engaged participants who were available at the convened venues. Consequently, to avoid smaller groups that could limit the diversity of discussion, the women and PwDs were combined where necessary.

Despite these limitations, triangulation across multiple data sources strengthened the validity of the findings.

4.0 Results

4.1 Social Demographics

4.1.1 Household and Individual Characteristics

A total of 318 households were interviewed for the survey. Of these, 38.1 percent were female-headed and 61.9 percent were male-headed households. With regard to the gender of respondents, females accounted the majority, representing 61.3 percent of the total sample. Furthermore, the average household size was 5.1 members, which is comparable to the national average of 4.8 persons per household -5.0 in rural and 4.6 in urban Zambia[1] (Table 4).

Table 4: Type of Household, Gender, Marital Status, Household Size and Level of Education

Variable	Measure	Chilambila (n=74)	Chipapa (n=80)	Nankanga (n=73)	Old Kabweza (n=91)	Overall (n=318)
Category of respondents	Youths	51.4	51.3	46.6	68.1	55.0
	Women	28.3	26.3	24.7	15.4	23.3
	Person with disability	13.5	5.0	13.7	9.9	10.4
	Man with a child with disability	5.4	9.6	9.6	3.3	6.9
	Woman with a child with disability	1.4	7.5	5.5	3.3	4.4
Sex of respondents	Female (%)	58.1	70.0	58.9	58.2	61.3
	Male (%)	41.9	30.0	41.1	41.8	38.7
Type of household	Female headed (%)	37.8	40.0	41.1	34.1	38.1
	Male headed (%)	62.2	60.0	58.9	65.9	61.9
Marital Status of respondent	Single (%)	16.2	16.2	16.4	17.6	16.7
	Married (%)	64.8	65.0	64.8	74.7	67.9
	Divorced (%)	12.2	3.8	6.9	6.6	7.2
	Widowed/Window (%)	6.8	15.0	11.0	1.1	8.2
Household size	Average	4.6	5.3	5.3	5.0	5.1
Level of education of respondent	No education (%)	10.8	11.3	15.1	9.9	11.6
	Primary (%)	60.8	47.5	63.0	56.0	56.6
	Secondary (%)	27.0	37.5	19.2	29.7	28.6
	Tertiary (%)	1.4	3.7	2.7	4.4	3.1

4.1.2 Livelihood Activities

The most common livelihood activity in the study sites was farming followed by small-scale business activities which included trading, charcoal burning, bricklaying and carpentry among others. Figure 1 below shows that crop farming representing 69.50 percent of the sample was the

[1] Zambia 2022 Census: https://www.zamstats.gov.zm/wp-content/uploads/2023/12/2022-Census-of-Population-and-Housing-Preliminary.pdf

dominant source of livelihood, followed by other income generating activities at 27.36 percent. While livestock rearing represented the smallest proposition of the sample at 3.14 percent.

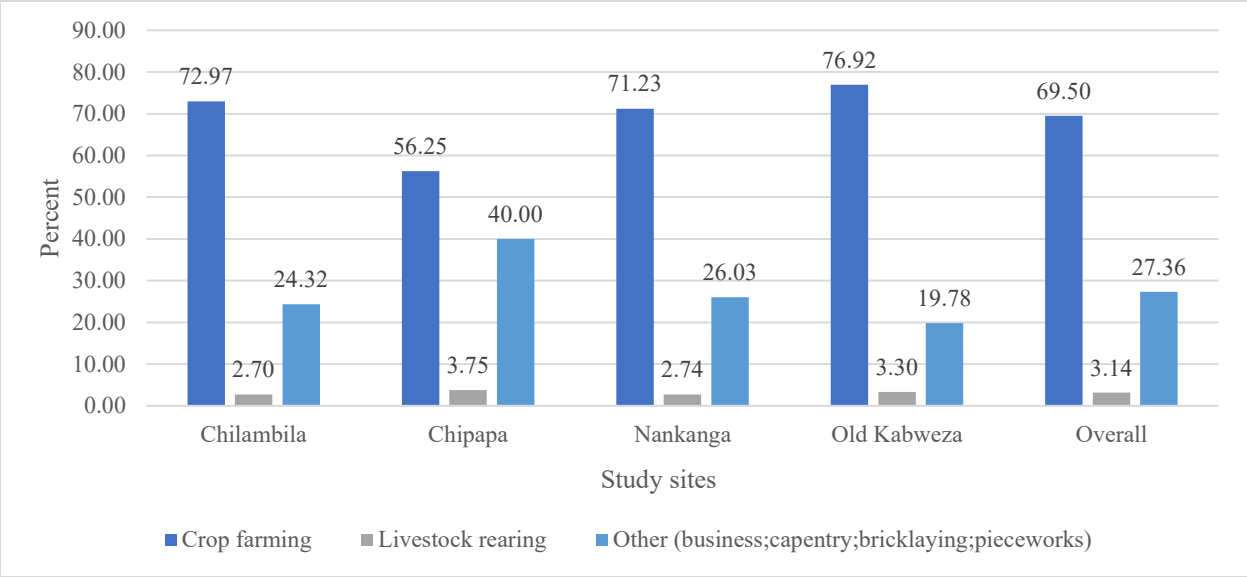

Figure 1: Source of livelihood in the study sites

In terms of gender, females were more engaged in small-scale business activities (32.30%) and livestock rearing (3.59%) compared to males (19.51% and 2.44%, respectively). However, a higher proportion of males (78.05%) were involved in crop farming compared to 64.1 percent of their female counterparts.

Regarding the question on farmland ownership, 93.7 percent of the respondents revealed that they owned the farmland they farm on, with an average land size of 2.3 hectares, ranging from 0.01 to 20 hectares. Among those who reported to own farmland, 84.62 percent were female and 89.43 percent were male. Furthermore, the average farming experience in years of the respondents was 9.4, ranging from 1 to 54 years.

4.1.3 Monthly Income

The overall average monthly income from the qualitative data was ZMW 896.43, which is 2.356 times lower than the rural average of ZMW 2112.2 and 3.841 times lower than the national average of ZMW 3442.90[2]. Within the sample, the minimum earned income was ZMW 100 and the maximum was ZMW 2,500.

The stakeholders revealed that household income is largely farming-dependent and highly seasonal**,** with limited access to regular cash income. Low education levels and lack of local business opportunities further increase vulnerability. As a stakeholder said:

[2] ZAMSTAT Living Conditions Monitoring Survey 2022: https://www.zamstats.gov.zm/average-household-income-by-rural-urban-zambia-2022-living-conditions-monitoring-survey

"Most people here are not educated, and they do not have regular jobs or monthly incomes. They rely entirely on farming for their livelihood. When the climate is favourable, they are able to produce more and even save food for the next season." *(Councillor, KII, 2025).*

Similarly, another stakeholder noted:

"On that one [household income] I am not really sure, but I have observed that people in my community are not educated… Only those working for the government or running licensed businesses earn a regular monthly income, and they are very few. People here only harvest more if there's good rainfall food which even reaches the next [farming] season." *(Village headwoman, KII, 2025).*

4.1.4 Phone Ownership, Internet Access and WhatsApp usage

The study showed that those who owned phones represented 86.48 percent of the sample, higher than the national percentage of 51.8 and those with internet access represented 20.44 percent of the sample, lower than the national percentage of 25.2[3]. While WhatsApp usage was 18.87 percent of the sample. Among the females, 84.62 percent, 13.30 percent and 12.31 percent owned phones, had internet access and used WhatsApp respectively. For the males, 89.43 percent owned phones, 31.71 percent had internet access and 29.27 percent used WhatsApp.

Figure 2 shows that Chipapa had more people who owned phones (93.75%), had internet access (36.25%) and used WhatsApp (33.75%) compared to Chilambila, Nankanga and Old Kabweza.

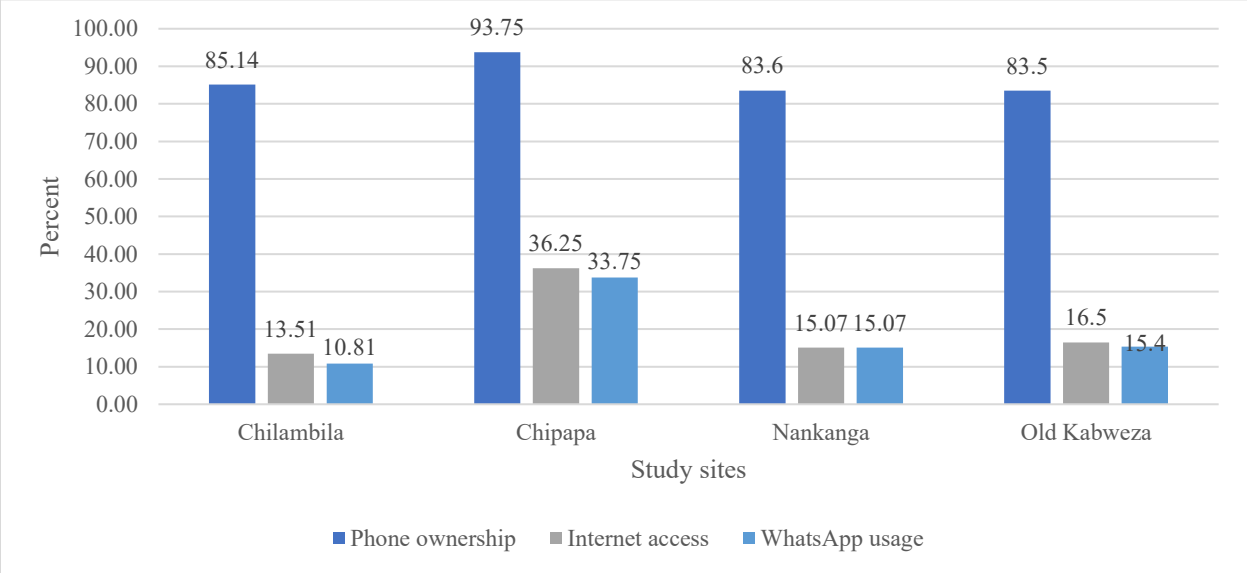

Figure 2: Mobile phone ownership, internet access and WhatsApp usage by study site

[3] ZICTA: 2022 national survey on access and usage of information and communication technologies by households and individuals: https://www.zicta.zm/2022_report.pdf

4.1.5 Disability Profile

The survey revealed that 79 of the 318 households interviewed had at least one member with a disability. Distribution of the houses with at least a member with disability across the study sites was as follows: Chilambila (20 households), Chipapa (25 households), Nankanga (19 households), and Old Kabweza (15 households). Regarding the number of household members with disabilities, 72 households reported one member, six households reported two members, and one household reported three members.

4.1.5.1 Gender and Type Disabilities

Of the 87 persons with disabilities (PwDs), 41.38 percent were females. Chilambila had the highest proportion of females with disabilities at 57.14 percent, while Old Kabweza had the highest male proportion at 70.59 percent (Table 5).

Table 5: Gender of the persons with disabilities by study site

Gender	Chilambila (n=21)	Chipapa (n=28)	Nankanga (n=21)	Old Kabweza (n=17)
Female (%)	57.14	35.71	42.86	29.41
Male (%)	42.86	64.29	57.14	70.59

In terms of types of disabilities, physical disability was the most prevalent, accounting for 55.17 percent of the sample. Intellectual and speech disabilities each accounted for 16.09 percent, while hearing and visual disabilities accounted for 14.94 percent each. Chilambila showed variability in disabilities with 47.62 percent with physical disabilities, 33.33 percent with speech disability and 23.81 percent each with hearing and intellectual disability (Figure 3).

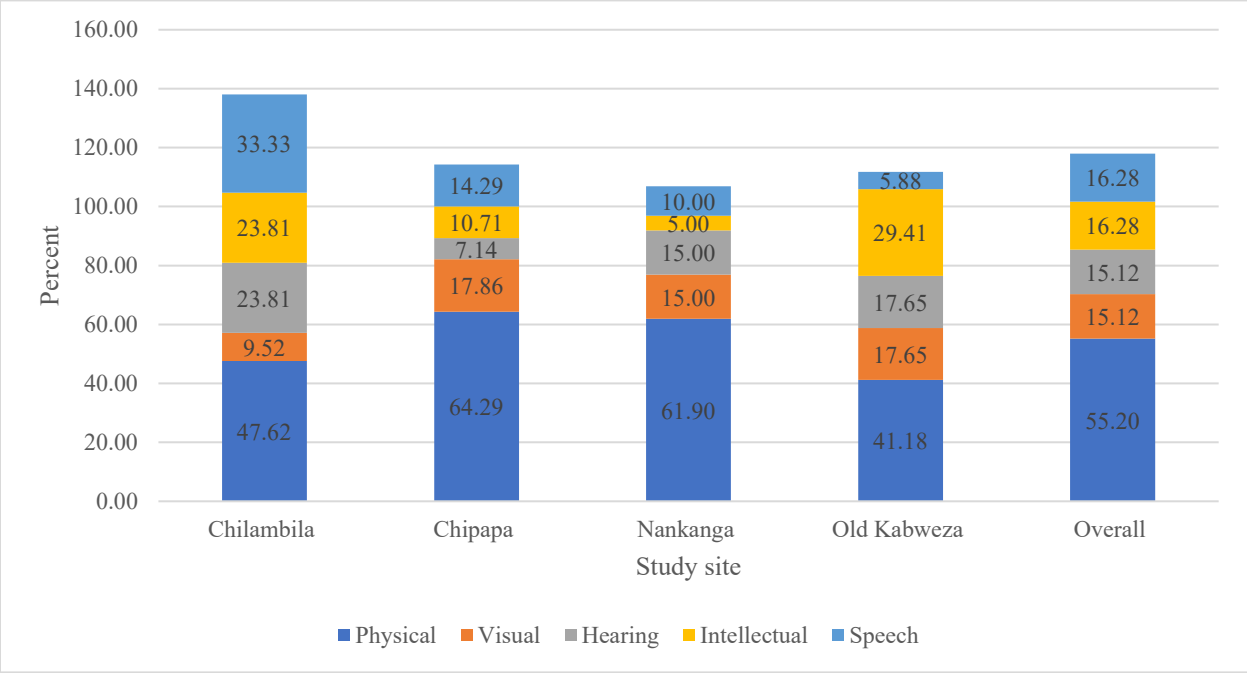

Figure 3: Type of disabilities by study sites

4.1.5.2 Participation in Farming Activities

Of the 87 PwDs, 46 were above 19 years and 30 reported participating in farming activities, which included 13 females and 17 males. Table 6 shows that seven of the 13 females engaged in farming had a physical disability and one had both physical and visual disability. While 11 of the 17 males engaged in farming had physical disabilities and four had a hearing disability.

Table 6: Type of disability and gender participating in farming activities

Sn	Type of disability	Female	Male
1	Hearing	2	4
2	Physical	7	11
3	Speech	2	1
4	Visual	1	1
5	Physical and Visual	1	0
6	Total	13	17

The results from the FGDs revealed mixed perceptions regarding the encouragement of PwDs who engage in farming. Some participants described an environment of respect and assistance, while others highlighted low levels of support and inclusion. A participant with mixed perception stated:

"They are discouraged, although some are encouraged; they separate the maize grain from the cob due to their physical inability." *(FGD participant, 2025).*

A participant with a negative perception stated:

"PwDs are not encouraged, but everyone else - regardless of age, as long as they are farming and physically able - are supported and encouraged, but not those with a disability." *(FGD participant, 2025).*

A participant with a positive perception stated:

"The community really respects PwDs; there is no stigmatised. They are treated well, and sometimes helped by youths to farm." *(FGD participant, 2025).*

4.2 Current Knowledge and Practice of Climate-Resilient Sustainable Farming

4.2.1 Major Climate Risk and Mitigation Strategies

Droughts and dry spells were the major climate risk identified, representing 95.28 percent of the sample. Followed by floods and stormy winds each at 1.26 percent and, extreme hotness at 0.94 percent of the sample. The stakeholders posited that drought and unpredictable rainfall had severely disrupted farming activities in the area, hence increased pest prevalence, food insecurity, economic hardships and heightened vulnerability among households.

"In this area, we have not experienced flooding because the land is hilly. However, soil erosion is a major problem since most of the cultivated fields are on slopes, making it difficult to prevent erosion. Drought is also a serious challenge, especially last season when we experienced severe

dry conditions. In addition, termites and armyworms frequently affect farmers, and many struggles to access the necessary chemicals for spraying." *(Village headman, KII, 2025)*

"The drought has greatly affected our farming [activities]. We are unable to cultivate because there is no water in the area, and even our animals lack water to drink. It has really been a serious challenge." *(FGD participant, 2025)*

"Climate change has affected our farming activities, especially through droughts. Our crops do not grow well - some dry up - and we experience reduced harvests during these periods. We also face increased pest attacks on our crops during droughts." *(FGD participant, 2025)*

In terms of the current climate mitigation strategies, 48 percent indicated that they do not apply any; 22 percent indicated early planting and early field preparation; 15 percent use resilient seed varieties; 6 percent rely on manual or solar irrigation; 4 percent practice crop rotation; 3 percent engage in soil and crop management; and 2 % fetch water and/or relocate animals to water points. Figure 4 shows that more (58%) females did not practice any climate-resilient mitigation strategy compared to males.

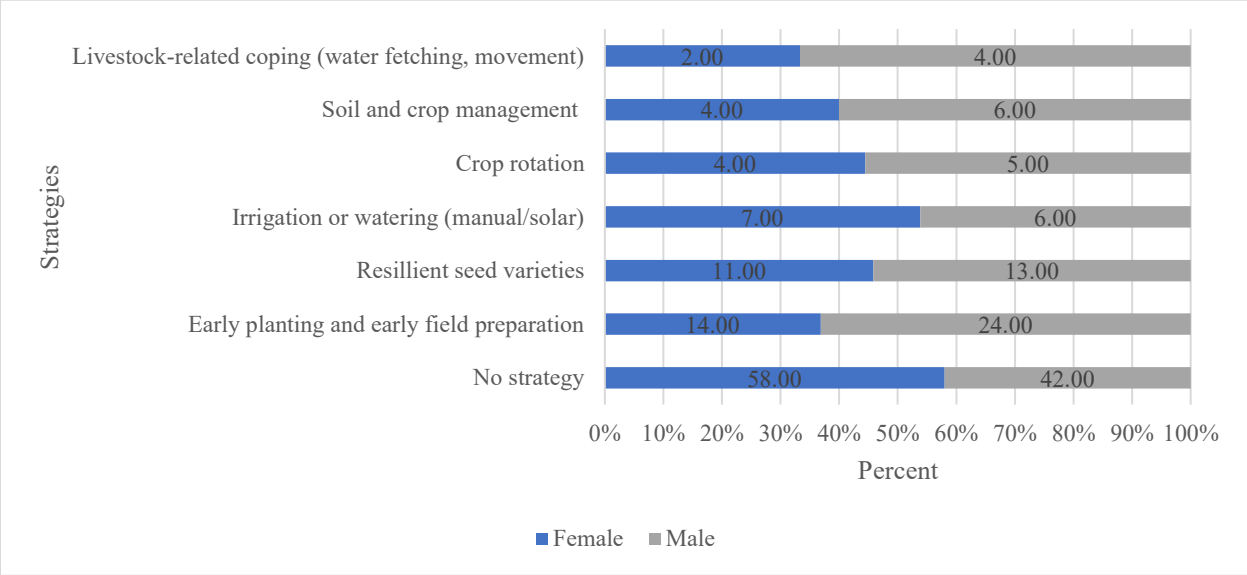

Figure 4: Climate-resilient mitigation strategies by gender

4.2.2 Awareness and Practice of Climate-Resilient Sustainable Farming Practices

The survey results showed that 57.55 percent of the sample had received some information on climate-resilient sustainable farming practices. Of the female and male respondents, 51.79 and 66.67 percent respectively indicated to have received such information. In terms of the entity which provided the information, 52.49 percent cited government extension officers, followed by cooperatives (46.09%) and lastly, social media and research institutions such as universities or colleges each at 2.19 percent (Figure 5).

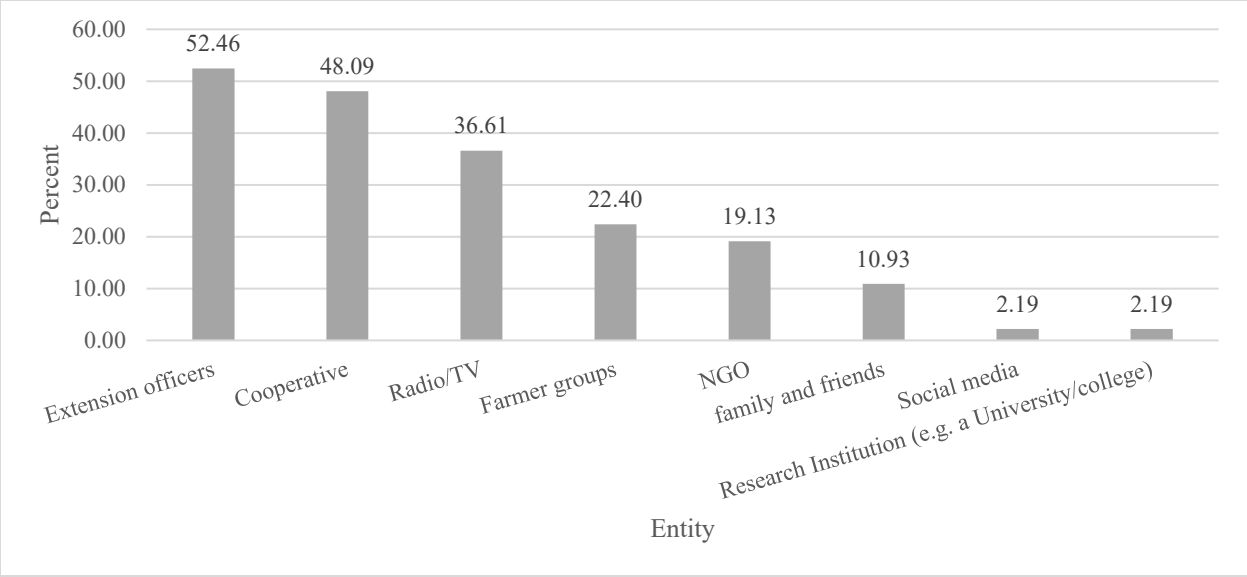

Figure 5: Entity that provided information on sustainable farming practices

Stakeholders suggested that adoption levels among smallholder farmers was moderate and that awareness of climate-resilient sustainable farming practices did not necessarily result into adoption.

"The level of adoption is medium because farmers do not immediately apply what they are taught. They tend to try new practices only after observing another farmer doing it, and if it works for them, they will give it a try themselves." *(Extension officer, KII, 2025)*

"In terms of gender, men are adopting more than women, youths and people with disabilities." *(Extension officer, KII, 2025).*

Furthermore, Table 7 presents respondents' knowledge and use of various climate-resilient sustainable farming practices, categorised as those known and used, not known, and known but not used. The practices are arranged in descending order, beginning with those widely known and used. Consequently, the results showed that the use of indigenous seeds (57.86%) was the most commonly known and used sustainable farming method, followed by the use of organic fertilizers (50.63%) and intercropping (49.06%). Conversely, sustainable fisheries practices were largely unknown to respondents (51.26%), while the use of renewable energy in agriculture, though relatively well-known (62.26%), was reported as one of the least used methods.

Table 7: Current knowledge level and rate of utilisation of climate-resilient sustainable farming practice

Sn	Sustainable farming practices	I know and use		I do not know		I know, but not use	
		Count	%	Count	%	Count	%
1	Use of indigenous/local seed varieties	184	57.86	80	25.16	54	16.98
2	Organic fertilizer/compost or manure use	161	50.63	54	16.98	103	32.39
3	Intercropping	156	49.06	35	11.01	125	39.31
4	Preservation of soil erosion (terracing, contour ridges, mulching)	148	46.54	72	22.64	98	30.82
5	Crop rotation	147	46.23	22	6.92	149	46.86
6	Conservation agriculture (cover crops, residue retention etc)	144	45.28	78	24.53	96	30.19
7	Livestock integration	132	41.51	92	28.93	94	29.56
8	Use of drought-tolerant or climate-resilient crop varieties	113	35.53	119	37.42	86	27.04
9	Integrated pest management	94	29.56	148	46.54	76	23.90
10	Waste recycling and reuse (e.g., crop residues, biogas, composting)	42	13.21	160	50.31	116	36.48
11	Agroforestry (integration of trees/shrubs with crops)	37	11.64	135	42.45	146	45.91
12	Rainy water harvesting	27	8.49	147	46.23	144	45.28
13	Use of renewable energy in agriculture (e.g., solar pumps, dryers)	19	5.97	101	31.76	198	62.26
14	Sustainable fisheries or aquaculture practices	13	4.09	163	51.26	142	44.65

In addition, the results from the lead farmers and extension officers showed that they promote a range of climate-resilient sustainable farming practices, with conservation agriculture and crop rotation being the most common.

“The sustainable agriculture practices that I currently promote and use include conservation farming, crop rotation, organic fertilizers or compost manure, and drought-tolerant or climate-resilient crop varieties, However, our main challenge is accessing water from the ground, as boreholes in this community often run dry. In addition, the soil in our area is not very suitable for many of the sustainable farming methods.” *(Lead farmer, KII, 2025).*

“We are promoting a lot of things some which include conservation agriculture, crop rotation, use different type of manure, agroforestry and integrated pest management among others.” *(Extension officer, KII, 2025)*.

In terms of gender distribution in knowledge and adoption of sustainable farming practices, Figure 6 below shows that the levels of knowledge and practice are largely comparable between the genders, with slight variations across specific practices. For instance, males reported higher

adoption in livestock integration (47.15% compared to 37.95%), preservation of soil erosion (51.22% compared to 43.59%), and conservation agriculture (52.03% compared to 41.03%). Conversely, females reported higher adoption in waste recycling and reuse (15.9% compared to 8.94%), use of indigenous seeds (58.46% compared to 56.94%), and intercropping (49.74% compared to 47.97%).

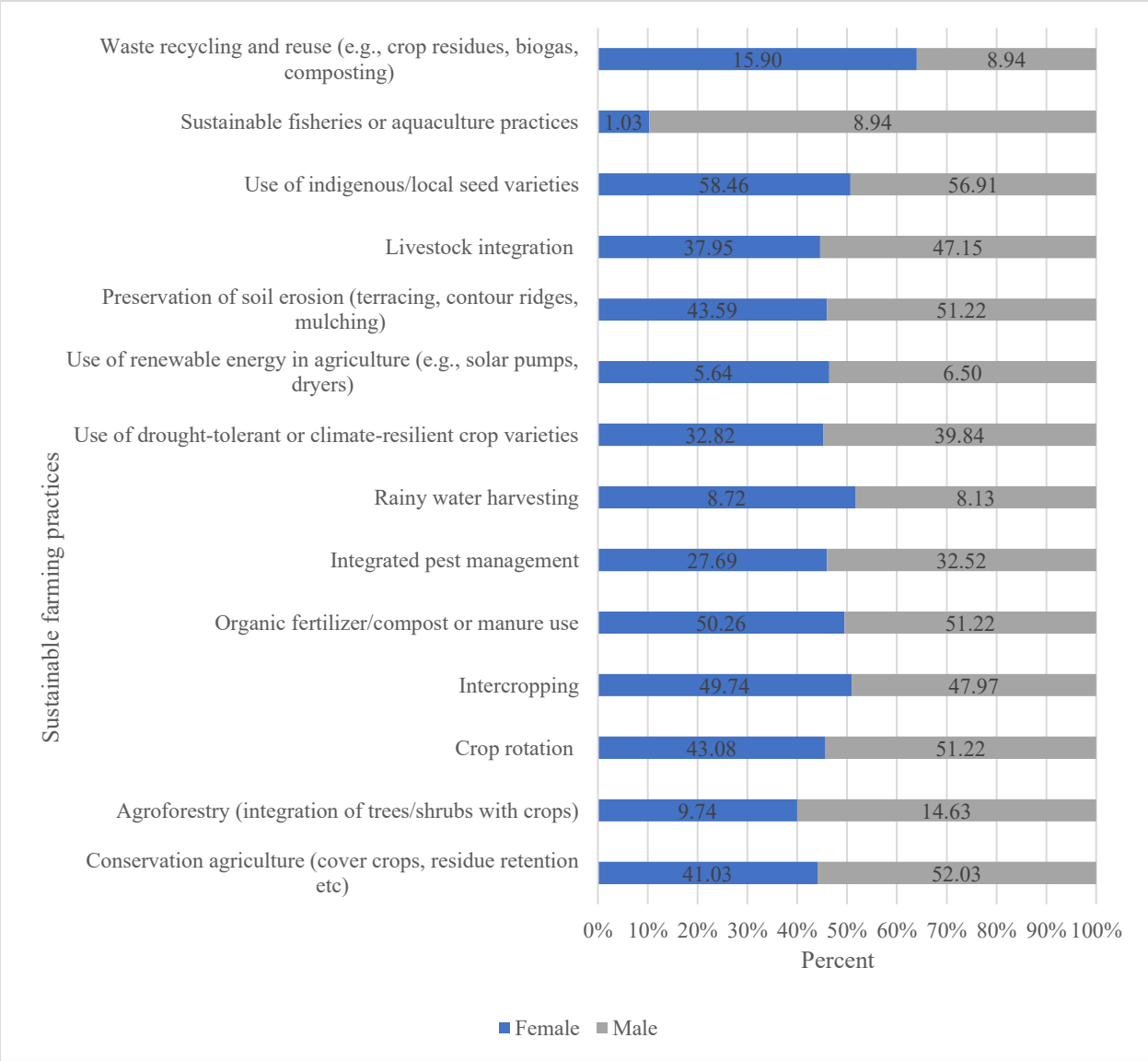

Figure 6: Climate-resilient sustainable farming practices known and practiced by gender

4.2.3 Current Challenges in Adoption of Climate-Resilient Sustainable Farming Practices

The overall results showed that lack of resources (92.77%) was the primary barrier to adoption of sustainable farming practices, followed by insufficient knowledge at 59.12 percent and social and culture barriers, including gender dynamics and disabilities-related factors at 6.92 percent (Figure 7). While the results by gender showed minimal differences, with 94.31 percent of females and 91.79 percent of males citing lack of resources as a major barrier to adoption (Figure 8).

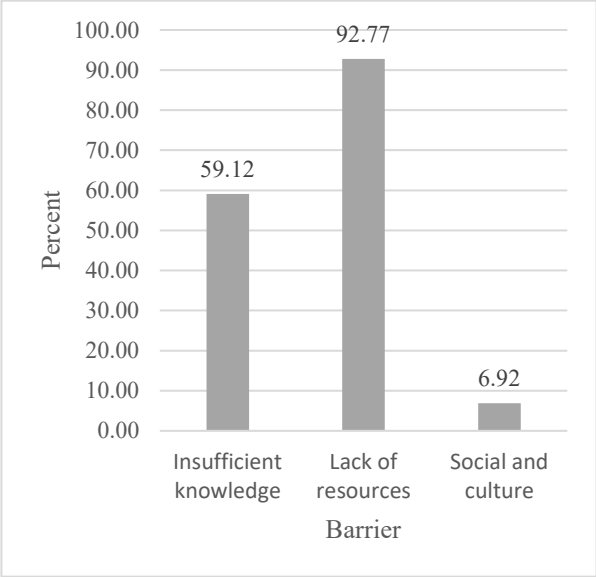

Figure 7: Barriers to adoption of sustainable farming practices

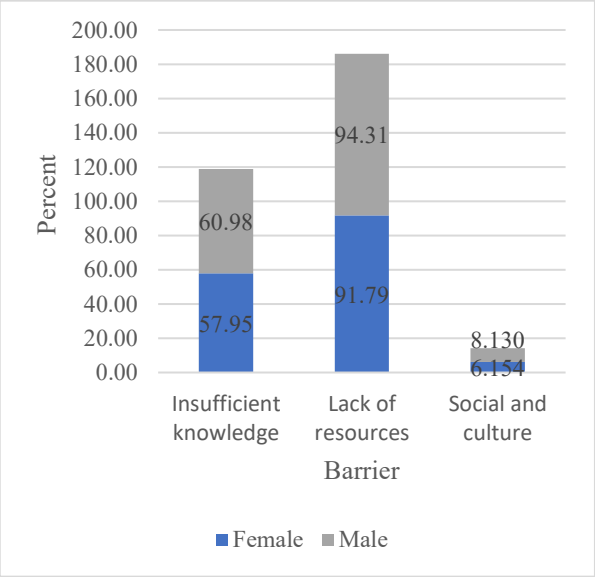

Figure 8: Barriers to adoption of sustainable farming practices by gender

According to stakeholders, challenges in adopting climate-resilient sustainable farming practices are primarily linked to gender and cultural norms, limited knowledge, and financial constraints. For instance, one stakeholder said:

"Most women in this area are under their husbands' authority, and men may be reluctant to adopt new farming methods. In addition, women have to manage household responsibilities and navigate a male-dominated environment." *(Village headman, KII, 2025)*

"Illiteracy is a significant barrier, particularly among women, as they are often hesitant to adopt new practices and tend to follow their husbands' decisions. This is partly because men in this area are generally more educated than women." *(Extension officer, KII, 2025).*

"The main barriers include lack of resources, such as farming equipment and money; cultural norms; land preparation challenges; household responsibilities, which often fall unevenly on women; limited knowledge about the practices; and financial constraints, which are considered the most significant obstacle." *(Councillor, KII, 2025).*

4.3 Training Needs

The survey results showed that 45.28 percent of the sample had received some training on climate-resilient sustainable farming practices. Of the female and male respondents, 42.05 and 50.41 percent respectively indicated to have received such trainings. In terms of the entity which provided the trainings, 61.11 percent of the respondents who received trainings cited government extension officers, followed by cooperatives (55.56%) and lastly, research institutions such as universities or colleges at 0.69 percent (Figure 9).

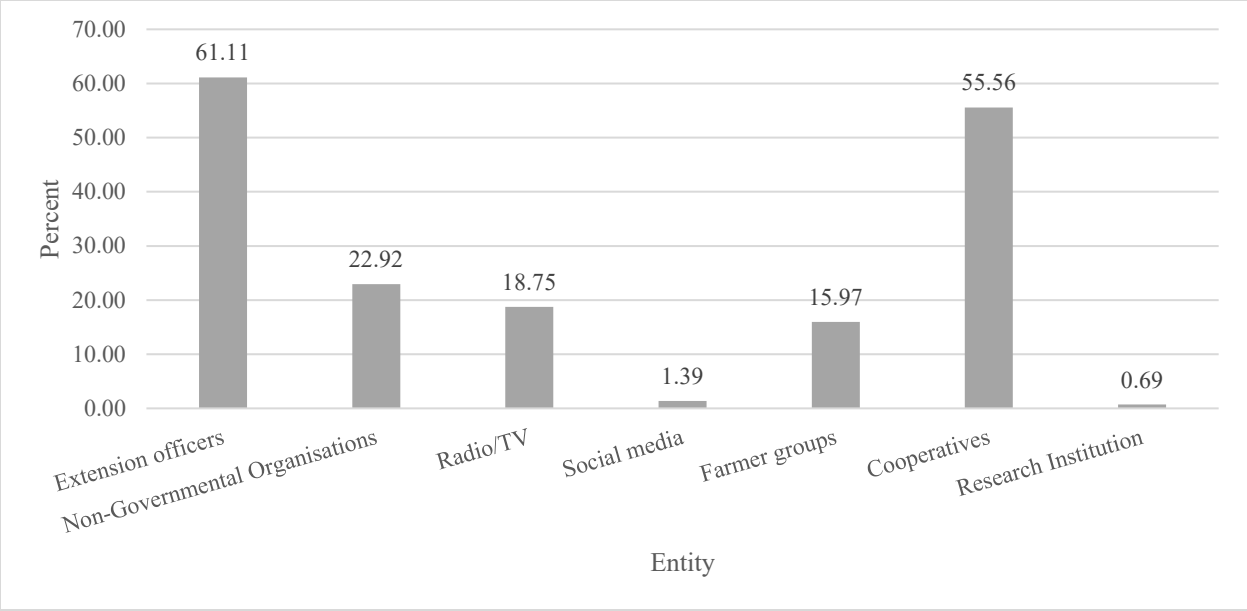

Figure 9: Entity that provided training in sustainable farming practices

4.3.1 Training Needs by Topic

The respondents identified the topics showed in Table 8 as the most relevant to them, with the table presenting these topics ranked in order of their perceived need. Livestock integration (61.95%) was the most relevant topic to the respondents followed by conservation agriculture and preservation of soil erosion each at 59.75 percent. The respondents also identified technical skills, such as use of technology and digital tools in farming (48.43%), post-harvesting handling (46.54%), marketing, value chains, and agribusiness skills (38.68%), record keeping and financial management (36.79%) and value addition (31.76%). Additionally, some soft skills such as cooperative based resource sharing (42.45%) and village banking (34.28%) were also identified.

Table 8: Identified training topic needs

Sn	Topics	Count	Percent
1	Livestock integration	197	61.95
2	Conservation agriculture (cover crops, residue retention etc.)	190	59.75
3	Preservation of soil erosion (terracing, contour ridges, mulching)	190	59.75
4	Agroforestry (integration of trees/shrubs with crops)	180	56.60
5	Waste recycling and reuse (e.g., crop residues, biogas, composting)	179	56.29
6	Integrated pest management	171	53.77
7	Rainwater harvesting and small-scale irrigation	166	52.20
8	Use of drought-tolerant or climate-resilient crop varieties	159	50.00
9	Use of technology and digital tools in farming (weather information, etc.)	154	48.43
10	Crop rotation	153	48.11
11	Post-harvest handling	148	46.54
12	Aquaculture (fish farming and pond management)	141	44.34
13	Cooperative-based resource sharing	135	42.45
14	Use of indigenous/local seed varieties	134	42.14
15	Use of renewable energy in agriculture (e.g., solar pumps, dryers)	129	40.57
16	Apiculture (beekeeping production and management)	125	39.31
17	Intercropping	124	38.99
18	Marketing, value chains, and agribusiness skills	123	38.68
19	Record keeping and financial management	117	36.79
20	Village banking	109	34.28
21	Value addition	101	31.76

The results on training needs by gender showed that male respondents were relatively more interested in technical and business oriented agricultural topics compared to their female counterparts who were more interested in climate-resilient sustainable farming focused topics. For instance, 41.62 percent of male respondents compared to 33.85 percent of female respondents identified record keeping and financial management, similarly 42.28 percent compared to 36.41 percent of male and female respondents respectively, identified marketing, value chains and agribusiness skills as relevant topics. Furthermore, 43.07 percent of male respondents (compared to 42.05% female respondents) identified cooperative-based resource sharing as a relevant topic. Regarding climate-resilient sustainable farming focused topics, most female respondents identified preservation of soil erosion (64.10% compared to 52.85 % of male respondents), conservation agriculture (62.56 % compared to 55.28 % of male respondents) and agroforestry (59.49% compared to 52.03% of male respondents) as the top three relevant topics (Figure 10).

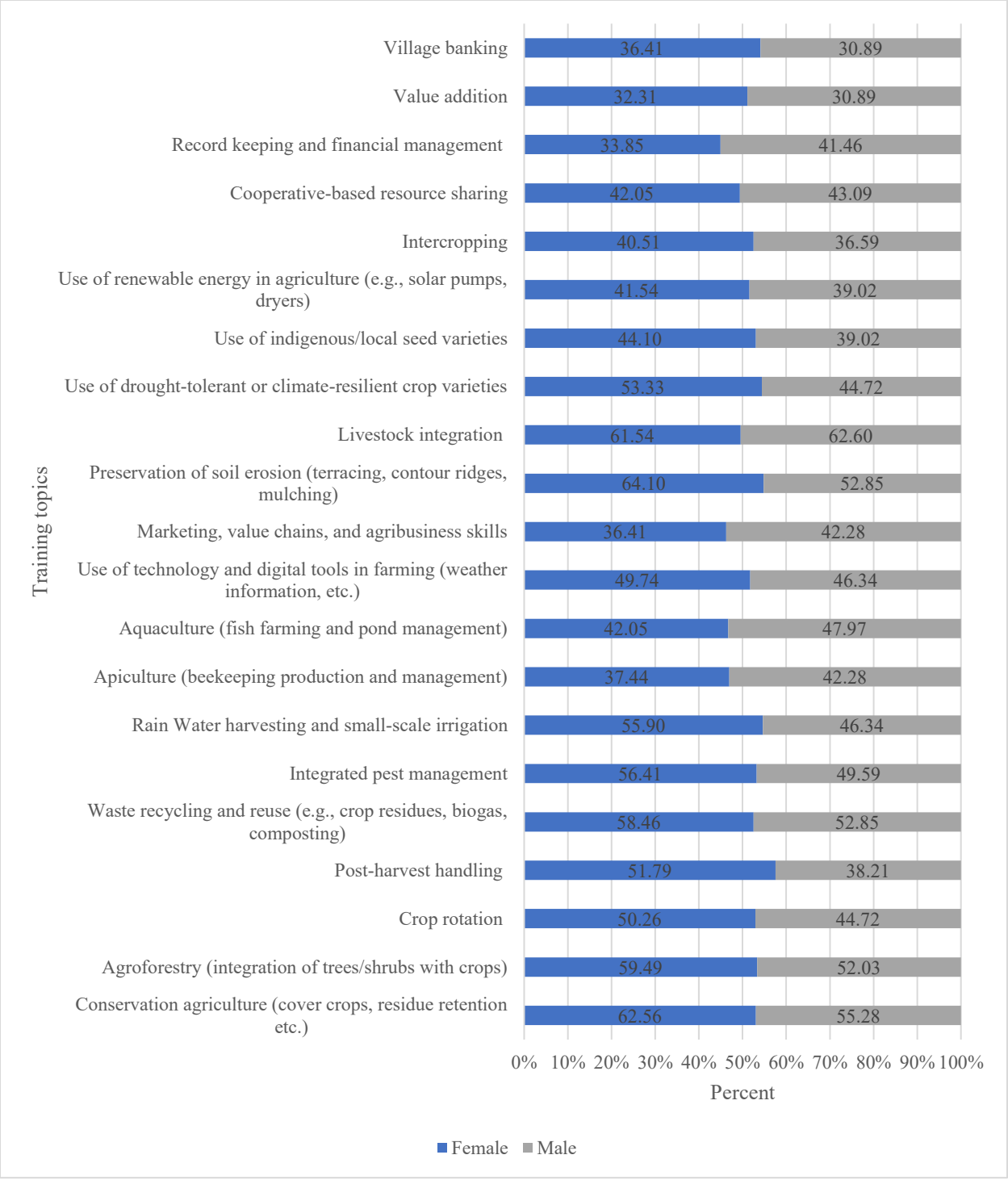

Figure 10: Training topic needs by gender

4.4 Training Preferences

4.4.1 Preferred Delivery Mode

Figure 11 shows that field demonstration (59.12%) was the most preferred training delivery mode followed by farmer-to-farmer exchange visits at 46.54 percent and one-on-one mentorship at 44.97 percent.

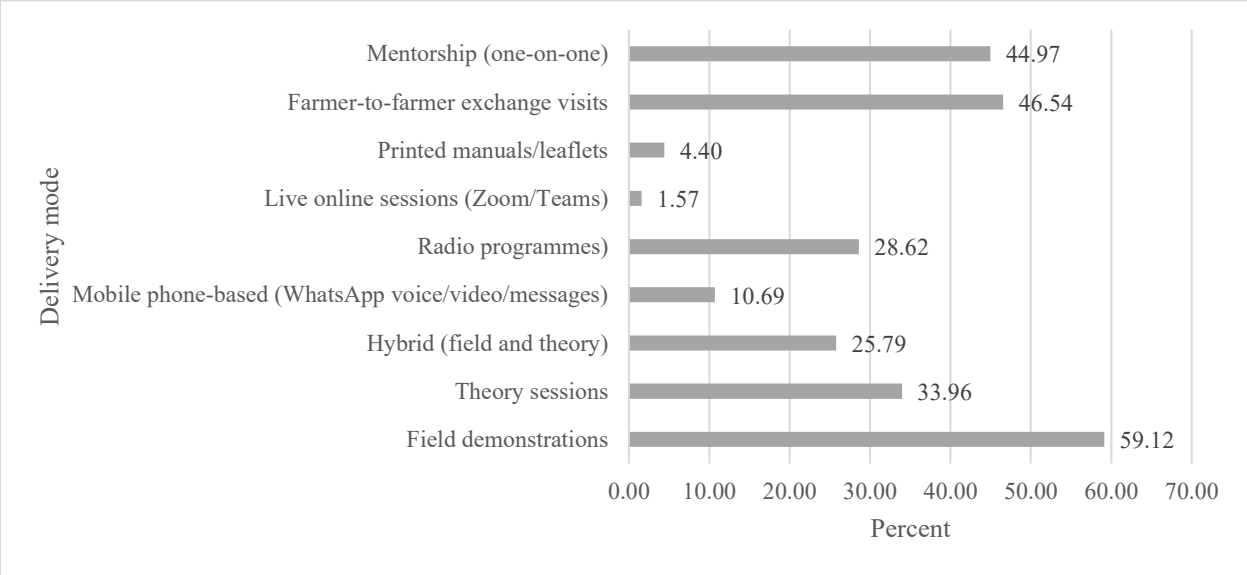

Figure 11: Preferred training delivery mode

In terms of preferred training delivery modes by gender, Figure 12 shows that more males (70.73%) than females (51.79%) preferred field demonstrations. Conversely, more females (29.74%) compared to males (19.51%) preferred a hybrid approach that combines both field-based and theoretical training.

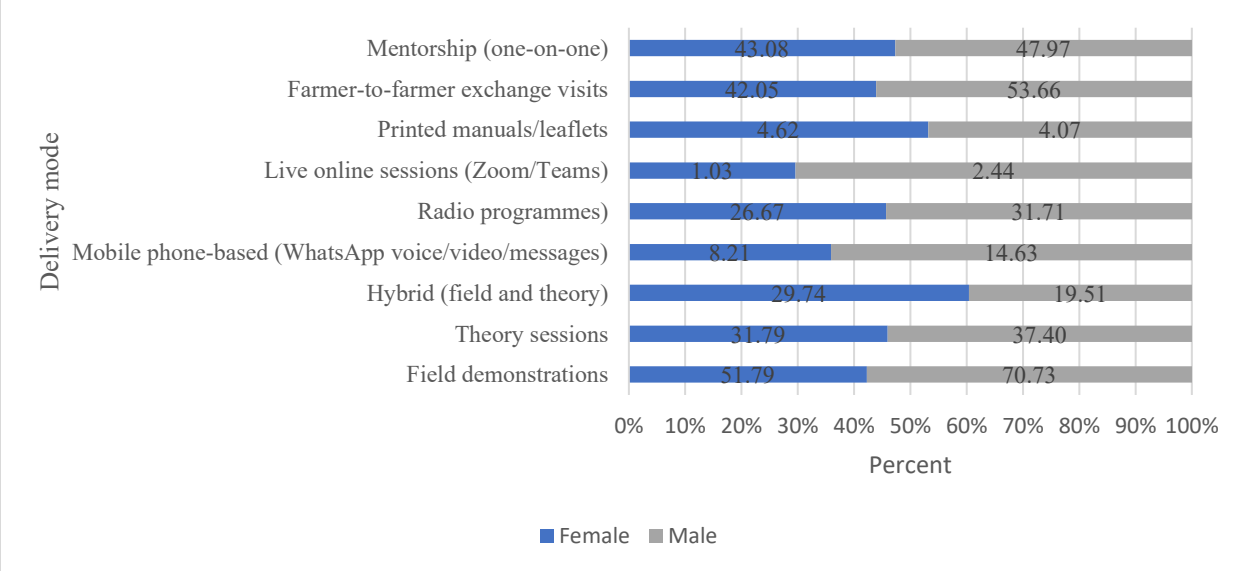

Figure 12: Preferred training delivery mode by gender

The FGDs emphasised the preferences of practical, hands-on training through demo plots. A FGD participant in support of hands-on approach stated:

"The best training would be on demo plots, because we would be able to see everything that is being taught and put it into practice."

Another FGD participant in support stated:

"I would prefer training sessions to be conducted as practical or field demonstrations, so I can see first-hand how sustainable farming methods are applied. Trainings could also be delivered through mobile phone-based methods radio programs, farmer-to-farmer exchange visits, and one-on-one mentorship."

4.4.2 Preferred Training Day and Time of Day

Workdays (63.52%) were the most preferred training day. In terms of what time of day, the training should be conducted, 60.38 percent indicated morning time, 34.91 percent afternoon time and 4.72 percent evening time. Figure 13 below shows that half of the 116 respondents who preferred the trainings to be conducted during the weekends, preferred morning trainings.

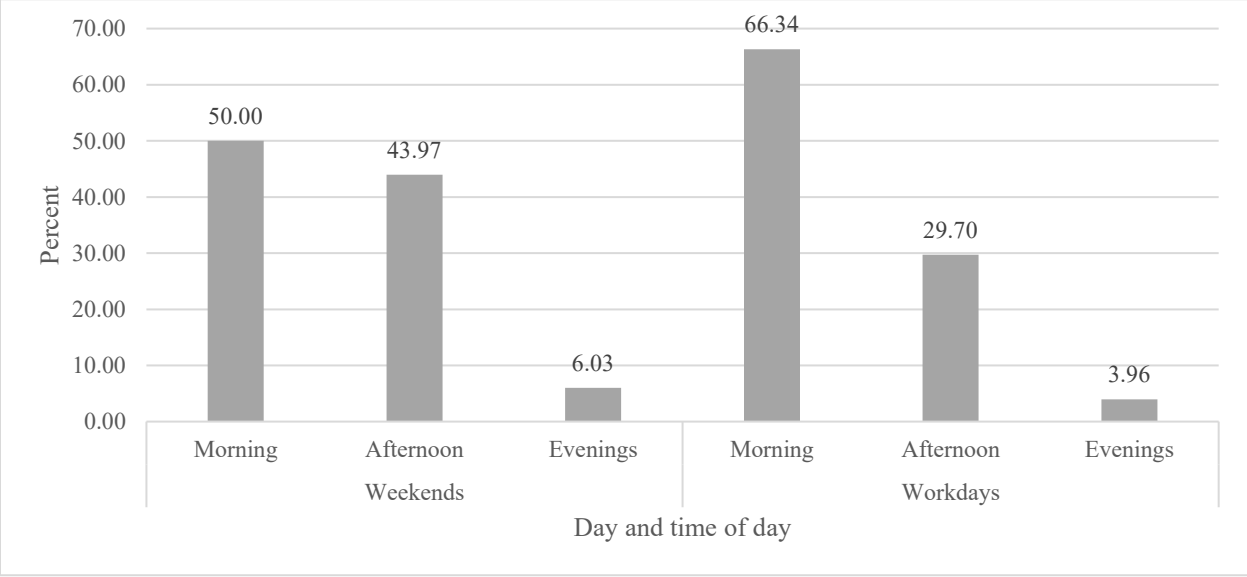

Figure 13: Preferred training day and time of day

Regarding gender and preferred training days, 64 females preferred training on weekends, while 131 preferred weekdays. Among males, 52 preferred weekends compared to 71 who preferred weekdays. Figure 14 below shows that both females and males preferred morning training sessions, but the preference was slightly higher among males (67.18%) during weekdays compared to 64.79 percent of females. On weekends, morning sessions were equally preferred by females and males at 50.00 percent each.

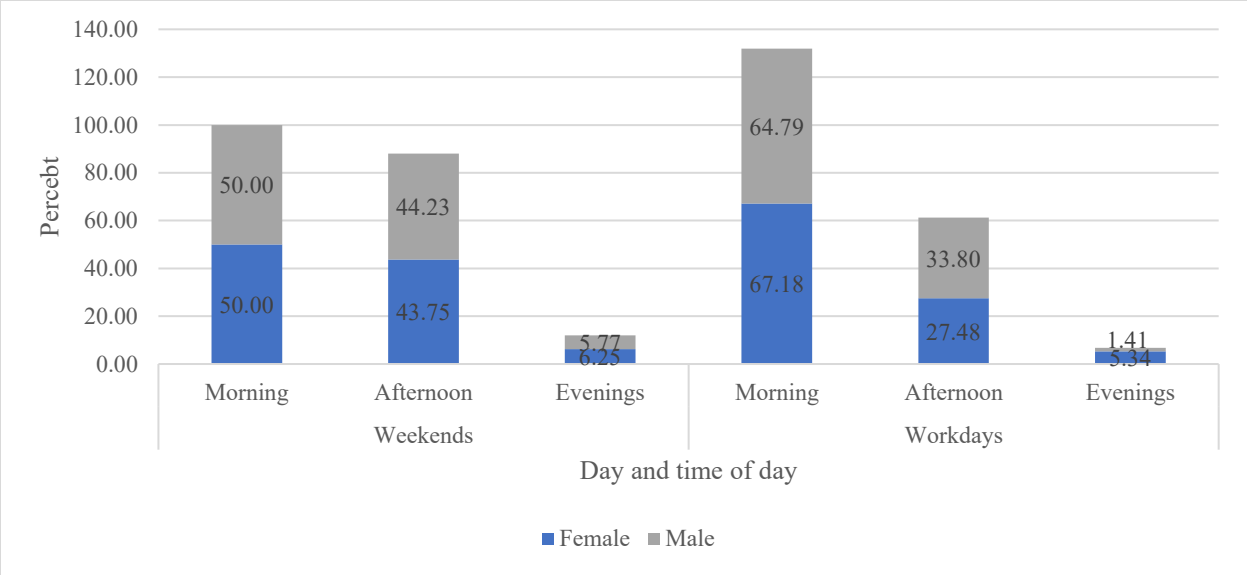

Figure 14: Preferred training day and time of day by gender

4.4.3 Preferred Frequency and Training Venue

The majority (60.50%) of the respondents indicated that they preferred to have training sessions weekly (Figure 15). In terms of training venue, 3.14 percent revealed that they did not mind the venue as long as they are impacted with knowledge, while the majority (50.31%) indicated to prefer having their trainings at a demo plot (Figure 16).

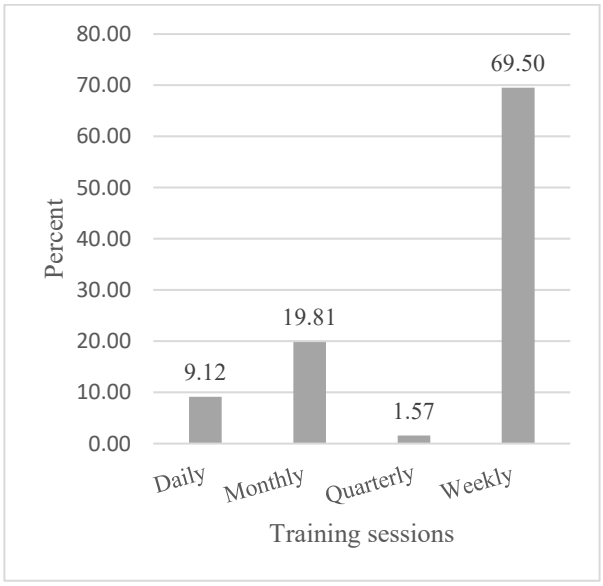

Figure 15*:* Preferred frequency of training

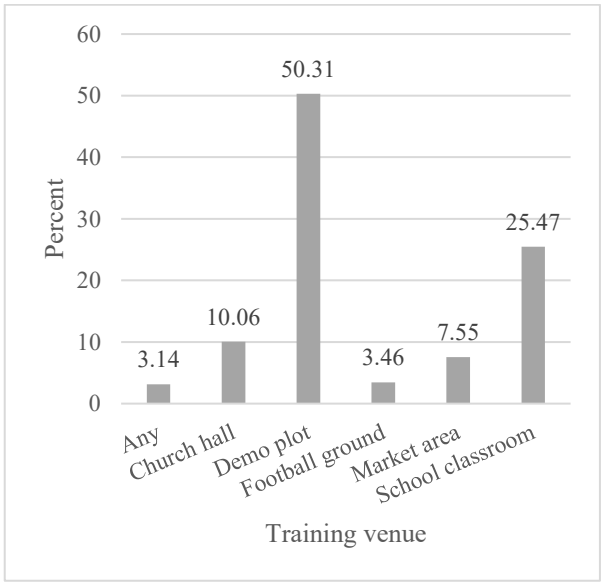

Figure 16: Preferred training venue

In terms of preferred frequency of training and gender, the results showed that both female and male respondents had a strong preference for weekly sessions. Specifically, 70.77 percent of females preferred weekly training, and 67.48 percent of males. For monthly sessions, the results showed that males had higher preference (21.95%) compared to females (18.46%). While 8.72 percent of females compared to 9.76 percent of males preferred daily sessions. Quarterly sessions

were the least preferred by both females (2,05%) and males (0.81%). Furthermore, the results on preferred training venue by gender showed that 46.67 percent of females indicated demo plots compared to 56.10 percent of males (Figure 17).

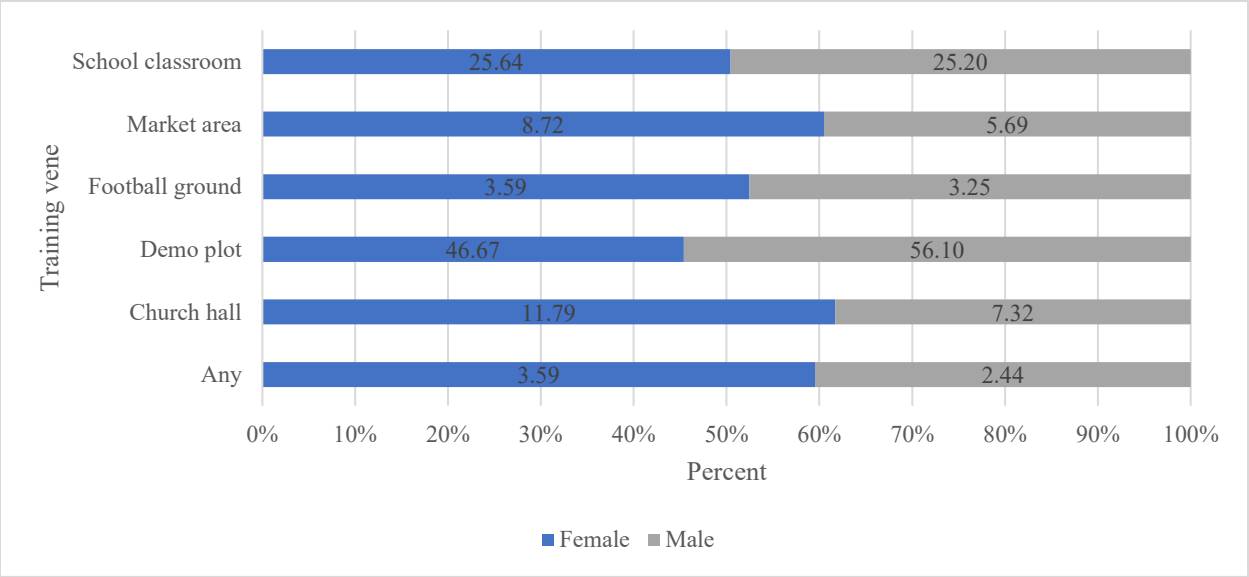

Figure 17: Preferred training venue by gender

4.4.4 Preferred Training Language and Training Facilitator

The most preferred language to be used during training was Nyanja at 89.50 percent, followed by Tonga at 66.04 percent, and lastly Soli at 11.64 percent (Figure 18). The results on who should facilitate the training showed that 36.48 percent preferred government extension officers, while 30.50 percent did not mind who facilitates the training (Figure 19).

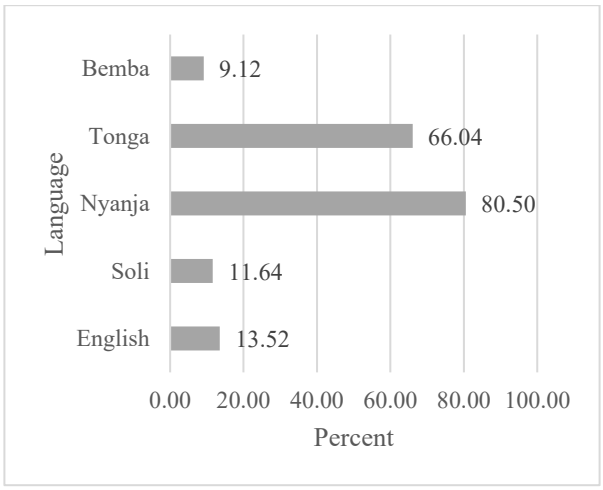

Figure 18: Preferred language of communication during trainings

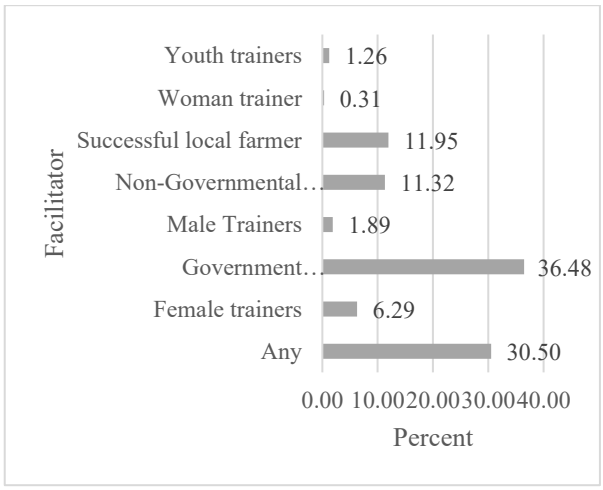

Figure 19: Preferred entity to facilitate the training

The results on the preferred entity to facilitate training by gender showed near parity, with similar proportions of females (30.26%) and males (30.89%) indicating that they are comfortable with any facilitator (Figure 20).

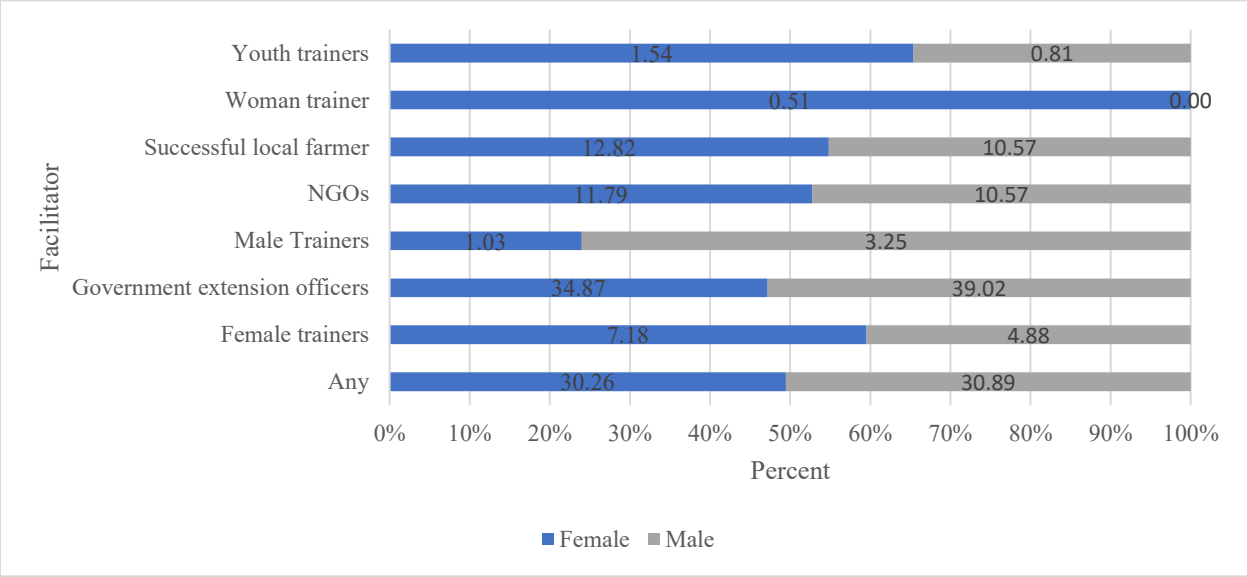

Figure 20: Preferred entity to facilitate the training by gender

4.4.5 Preferred Group Size and Composition

Close to 50.00 percent preferred a lean group size of at least five to 10 people, while 23.27 percent indicated to be comfortable with any group size (Figure 21). Furthermore, 16.67 percent indicated not to mind the composition of the group for training (Figure 22).

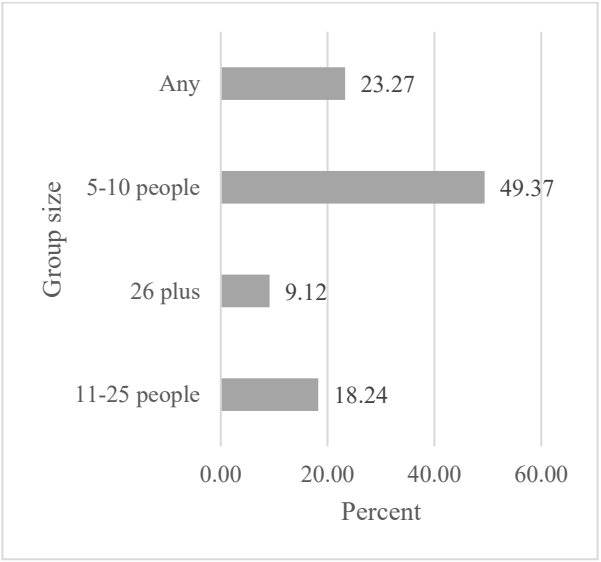

Figure 21: Preferred group size for training sessions

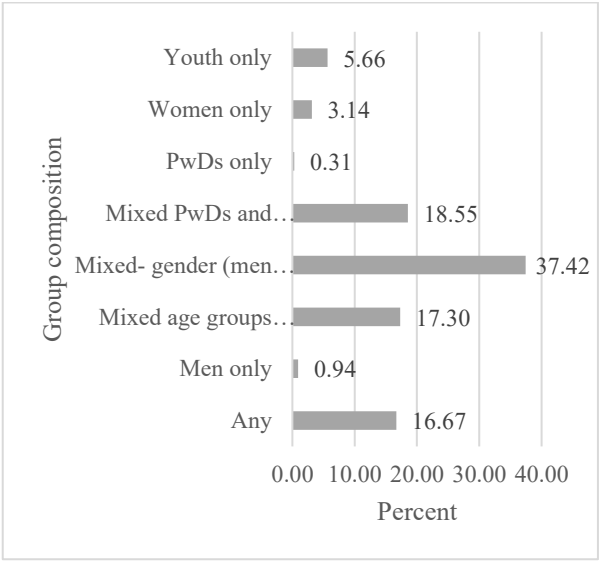

Figure 22: Preferred group composition for training

In terms of preferred group training size by gender, the majority of both females (51.28%) and males (46.34%) preferred small groups of 5–10 people. Medium-sized groups of 11–25 people were preferred by 16.92 percent of females and 20.33 percent of males, while larger groups of 26 or more favoured by 8.21 percent of females and 10.57 percent of males. While 23.59 percent of females compared to 22.76 percent of males indicated to have no preference and was comfortable with any group size. Furthermore, Figure 23 shows that, unlike males, a proportion of females preferred women-only groups (5.13%) and groups for PwDs (0.51%).

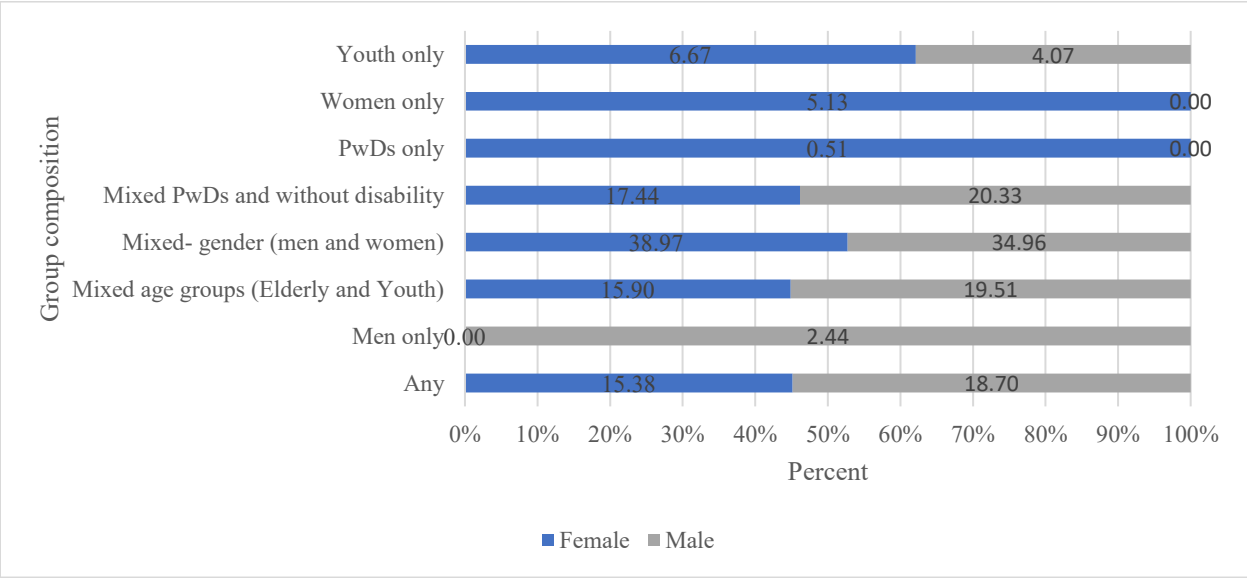

Figure 23: Preferred group composition for training

4.5 Access and Control of Farming Resources

4.5.1 Access to Farming Resources

The perception of equal access to farming resources between females and males (Figure 19) indicated a considerably high degree of gender parity. For instance, 79.87 percent of respondents believed that both females and males had equal access to land ownership.

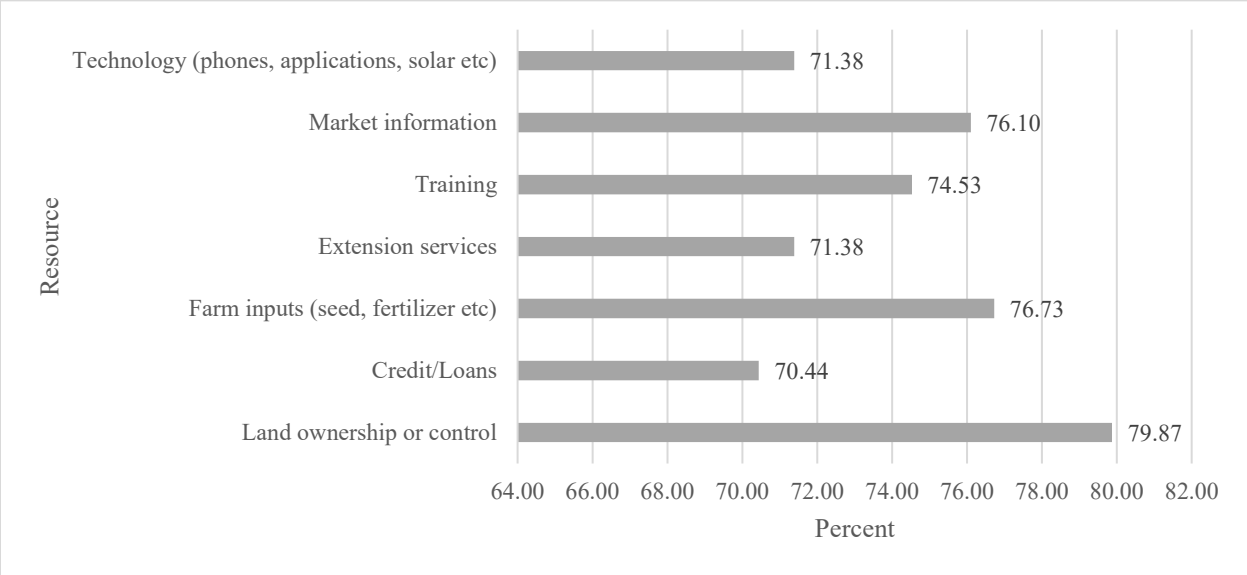

Figure 24: Perception on gender access to farming resources

The stakeholder perceived gender equality in access to land, training opportunities and farming inputs within the community. The stakeholders stated that both men, women, including the youths have equal opportunities to participate in agriculture activities.

"…Both men and women have equal access to land, training, and farming inputs. There is no situation where one gender receives more inputs than the other, and all types of agricultural training are open to both men and women." *(Councillor, KII, 2025).*

"Since I became a headwoman in 1975, I have never heard of a situation where women have more access to land or other resources than men or vice versa. In my community, that is not allowed." (*Village headwoman, KII, 2025).*

4.5.2 Control of Farming Activities and Income

The results on who control farming activities in terms of what to plant, when to sell or attend training showed that males were perceived to have greater control, accounting for 43.08 percent of the sample. While the results on control over income from farming revealed that it was predominantly joint, with 37.11 percent of the sample reported that decisions were made together by household members (Figure 21).

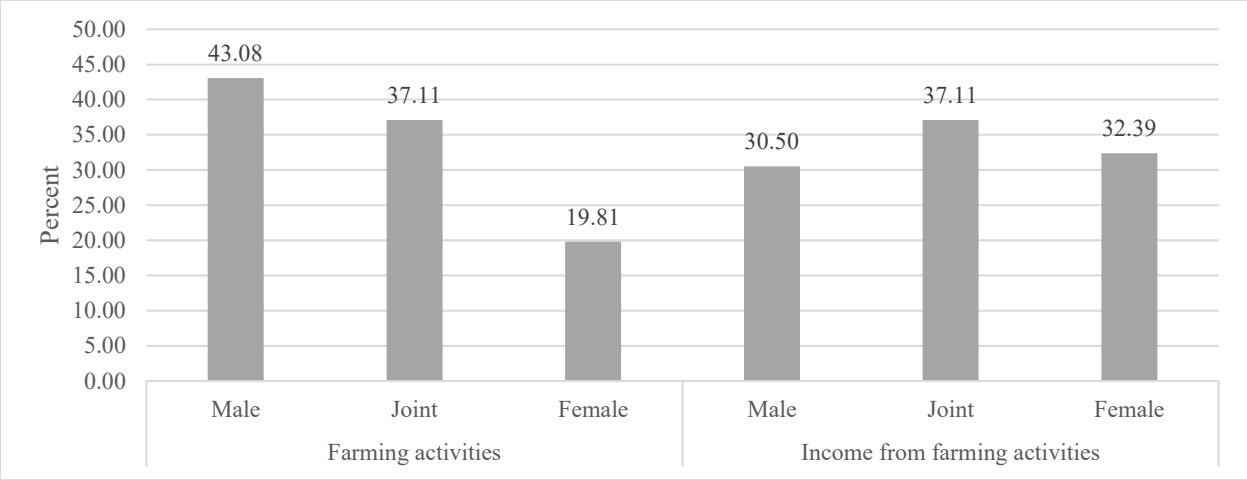

Figure 25: Perception on control over farming activities and income

4.5.3 Barriers to Gender Equality in Access to Farming resources

Although not highly pronounced, the respondents identified several barriers that limit gender equality in accessing farming resources: cultural norms dictates and restricts women's participation in certain farming activities; limited access to information and technical knowhow constrains women from effectively participating; household responsibilities reduces time for farming; lack of confidence and interest in certain agricultural practices limits full utilisation of available resources; and male dominance in decision making results in men controlling key farming resources. Quantitively, Figure 21 shows that lack of information (66.04%) was the major barrier to achieving gender equality in access to farming resources.

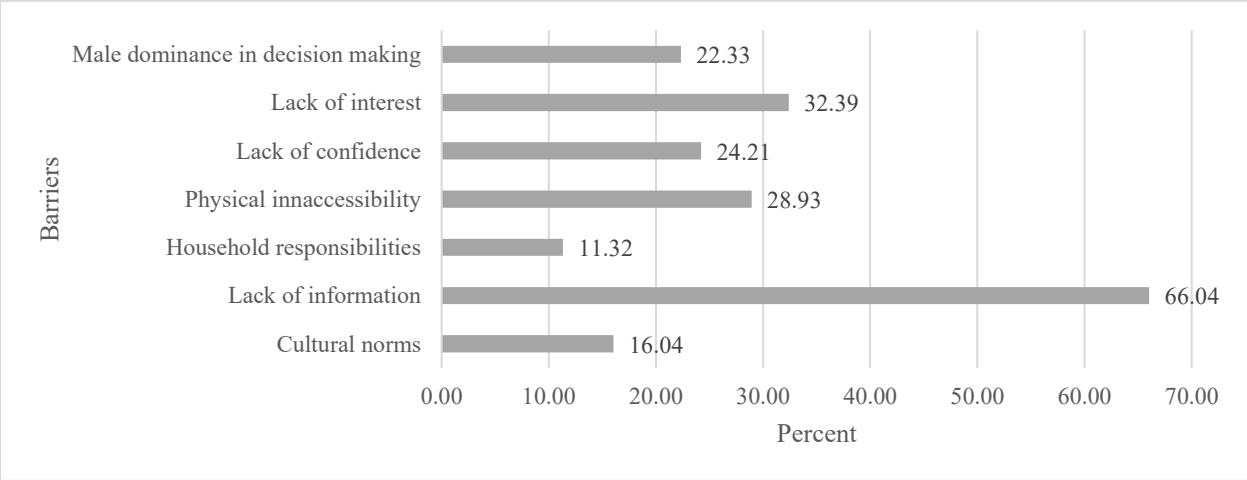

Figure 26: Barriers to gender equality tin access to farming resources

The stakeholders retorted lack of cultural barriers influencing farming practices in the community. A Village headwoman, in supporting this position said, *"We do not have any cultural beliefs that affect how people farm. Here, everyone cultivates in whichever way they choose, and when they harvest, the produce belongs to them."* Another Village headman said, *""There are no cultural beliefs in my community that prevent any gender from participating in farming."*

5.0 Discussion

5.1 Training Needs

Gender differences in training access: The survey results show that 45.28 percent of respondents had received some form of training in climate-resilient sustainable farming practices, with males (50.41%) slightly more than females (42.05%) to have participated. This pattern reflects long-standing gendered disparities in access to extension services, where sociocultural norms and institutional biases often position men closer to formal information channels than women. National assessments such as the CSAIP (2019) and the SIFAZ project (2022) highlight that training and agricultural support remain unevenly distributed across gender lines in Zambia. The SIFAZ programme, for instance, underscores the need for deliberate inclusion of women through targeted mentoring and capacity-building in sustainable intensification practices and enterprise management.

Training priorities: Farmers' indicated training priorities such as livestock integration, soil health management, crop rotation, agroforestry and conservation agriculture, reflecting internationally recognised CSA interventions - SIFAZ project actively promotes these approaches to enhance smallholder resilience and productivity under variable climatic conditions. Meanwhile, global and regional literature also emphasise training in drought-tolerant varieties, water-harvesting techniques, integrated pest management and digital tools to equip farmers for climate shocks (World Bank, 2018; WFP, 2024). The training should, therefore, integrate both traditional CSA practices and emerging technological skills to ensure that farmers are equipped with comprehensive knowledge and practical tools.

Gendered training preferences: Female respondents expressed greater interest in agronomic and production-oriented training topics, including soil conservation, agroforestry, and conservation agriculture. These areas focus on improving crop productivity, maintaining soil fertility, and promoting sustainable farming practices that directly benefit household food security. In contrast, male respondents showed a stronger preference for business-oriented training, such as record-keeping, enterprise management, and developing market linkages, which are focused on enhancing the commercial aspects of farming and income generation. This pattern reflects broader trends highlighted in other studies (FAO, 2021; Wiafe & Yona, 2016), which show that women in smallholder farming systems often prioritize activities that support subsistence and household-level production, while men are more likely to engage in commercial and market-oriented farming activities. Therefore, training programmes should be designed to address these gender-specific interests, while ensuring both increased household food security and income.

Technical and soft skills: Beyond purely technical skills, respondents also highlighted the importance of soft skills training, including cooperative resource-sharing, village banking, and collective marketing. The literature supports this, noting that building capacities in business management, value addition, market access, and collective action is critical for enhancing economic resilience and facilitating the uptake of CSA practices (World Bank, 2019; FAO, 2021).

Integrating both agronomic and livelihood-oriented competencies into training programmes, therefore, presents a valuable opportunity to increase adoption rates and strengthen smallholder livelihoods over the long term.

5.2 Training Preferences

Training delivery method: Farmers strongly preferred hands-on, practical training, with field demonstrations (59.12%), farmer-to-farmer exchanges (46.54%), and one-on-one mentorship (44.97%) rated highest. Evidence supports this approach, showing that demonstration-based, participatory methods significantly improve adoption CSA practices (FAO, 2022; Midva et al., 2024; Mponela et al., 2022). Given this strong preference, training programmes should prioritize interactive, experiential approaches to ensure knowledge retention and practical application in the field.

Timing, frequency and group size: Most respondents preferred training sessions to be conducted in the mornings on workdays (63.52% and 60.38%, respectively), with a weekly frequency (60.50%) and small groups of 5–10 participants. These preferences underscore the importance of scheduling, consistency, and focused group learning in maximizing both attendance and active engagement. Morning sessions on workdays aligns with farmers' daily routines, while small, consistent groups facilitate interaction, individualised attention, which are essential for effective knowledge retention and practical application (Van den Berg et al., 2023). Training planners should therefore carefully consider timing, frequency, and group size when designing programmes to ensure that learning is accessible, manageable, and impactful for all participants.

Language: Local language delivery was highly preferred, Nyanja (89.50%) and Tonga (66.04%), while English at 13.52 percent. This supports literature showing that training delivered in familiar languages improves comprehension and engagement (FAO, 2022; UNDP, 2025). Training providers should ensure materials and sessions are delivered in local languages and adapted to the literacy levels of participants to maximize understanding and uptake of CSA practices.

Digital training approach: Phone ownership was high among respondents (86.48%), but considerably low access to the internet (20.44%) and WhatsApp (18.87%). This indicates that while mobile phones are widely available, most farmers have limited connectivity to online platforms, which constrains the effectiveness of fully digital training approaches. As a result, reliance on internet-based tools for delivering training may exclude a large proportion of participants, particularly females (FAO, 2022). This situation highlights the need for blended training approaches that combine face-to-face methods with accessible low-tech channels such as radio, SMS messaging, and basic mobile phone applications. By leveraging multiple communication channels, training programmes can ensure inclusivity, maximize reach, and provide farmers with the information and guidance they need to adopt CSA practices effectively (Alamo et al., 2022; Ongachi et al., 2017; Rural Finance & Learning Centre, 2024).

5.3 Barriers to Effective Participation

Lack of resources (92.77%) and insufficient knowledge (59.12%) were the reported key barriers limiting farmers' adoption of sustainable farming practices, with women being more affected. Gender and cultural factors further restrict access, as 66.04% of women cited lack of information, while household responsibilities, low confidence, and male-dominated decision-making reduce their participation in training programmes. These challenges are made worse by differences in phone ownership, internet access, and WhatsApp usage, which limit women's engagement in mobile-based advisory services and reduce their access to timely CSA information. Stakeholders also noted that literacy gaps, financial constraints, and socio-cultural norms act as additional barriers, even though some community leaders reported minimal cultural restrictions. Overall, these barriers call for participatory, visual, and context-sensitive training approaches that consider literacy levels, cultural realities, and gender differences. Flexible scheduling, gender-balanced facilitation, and targeted support for resource-limited participants are important for improving engagement, promoting fair participation, and increasing adoption of CSA practices (FAO, 2024; Yami et al., 2024; Gupta et al., 2023; Reeves et al., 2023; SE & Partners, 2023).

6.0 Conclusion and Recommendations

Smallholder farmers have limited access to climate-resilient agriculture training, with females facing additional barriers due to household responsibilities, low confidence, and restricted information access. Farmers prioritize technical skills such as soil health, conservation agriculture, and pest management, alongside livelihood skills like business management and market linkages. Hands-on, participatory approaches in local languages, small groups, and convenient schedules are strongly preferred, while low digital access highlights the need for blended training methods. Hence, inclusive, practical, and gender-responsive programmes are essential to strengthen adoption, and climate resilient livelihoods. Below are the recommendations that could ensure an effective training programme on climate-resilient sustainable farming practices among small holder farmers in Chilambila, Chipapa, Nankanga and Old Kabweza of Kafue district:

i. Integrate technical and emerging practices

The Ministry of Agriculture (MoA) extension officers and implementing partners including lead farmers should co-design training modules that combine soil health, crop rotation, conservation agriculture, water harvesting, improved seed use, and integrated pest management with simple digital tools. Train lead farmers as community trainers to promote practices locally. Train other farmers in the community trainers to adopt sustainable practices locally. Development of the training materials could take 1 to 2 months followed by a training of lead farmers in month 3 and rollout of training to all other farmers in month 4 and continues on a monthly basis.

ii. Balance agronomic and livelihood skills

Agricultural extension officers and implementing partners including lead farmers should balance agronomic and livelihoods by alternating training blocks such as one week focusing on agronomy (e.g., soil conservation, agroforestry) and the next on livelihood skills (record-keeping, enterprise

development, market linkages). This should be enhanced by the use of real farm data and mock business exercises to strengthen financial literacy in addition to engaging cooperatives to support collective marketing and link smallholders with buyers. This could be considered in a bi-monthly and market linkage event conducted twice a year before harvest and immediate after harvest.

iii. Adopt gender-responsive approaches

All the implementing agencies including the community leadership and traditional leadership should adopt a gender responsive approaches by conduct household-level sensitisation meetings to encourage men's support for women's participation, scheduling trainings mid-morning (9:00–11:00) to avoid peak household workload hours and provide childcare spaces and support during sessions where possible and establish women-only learning groups to build confidence and encourage peer support. Gender responsive approaches should be done every time and the women group meeting could be held quarterly.

iv. Promote hands-on and participatory delivery

The extension officers, lead farmers, project team and facilitators should conduct regular field demonstrations showcasing mulching, minimum tillage, water harvesting structures, composting, and pest control methods. Establishment of demonstration plots in each village cluster and implementing mentorship with extension officers visiting each group monthly for follow-up while encouraging farmer field schools using peer-to-peer learning should be considered. Field demonstration could be held once a month and so should mentorship visits.

v. Blended delivery approach

The project implementing team with other stakeholders such as youths and local radio stations should produce short, practical radio segments on climate-smart practices in local languages, aired weekly and also shared through various social media platforms. The SMS could be sending reminders on meetings, weather, planting times, pest alerts, markets opportunities and upcoming training sessions.

vi. Scheduling and group size

The extension officers, lead farmers, project team and facilitators should plan and announce the training calendars during village meetings, organise participants into small groups of 10-15 people based on proximity for the scheduled training meetings mid-morning on workdays, organised weekly. Tracking of attendance and follow up with households that miss sessions will be essential.

vii. Use local languages

Training should be delivered in local languages such as Nyanja and Tonga, with content adapted to participants' literacy levels. Translation support should be provided where necessary to ensure inclusive participation and effective learning.

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