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Examining the Effectiveness of NGO-Facilitated Market Linkages on Sustainable Agriculture: A Case Study of Farmer Cooperatives in Selected Wards of Kalomo District

[1] Abraham Ndandula Malasha, [2] Dr. Chisala Bwalya

[1, 2] Department of Development Studies, School of Humanities, Information and Communications University, Lusaka, Zambia

Corresponding Author: **Abraham Ndandula Malasha**

Abstract

The study examined the effectiveness of NGO-facilitated market linkages in promoting sustainable agricultural practices among farmer cooperatives in selected wards of Kalomo District, Zambia. It seeks to address a research gap regarding the extent to which these linkages effectively contributed to improving market access and the adoption of sustainable agricultural practices.

The study was guided by three specific objectives: to examine the effectiveness of NGO-facilitated market linkages in improving access for smallholder farmers to competitive markets; to examine the effectiveness of NGO-facilitated market linkages in the adoption of sustainable agriculture and to examine the challenges farmer cooperatives encounter in utilizing NGO-facilitated market linkages.

A case study research design and mixed-method research approach were employed. Quantitative data was collected from 94 respondents, while qualitative data was collected from 20 respondents. Quantitative data was analyzed, while Qualitative data was analyzed using thematic analysis. The study was guided by the sustainable Livelihood Framework (SLF).

The findings showed that NGO-facilitated market linkages were available, but utilization was limited, with 52.1% of respondents reporting never having used them. A significant association existed between ward and frequency of utilization, ($X2=15.12$, $p<.001$, Cramer's $V=.414$). Regarding the adoption sustainable agriculture, 98.9% of respondents adopted new farming practices with NGOs support, while 63.8% reported reduced chemical fertilizers and pesticides use. Major challenges included recordkeeping burdens, unclear communication, transport unreliability, limited price transparency and difficulties in meeting quality and quantity requirements.

The study recommends improving market infrastructures, cooperative governance, trade policies, bureaucratic procedures and market diversification. Future research should use longitudinal and comparative designs, expand geographic scope and conduct cost-benefit analysis.

Keywords: NGO-Facilitated Market Linkages, Sustainable Agriculture, Farmer Cooperatives, Smallholder Farmers, Market Access, Kalomo District, Zambia

1. Introduction

1.1 Background of the study

Agriculture is one of the major sector of the Zambia economy. It is estimated to employ between 65% and 70% of the working labour force in rural population (PMRC, 2021 in Mwando, 2022 [22]), Contributing approximately 20% of the gross domestic product and about 12% of the export earnings, and supports most of the rural population. Small and medium-sized farmers supply most of grain of the grain on the domestic market, with 88% of agricultural households involved in production (World Food Programme, 2020) [32]. The Ministry of agriculture's strategic plan (2022-2026) recognizes the National Policies such as the Eight National Development plan and the compressive agriculture transformation support programme (2024-2033), the strategic plan emphasizes climate smart agriculture, extension delivery, mechanization, public-private partnerships and market linkages as routes to higher productivity, food security and rural incomes (Ministry of Agriculture, 2022) [19].

The sector's performance in the recent years falls short of its potential despite having an estimated 42 million hectares of arable land, the agriculture GDP declined by 2.8% in 2023 (Republic of Zambia, 2024) [27]. The 2023/2024 El Nino- induced

drought, the worst in four decades according to the Famine Early warning Systems Network, destroying nearly half of the 2.2 million hectares of planted maize across more than 70 districts and pushing 50-60% of households in Southern, Western and Eastern province into food insecurity (FEWS NET, 2026) [8]. Further, the report identified barriers encountered in the sector, these included; transport cost, weak infrastructure, market distortions, linked state interventions and dependence on informal cross-border trade as persistent barriers.

Policy setting also key in determine growth through the guidance they offer. The World Bank (2022) [31] estimated that maize export restrictions are costing Zambian farmers approximately US$97 million a year and could cost producers about US$1.42 billion between 2023 and 2030.

1.2 Statement of the Problem

In as much as agriculture is essential to human, yet it also threatens the environment. Oberč & Arroyo (2020) [24] stated, "Agriculture is a fundamental human activity that intrinsically depends on nature and at the same time poses a threat to it. Thus, sustainability has emerged as a necessity in future agricultural policy and practice."

Smallholder farmers in developing countries encounter persistent challenges in accessing markets, finance, technology and reliable information. Farmer cooperatives help in addressing these challenges through collective bargaining, resource and risk sharing (Kalogiannidis, Karafolas and Chatzitheodoridis, 2024; Borsellino, Schimmenti and El Bilali, 2020) [13, 4].

According to FAO (2017) [7], sustainability is not only productivity, but also the stability of livelihood, inclusivity and environmental protection. In Zambia, smallholder farmers support food security, employment creation and fostering rural development. However, extension services, poor infrastructure and impacts of climate change because majority of farmers rely heavily on rain-fed agriculture (Malesu, Syrovátka and Wittmann, 2024) [16]. For instance, the 2023/2024 ElNino-induced the worst recoded drought in four decades, severely destroying crops and reducing agriculture productivity in more than 70 districts and rendering rural house households dependent on rain fed agriculture food insecure (FEWS NET, 2026) [8].

The World Bank (2022) [31] estimated that Zambia's maize export restrictions cost famers approximately US$97 million annually. The restriction not only affects the income stability of farmers, but also opportunities to investments in agricultural production.

Despite growing interest in sustainable agriculture and the role of NGOS in facilitating market linkages for smallholder farmers through farmer cooperatives, there limited empirical evidence on the extent to which these linkages effectively contributing in improving market access and adoption of sustainable practices. This study examines the effectiveness of NGO-facilitated market linkages in promoting sustainable agricultural practices among farmer cooperatives in selected wards of Kalomo District.

1.3 Objectives of the Study

1.3.1 General Objectives

The general objective of the study is to examine the effectiveness of NGO-facilitated market linkages in promoting sustainable agricultural practices among farmer cooperatives in selected wards of Kalomo District.

1.3.2 Specific Objectives

1. To examine the effectiveness of NGOs facilitated market linkages in improving access for smallholder farmers to competitive markets.
2. To examine the effects of NGO-Facilitated Market Linkages in the adoption sustainable agriculture.
3. To examine the challenges farmer cooperatives, encounter in utilizing NGO-facilitated Market Linkages.

1.4 Rsearch Questions

1. How do NGO-facilitated market linkages influence access to competitive markets for small holder farmers?
2. What is the relationship between market linkages and the adoption of sustainable agriculture?
3. What significant challenges do farmer cooperative encounter in utilizing NGO-facilitated Market linkages?

1.5 Theoretical Framework

This study adopted the Sustainable Livelihood Framework (SLF). The framework provided a broad spectrum for understanding factors affecting people's livelihoods and relationships among these factors. The Framework uses a combination of five core assets or capitals in understanding the sustainable livelihood approach, these include; Human, Social, Natural, Physical and Financial capital asset. These assets form the backbone for understanding the vulnerabilities and transformational structures of the livelihood outcomes, such as farming and trade, improved income, food security and reduced vulnerability. The framework provides a lens for understanding how NGO-interventions in facilitating market linkages shape smallholder farmers' access to competitive markets and adoption of sustainable agricultural practices, whilst accounting for vulnerabilities farmers encounter, such as droughts and price shocks.

It is hypothesized that smallholder farmers who are receiving interventions from NGOs are more likely to have better access to markets and adopt sustainable agriculture practices than those not receiving interventions.

Hypothesis 1

H_0 (null hypothesis) - NGO-facilitated market linkages do not effectively improve smallholder farmers' access to competitive markets.

H_1 (alternative hypothesis)-NGO-facilitated market linkages effectively improve smallholder farmers' access to competitive markets.

Hypothesis 2

H_0 (null hypothesis) - There is no significant relationship between NGO-facilitated market linkages and the adoption of sustainable agriculture practices.

H_2 (alternative hypothesis)-There is a significantly positive relationship between NGO-facilitated market linkages and the adoption of sustainable agriculture practices.

Hypothesis 3

H_0 (null hypothesis) - Farmer cooperatives do not encounter significant challenges in utilizing NGO-facilitated market linkages.

H_3 (alternative hypothesis)-Farmer cooperatives encounter significant challenges in utilizing NGO-facilitated market linkages.

1.6 Significance of the Study

The study provides evidence the importance of empowering farmers with knowledge on how effective market linkages can improve smallholder farmers' income and reduce post-harvest losses. It also promotes the adoption of sustainable agricultural practices by examining the relationships between market access and the adoption of sustainable agricultural practices. At intuitional levels, it strengthens farmer cooperatives and institutional capacity through the identification of challenges limiting cooperatives from using the NGO-facilitated market.

Additionally, academic researchers and policy makers NGOs will gain empirical data on how to refine their strategies that will enhance market access for smallholder farmers.

1.7 Scope of the Study

This study focused on examining the effectiveness of NGO-facilitated market linkages on sustainable agriculture among farmer cooperatives. Geographically the study was limited to Kalonda ward in Kalomo Central constituency and Bbilili ward in Dundumwezi Consistency in Kalomo District, Zambia. The rationale for confining the study to Kalomo District is based on the fact that it is one of the major producers of maize with a number of NGOs championing sustainable agriculture practice.

2. Literature Review

2.1 Market Linkages and Access to Competitive Markets

Studies from Southeast Asia the studies illustrated how institutional market-related factors shape collective market participation. Orejudos *et al*. (2022) [25] found that among cardava banana farmers in the Philippines, larger households were more likely to participate in collective marketing, while low prices and delayed payments discouraged participation and reliable delivery schedules encourage it; access to extension services and organizational membership was also influential. Methanontri *et al*. (2022), studying organic rice farmers in Thailand, found that the scale of collective marketing varied with farmer-group capacity, from export oriented groups to those serving purely domestic retailers and that education, land size and perceived economic benefits shaped participation.

At regional level, Ma, Sonobe and Gong (2024) [14] found that market participation strengthens rural economies but requires complementary investment in education, infrastructure, and affordable credit, while Magakwe and Olorunfemi (2024) [15], reviewed of collective market across the Sub-Saharan Africa and found that it improved market access, bargaining power, income and livelihood by helping farmers over high transactional costs and resource constraints, though mistrust among members, weak extension services and gaps in policy support remained as barriers. In West Africa, Iddrisu *et al*. (2025) found that household size and market information significantly raised the potential and intensity of market participation among Ghanian maize and rice farmers.

Within Zambia, smallholder farmers continue to face poor transport and market infrastructure and weak institutions, often compelling farmers to sell produce at low prices to local middlemen, because of high transport costs and limited market options (European Commission, 2022; Malesu, Syrovatka Wittmann, 2024) [6, 16]. Jimaima *et al*. (2025) [12] found that maize commercialization was driven mainly by economic and production factors such as prices and size of the cultivated area, rather than socio-demographic characteristics. Focusing on Kalomo District, Upla *et al*. (2022) [29] found that maize production is almost entirely rain-fed and constrained by credit and market access challenges, low profitability and limited extension services. Arumugan *et al*. (2022) found that market outlet choices among Zambian Vegetable farmers were shaped by gender, farm size and group membership.

2.2 Market Linkages and the Adoption of Sustainable Agriculture

Global evidence on market access and adoption of climate smart agricultural practices found that technology integration, particularly in Greece expanded market access and encouraged crop diversification, while stable market linkages gave farmers the financial security to reinvest in irrigation and soil health. However, identified financial challenges, inadequate infrastructure and vulnerability such as price fluctuations limited the farmers' potential.

At regional level, Mpinda *et al*. (2025) [20] found high adoption rates climate smart agricultural practices, with approximately 71% crop diversification and 68% improve seed usage among Botswana's maize farmers, this shift is driven by education, farming experience and access to extension services. Gudina and Alemu (2024) [9] found low climate smart agriculture adoption in Ethiopia, constrained by limited capital, information and technical knowledge. Sithole and Olorunfumi (2024) found uneven adoption rates of sustainable agriculture practices across the Sub-Saharan African region, associated differences in institutional support and service delivery. Despite all these, roughly 12% gain in house hold was recorded in regions where sustainable agriculture practices were adopted and being practiced.

In Zambia, Hamakaza *et al*. (2022) found that smaller farm sizes and limited access to extension services reduced the intensity of sustainable agricultural intensification, while farmers' association membership and training increased it. Tembo *et al*. (2025) [28] found conservation farming to be the most widely adopted sustainable price, valued for improving soil health and water retention. On the other hand, Nyirenda (2024) [23] found that access to extension services, credit availability and group membership were key drivers of climate smart agriculture adoption among field crop farmers in Eastern province, while Bwalya, Mutandwa and Chiluba (2023) [5] emphasized that sustainable land management addresses environmental, social and economic dimensions simultaneously, though awareness has not fully matched the adoption rates.

2.3 Challenges in market Linkages utilization

Despite the presence of NGOs and their support in linking farmers to markets, several studies have observed persistent barriers to the full utilization of these markets. Wale, Chipfupa and Hadebe (2021) [30] found that land tenure insecurity, lack of complementary resources, and from irrigation schemes inhibited enterpreneual behavior among smallholder farmers in KwaZulu-Natal, while access to extension services, cooperative membership and market access had a positive effect. A comparative study by Mulema *et al*. (2021) [21] found that Zambian youths in agribusiness were constrained by restricted market access, low profitability and inadequate infrastructure compared

with Vietnamese youths who cited profitability and specialized skills.

Hassan *et al*. (2025) [11] in a study conducted in Nigeria focusing on farmer cooperative participation markets, found that inadequate funding, inadequate sensitization and bureaucratic procedures were major barriers, even though cooperatives were perceived to encourage farmers make savings and access subsided inputs. Akiri *et al*. (2024) [1] found that smallholder farmers in Zambia and Rwanda struggled to meet regulatory market standards for high-value produce because of the limited technical knowledge and the cost of compliance coupled with low awareness of the specific standard requirements, thereby recommending that farmers organize in formally recognized groups to lower costs and access to information more easily through cost sharing.

2.4 Personal Critique of Literature Review

The literature review provides a broad and well-organized discussion on the relationship between market linkages, sustainable agriculture adoption and the challenges smallholder farmers face in access market and utilizing linkages, drawing evidence from the global, regional and Zambian perspective. However, much of it does not fully situate these findings within the socio-economic and infrastructure realities of specific Zambian districts such as Kalomo and factors such as ward-level infrastructure disparities and cooperative governance capacity are insufficiently analyzed. While the review acknowledged the improvements in market access, income and sustainable agriculture practices adoption, but less attention was given to the administrative and trust issues, such as recordkeeping challenges and pricing transparency, these determine whether farmers will actually utilize the market linkages available. A more context-sensitive approach, attentive to these operational realities, would strengthen the literature's relevance for guiding NGO and policy interventions in districts like Kalomo.

2.5 Establishment of Research Gaps

Despite considerable progress in linking smallholder farmers to market linkages and provision of support in the adoption of sustainable agricultural practice, gaps persist. Existing studies mainly emphasize participation and adoption determinants but say little about the gap between the availability of NGO-facilitated market linkages and sustainable agriculture practice adoption and their actual utilization by cooperative farmers. Few studies examine ward level or intra district disparities in access and outcomes of the NGO-facilitated market linkages, and there is limited evidence on the specific procedural and trust-related issues, such as recordkeeping, communication and pricing transparency, that constrain cooperative even where linkages are formally accessible. This study addresses these gaps by combining quantitative and qualitative evidence from two contrasting wards of Kalomo District to assess both the effectiveness and lived challenges of NGO-facilitated market linkages.

3. Research Methodology

3.1 Research Design

The study adopted a cross-sectional research design was adopted to examine the effectiveness of NGO-facilitated market linkages on sustainable agriculture. A Case Study of Farmer Cooperatives in Selected Wards of Kalomo District to gain in-depth and contextual insights.

3.2 Target Population

The study targeted 86 smallholder farmers in both Bbilili and Kalonda ward, 4 cooperative chairpersons/vice chairpersons, 1 District Agricultural Coordinating Officer, 4 agriculture extension/camp officers and 5 NGO officers running or having run sustainable agriculture projects in Bbilili and Kalonda wards of Kalomo District.

3.3 Sampling Design

Purposive sampling was used to select key informant; the District Agricultural Coordinating Officer, agriculture extension/camp officers and NGO officers. While smallholder farmers were selected through stratified random sampling, stratified by cooperative membership, sex and age categories to ensure a balanced representation.

3.4 Sample Size Determination

A sample of 100 respondents was determined using Cochran's formula for an infinite population ($Z = 1.96$ for a 95% confidence level; $P = 0.5$; margin of error = 0.0979), adjusted for the finite population of Kalomo District ($N \approx 16{,}000$). The final achieved sample comprised of 94 quantitative respondents and 20 qualitative participants across Kalonda and Bbilili wards, inclusive of District Agricultural Coordinating Officer, agriculture extension/camp officers and NGO officers.

3.5 Data Collection Methods

Mixed-methods approach was employed, combining quantitative and qualitative approaches to draw on the strengths of each and offset their respective limitations (Asenahabi, 2019 [3]; Tashakkori & Teddie, 2010, in Asenahabi, 2019 [3]).

Primary data was collected using structured and unstructured questionnaires. Structured questionnaires were administered District Agricultural Coordinating Officer, extension/camp officers, NGO officers, cooperative leaders, and smallholder farmers, while guided interviews and focus group discussions were held with key informants, cooperative chair/vice chairperson and selected farmers.

3.6 Data Analysis

Quantitative data were cleaned in Microsoft Excel and analyzed using SPSS for descriptive and inferential statistics (including chi-square tests), while qualitative data were analyzed thematically, with field notes and interview transcripts grouped into themes aligned with the study's three objectives, this was to ensure a meaningful interpretation of results.

3.7 Triangulation

Methodological triangulation, comparing questionnaire findings against qualitative accounts and secondary data, was used to strengthen the validity of the conclusions.

3.8 Limitations of the Study

Limitations included the confining the study to two wards of Kalomo District out 20 wards, potential response bias, and time/resource constraints. These were mitigated through and

the use of mixed-methods approach and data triangulation.

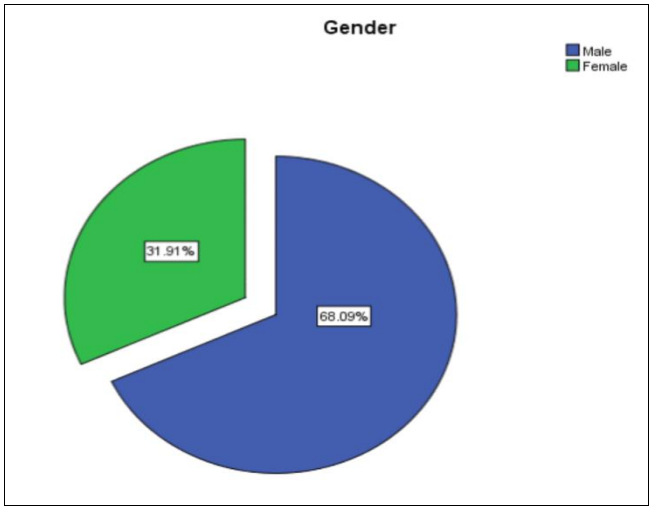
3.9 Ethical Considerations

Ethical approval was obtained from the university and a written approval was sought from the relevant authorities. All participants were informed of the study's purpose, assured of confidentiality, anonymity and voluntary participation, and gave informed consent. Data collected were securely stored and used strictly for research purposes.

4. Results and Discussions

4.1 Background characteristics of the respondents

Gender Distribution of Respondents

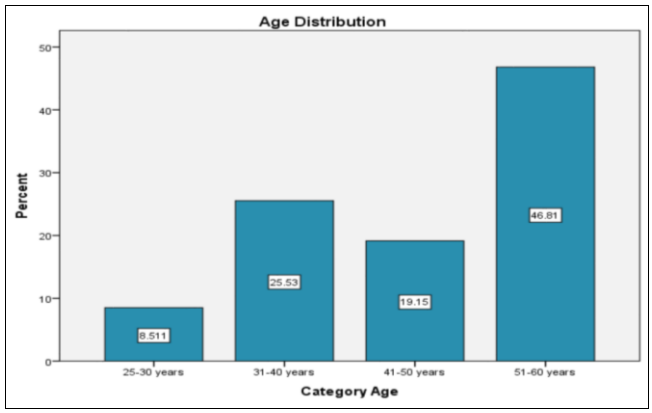


Source: Primary data, 2026.

Fig 4.1: Gender Distribution of Respondents

The gender distribution of respondents shows that males accounted for the majority at 68.1%, while females made up 31.9 % of the sample. This suggests that both genders are well represented among use of NGO-facilitated Market Linkages in Kabwe. though slightly more men are engaged with the system compared to women. However, the inclusion of approximately a third of female respondents ensured that the findings captured reflected both the male and female perspectives, allowing the study to examine differences in the experiences of NGO-facilitated market linkages.

Age Distribution of Respondents

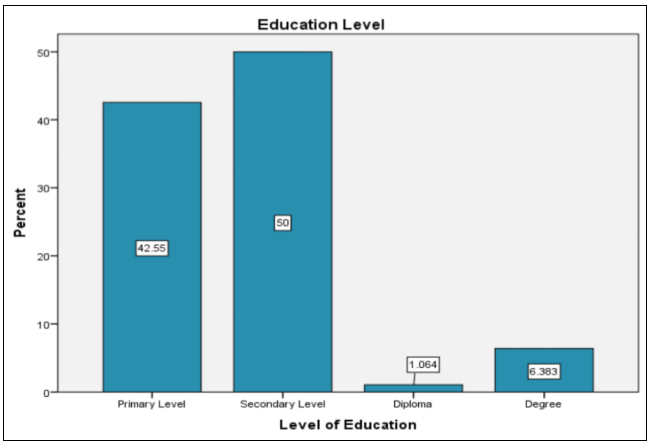


Source: Primary data, 2026.

Fig 4.2: Age Distribution of Respondents

The age distribution of respondents indicate that the majority fell within 51 - 60 years (46.8%, n=44). This was followed by those aged 31 - 40 years (25.5%, n=24), 41 to 50 years (19.1%, n=18) and 25 to 30 years (8.5%, n=8) respectively. The concentration of respondents in the older age categories indicates that farming and cooperative membership are largely characterized by mature and experienced farmers. This demographic composition has potential implications for the adoption of new technologies and market practices introduced through NGO interventions.

Education Level Distribution of Respondents

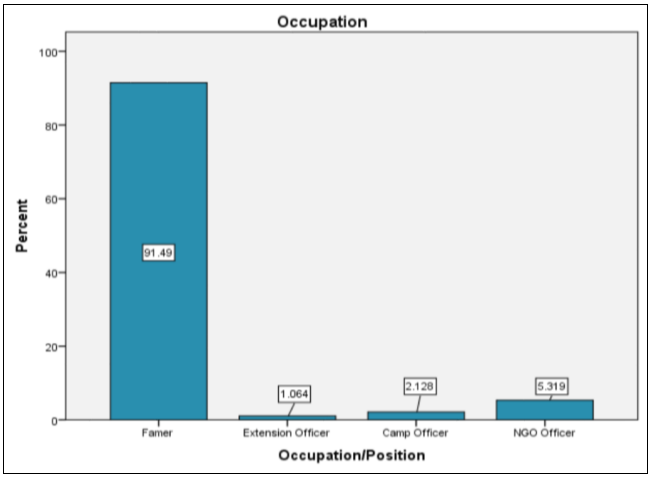


Source: Primary data, 2026.

Fig 4.3: Education Level Distribution of Respondents

The educational background of respondents reveals that the majority, 50.0% (n=47) of the respondents accounted Secondary education, followed by primary education at 42.6 % (n=40). Diploma and degree holders represented 1.1% (n=1) and 6.4% (n=6), respectively. Overall, 92.6% of respondents had not progressed beyond secondary school, indicating generally a relatively low formal education attainment among farmer cooperative members. This is important contextual factor, because literacy levels can affect farmers' capacity to interpret market information, understand contractual requirements and engage effectively in NGO-facilitated market.

Occupation Distribution of Respondents

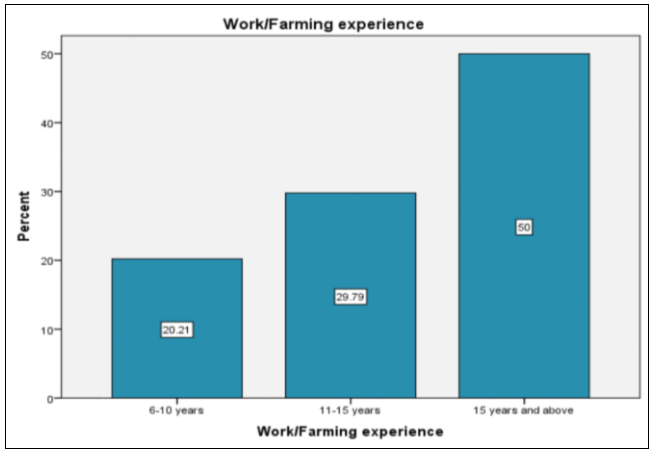


Source: Primary data, 2026.

Fig 4.4: Occupation Distribution of Respondents

The findings indicate that majority of the respondents were smallholder framers, accounting for 91.5% (n=86) of the sample, this is consistent with the study's sampling design which targeted farmer cooperative members as the primary respondents. NGO officers accounted for 5.3% (n=5), while camp officer and extension officers accounted for 2.1% (n=2) and 1.1% (n=1) respectively. Although the institutional representation is a relatively small proportion of the sample, their inclusion provided a complementary perspective on the institutional dimensions of the NGO-facilitated market linkages.

Work/Farming experience Distribution of Respondents

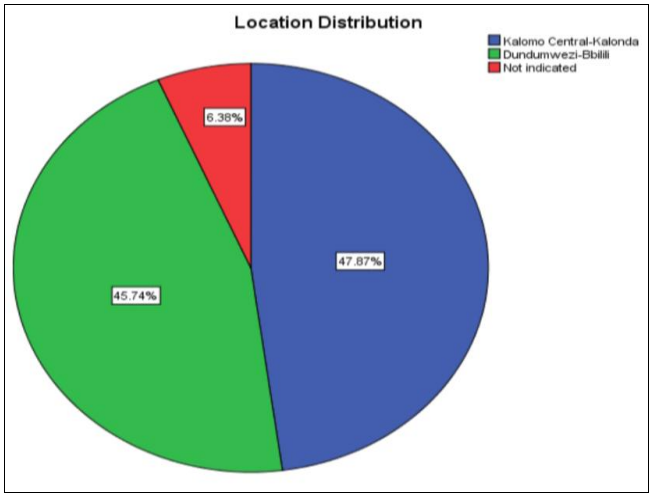


Source: Primary data, 2026.

Fig 4.5: Work/Farming experience Distribution of Respondents

Half of the respondents, 50.0% (n=47) reported 15 or more years of farming experience, while 29.8% (n=28) had 11 to 15 years and 20.2% (n=19) had 6 to 10 years. The distribution indicates a relatively high level of farming experience among respondents. The level of experience strengthens the credibility of their reported experiences of how NGO-facilitated market linkages have changed their access and farming practices over time, nonetheless such assessments should be interpreted cautiously as they are dependent on the respondents' individual experiences and recollections.

Location Distribution of Respondents

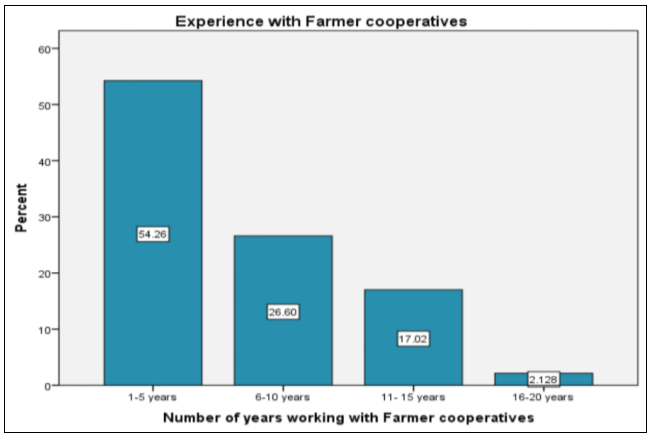


Source: Primary data, 2026.

Fig 4.6: Location Distribution of Respondents

The respondents were relatively distributed across the two wards being studied. Kalonda Ward in Kalomo Central accounted for 47.9 % (n=45) of the respondents, while Bbilili ward in Dundumwezi constituency accounted for 45.7% (n=43) and 6.4% (n=6) did not indicate the constituency and ward they residence. The relatively even distribution of respondents across the two wards provides the basis for ward-level comparison in subsequent cross-tabulation.

Experience with Farmer Cooperatives Distribution of Respondents



Source: Primary data, 2026.

Fig 4.7: Experience with Farmer Cooperatives Distribution of Respondents

Slightly more than half of the respondents, 54.3% (n=51), reported having been members of a farmer cooperative for 1 to 5 years. While, 26.6 % (n=25) held membership for 6 to 10 years, 17.0% (n=16) for 11 to 15 years and 2.1% (n=2) for 16 to 20 years. The relatively high proportion of respondents with shorter period of cooperative membership suggests that recent participation in farmer cooperatives is common among the study participants. Nevertheless, membership duration alone does not provide sufficient evidence to conclude that cooperatives or NGO-facilitated market linkages have expanded substantially in the study area over the last five years.

4.2 Effectiveness of NGOS Facilitated Market Linkages in Improving Access for Smallholder Farmers to Competitive Markets

Table 1: Frequency Distribution of Utilization of NGO-Facilitated Market Linkages in the Previous Year

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Daily	1	1.1	1.1	1.1
Weekly	1	1.1	1.1	2.1
Monthly	43	45.7	45.7	47.9
Never	49	52.1	52.1	100
Total	94	100.0	100.0	

Source: Primary data, 2026.

The findings indicate that 52.1% (n=49) of respondents reported never using NGO-facilitated market linkages, while

45.7% (n=43) reported using them on a monthly basis. Only 1.1% reported weekly use and a further 1.1% reported daily use. The distribution of that suggests, despite the presence of NGO-facilitated market linkage, the actual utilization remains limited for substantial proportion of farmer cooperative members. Among those reported of utilizing the market linkages, majority used them on a monthly basis, indicating that such market linkages were used occasionally rather than routinely.

Table 2: Comparison of Prices between NGO-Linked Market and Local Traders

Response	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Much better	35	37.2	38.0	38.0
Slightly better	28	29.8	30.4	68.5
Same	29	30.9	31.5	100.0
Total	92	97.9	100.0	

Source: Primary data, 2026.

The findings indicate that 38.0% of the respondents perceived prices in NGO-linked markets as much better than those offered by local traders, While 30.4% considered slightly better. In contrast 31.5% reported no difference in the prices between the two markets. Overall, 68.5% of respondents perceived NGO-linked market prices as offering more favorable prices than local trades. This suggests that a substantial number of respondents do engage with NGO-facilitated markets with favorable prices.

Table 3: Change in Income since Engaging with NGO-Linked Markets

Response	Frequency	Percent	Valid	Cumulative Percentage
Increased	54	57.4	57.4	57.4
Stayed the same	39	41.5	41.5	98.9
Decreased	1	1.1	1.1	100.0
Total	94	100.0	100.0	

Source: Primary data, 2026.

The findings indicate that 57.4% (n=54) respondents reported an increase in income since engaging with NGO-linked markets, while 41.5% (n=39) reported that their income had stayed the same. Only 1.1% (n=1) reported a decline in income. Nonetheless, the findings provide direct evidence that engagement with NGO-facilitated market linkages, where it occurs, is associated with a positive income effect for the majority of participating farmers. However, these findings should be interpreted cautiously, as the data is based on the reflections on respondent's self-reported experience.

Table 4: Descriptive Statistics for Market Access Variables

Variable	N	Mean	Median	SD
Utilization of NGO-facilitated market linkages	94	3.49	4.00	0.582
Comparison of prices	92	1.93	2.00	0.836
Change in income	94	1.44	1.00	0.520

Source: Primary data, 2026.

Table 4 presents the descriptive statistics of three variables: Utilization of NGO-facilitated market linkages in the previous year, Comparison of prices offered by local traders with those offered by NGOs and change in income. The mean score for utilization was 3.49 which was close to response "Never", indicating that on average, respondents used NGO-facilitated markets infrequently. The mean score for price comparison was 1.93, close to the response "Slightly better", While the mean score for was income change 1.44 corresponding closely to the response "Increased". These results generally indicating a favorable perception of NGO-facilitated market linkages.

Table 5: Utilization of NGO-Facilitated Market Linkages by Ward

Ward	Monthly, n (%)	Never, n (%)	Total
Kalonda Ward	29(64.4)	16(35.6)	45
Bbilili Ward	10(23.3)	33(76.7)	43
Total	39(44.3)	49(55.7)	88

Source: Primary data, 2026.

The cross-tabulation by ward indicates disparity in the reported utilization of NG-facilitated market linkages between the two wards. In Kalondo ward, 64.4% of respondents a monthly utilization, compared with 23.3% in Bbilili ward, where as 76.7% reported never using the linkages.

Table 6: Comparison of prices between NGO-Facilitated Markets and Local Traders by Ward

Ward	Much better, n (%)	Slightly better, n (%)	Same, n (%)	Total
Kalonda Ward	21(48.8)	10(23.3)	12(27.9)	43
Bbilili Ward	12(27.9)	14(32.6)	17(39.9)	43
Total	33(38.4)	24(27.9)	29(33.7)	86

Source: Primary data, 2026.

The findings indicated that differences were observed in price perception, in Kalondo ward 48.8% (n=86) respondents reported that prices NGO-linked market were "much better", compared to 27.9% in Bbilili ward.

Table 7: Change in income since Engaging with NGO-Facilitated Markets by Ward

Ward	Increased, n (%)	Stayed the same, n (%)	Decreased, n (%)	Total
Kalonda Ward	32(71.1)	13(28.9)	0(0.00)	45
Bbilili Ward	16(37.2)	26(60.5)	1(2.3)	43
Total	48(54.5)	39(44.3)	1(1.1)	88

Source: Primary data, 2026.

The findings indicated that 71.1% Kalondo respondents reported increased income compared to 37.2% in Bbilili ward, where 60.5% reported no change in income.

Table 8: Chi-Test of Independence: Ward and Frequency of Utilisation of NGO-Facilitated Market Linkages

N	X^2	df	P	Cramer's V
88	15.12	1	0.00	0.414

Source: Primary data, 2026.

A Chi-square test of independence was conducted to

determine whether ward of residence was significantly associated with frequency of utilization of NGO-facilitated market linkages. The results showed a statistically significant association between the two variables, X2(1, N=88) =15.12, P<.001, with a Cramer's V=0.414 indicating a moderate association. The findings suggest that farmers in Kalondo ward were significantly more likely to actively use NGO-facilitated market than those in Bbilili ward.

Table 9: Chi-Square Test of independence: Ward and Comparison of prices between NGO-Linked markets and local traders

N	X^2	df	P	Cramer's V
86	3.983	2	0.136	0.215

Source: Primary data, 2026.

The findings found that the association between ward residence and perceived price advantage was not statistically significant, X2(2, N=86) =3.98, P=.137, Cramer's V=0.215, suggesting that despite Kalondo ward respondents reported somewhat more favourable price perceptions, this did not reach statistical significance.

Overall, the findings provide evidence consistent with the alternative hypothesis (H1), which proposes that Ngo-facilitated market linkages effectively improve smallholder farmers' access to competitive markets. However, the high proportion of the respondents who reported never utilizing the linkages (52.1%), together with ward disparity indicates that the observed effectiveness is unevenly experienced across the district.

4.3 Effects of NGO-Facilitated Market Linkages in the Adoption Sustainable Agriculture

Table 10: Adoption of New Farming Practices with NGO Support

Response	Frequency	Percent	Valid Percent	Cumulative Percentage
Yes	91	96.8	98.9	98.9
No	1	1.1	1.1	100.0
Total	92	97.9	100.00	

Source: Primary data, 2026.

The finding indicate that 98.9% (n=91) of the respondents reported adopting new farming practices with support from the NGO, while only 1.1 % (n=1) reported not adopting new farming practices. The highly reported adoption rate suggests that NGO interventions have been highly effective in encouraging farmers adopt new farming methods.

Table 11: Rating of Training Provided on Sustainable Farming Methods

Response	Frequency	Percent	Valid Percent	Cumulative Percentage
Excellent	56	59.6	59.6	59.6
Good	38	40.04	40.04	100.0
Total	94	100.0	100.0	

Source: Primary data, 2026.

All respondents rated the training they received on sustainable farming methods positively, with 59.6% (n=56) rating it as "Excellent" and 40.4% (n=38) rating it as "Good". No respondent rate the training as "poor". The findings indicate a favorable assessment of the capacity-building component of NGO-facilitated interventions.

Table 12: Change in Use of Chemical Fertilizers and Pesticides

Response	Frequency	Percent	Valid Percent	Cumulative Percentage
Increased	19	20.2	20.2	20.2
Decreased	60	63.8	63.8	84.0
Stayed the same	15	16.0	16.0	100.0
Total	94	100.0	100.0	

Source: Primary data, 2026.

Approximately two-thirds of the respondents, 63.8% (n=60) reported a decrease in the use of chemical fertilizer and pesticides, while 20.2% (n =19) reported an increase and 16.0% (n=15) reported no change. The largest proportion of respondents a decreased in the use of chemical inputs indicates a strong shift towards lower reliance on chemical fertilizer and pesticides. This pattern is consistent with the adoption of more environmentally friendly farming practices promoted through NGO interventions. However, the findings reflect reported changes in the input use and does not establish the extent to which NGO support contributes directly to these changes.

Table 13: Descriptive Statistics for Sustainable Agriculture Adoption Variables

Variable	N	Mean	Median	SD
Adoption of New Farming Practices	92	1.01	1.00	0.104
Rating of Training received	94	1.40	1.00	0.493
Change in Use of Chemical Fertilizers and Pesticides	94	1.96	2.00	0.603

Source: Primary data, 2026.

The mean adoption score of 1.01 (SD=0.104), indicates very high adoption of new practices. The mean training rating of 1.40 (SD=0.493) falls between "Excellent" and "Good" and slightly closer to "Excellent", this confirms a favorable perceptions of NGO training. The mean chemical use score of 1.96 (SD=0.603), is close to "Decreased", confirming the observed trend towards reduced chemical use of fertilizer and pesticides.

Table 14: Adoption of New Farming Practices by Ward

Ward	Yes, n (%)	No, n (%)	Total
Kalonda Ward	44 (100.0)	0 (0.0)	44
Bbilili Ward	42 (97.7)	1 (2.3)	43
Total	86 (98.9)	1 (1.1)	87

Source: Primary data, 2026.

The findings indicated that the adoption of new farming practices was very high in both wards, with 100.0% (n=44) of the respondents in Kalondo ward and 97.7% (n=42) in Bbilili ward reported adopting new farming practices.

Table 15: Rating of Training Provide by Ward

Ward	Excellent, n (%)	Good, n (%)	Total
Kalonda Ward	37 (82.2)	8 (17.8)	45
Bbilili Ward	17(39.5)	26 (60.5)	43
Total	54(61.4)	34(38.6)	88

Source: Primary data, 2026.

The findings showed that the rating of training quality differed considerably across the two wards, in Kalondo ward the 82.2% of respondent rated training as "Excellent" as compared to 39.5% in Bbilili ward, where 60.5% of the respondents rated it as "Good".

Table 16: Change in Use of Chemical Fertilizers and Pesticides by Ward

Ward	Increased, n (%)	Decreased, n (%)	Stayed the same, n (%)	Total
Kalonda Ward	8 (17.8)	25 (55.6)	12 (55.6)	45
Bbilili Ward	10 (23.3)	30 (69.8)	3 (7.0	43
Total	18 (20.5)	55 (62.5)	15 (17.0)	88

Source: Primary data, 2026.

The finding revealed that the differences observed in chemical fertilizer and pesticide use revealed that 69.8% respondents in Bbbilili ward reported a decrease compared to 55.6% in Kalondo ward. This suggests that the reduction in chemical input use were, frequently reported in Bbilili ward, despite its lower proportion of respondents rating the training as "Excellent".

Table 17: Chi-Square Test of independence: Training Rating and Change in Chemical Fertilizer and Pesticide Use

N	X^2	df	P	Cramer's V
94	10.514	2	0.05	0.334

Source: Primary data, 2026.

A Chi-square test of independence was conducted to examine the relationship between the quality of training received and change in chemical input use. The results showed a statistically significant association, $X^2(2, N=94) =10.51$, $P<.005$, Cramer's $V=0.334$, indicating a moderate association. This finding suggests that respondents' rating of training quality were highly associated with reported reduction in chemical fertilizer and pesticide use.

The findings there provides empirical support for the alternative hypothesis (H_2) that there is significant positive relationship between NGO-facilitated market linkages and the adoption of sustainable agriculture practices.

4.4 Challenges farmer cooperatives, encounter in utilizing NGO-facilitated Market Linkages

Table 18: Frequency of Perceived Complexity of Joining and Using NGO Market Linkages

Response	Frequency	Percent	Valid Percentage	Cumulative Percent
Somewhat Complex	16	17.0	18.0	18.0
Simple	73	77.7	82.0	100.0
Total	89	94.7	100.0	

Source: Primary data, 2026.

The findings indicate that 82.0% (n=73) respondents reported that the process of joining and using NGO market linkages as "simple", while 18.0% (n=16) reported it as being "somewhat complex". The distribution suggests that the procedural complexity is not widely perceived as a major barrier to participation among the respondents. However, complexity reported by a small proportion indicates that challenges still exist and remain relevant factors in preventing farmers from engaging fully with NGO-facilitated market linkages.

Table 19: Frequency of Perceived extent to Which transportation costs are a barrier to Utilization of NGO Markets

Scale point	Frequency	Percent	Valid Percent	Cumulative Percent
1 (Lowest)	28	29.8	29.8	29.8
2	32	34.0	34.0	63.8
3	17	18.1	18.1	81.9
4	12	12.8	12.8	94.7
5 (Highest)	5	5.3	5.3	100.0
Total	94	100.0	100.0	

Source: Primary data, 2026.

Respondents rated the extent to which transportation costs constitute a barrier to utilizing NGO-facilitated markets on a five-point scale. The findings showed that 29.8% respondent selected the lowest value on the scale, 34.0% respondents selected the second-lowest value. A further 18.1% respondents selected the middle value and the two highest values were selected by 12.8% and 5.3% of respondents respectively. The distribution was therefore concentrated towards the lower end of scale with the lowest two value having a cumulative percent of 63.8%. This indicates that, while transportation cost are a major concern for some farmers, they are not a major barrier based on the majority of respondents.

Table 20: Frequency of Perceived extent to which transportation costs are a barrier to utilization of NGO Markets

Scale point	Frequency	Percent	Valid Percent	Cumulative Percent
1 (Lowest)	28	29.8	29.8	29.8
2	32	34.0	34.0	63.8
3	17	18.1	18.1	81.9
4	12	12.8	12.8	94.7
5 (Highest)	5	5.3	5.3	100.0
Total	94	100.0	100.0	

Source: Primary data, 2026.

Respondents rated the extent to which transportation costs constitute a barrier to utilizing NGO-facilitated markets on a five-point scale. The findings showed that 29.8% respondent selected the lowest value on the scale, 34.0% respondents selected the second-lowest value. A further 18.1% respondents selected the middle value and the two highest values were selected by 12.8% and 5.3% of respondents respectively. The distribution was therefore concentrated towards the lower end of scale with the lowest two value

having a cumulative percent of 63.8%. This indicates that, while transportation cost are a major concern for some farmers, they are not a major barrier based on the majority of respondents.

Table 21: Frequency of Overall Effectiveness of NGO Market Linkages

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Very Effective	42	44.7	44.7	44.7
Somewhat effective	51	54.3	54.3	98.9
Not Effect	1	1.1	1.1	100.0
Total	94	100.0	100.0	

Source: Primary data, 2026.

The findings show that 44.7% (n=42) rated the markets as "very effective", while the majority, 54.3% (n=51) respondents rated them as "somewhat effective". Only 1.1% (n=1) considered them as "Not effective". This indicates that the 99.9 % of the respondents rated overall effectiveness of NGO market linkages as either being very effective or somewhat effective. However, the majority of respondents reported the effectiveness as "somewhat effective". The findings suggests that although the market linkages are generally perceived be highly effective, the distribution of the ratings indicates that there is need to strength their implementation.

Table 22: Descriptive Statistics for challenge-Related Variable

Variable	N	Mean	Median	SD
Complexity of joining and using NGO market linkages	89	2.82	3	0.386
Transport cost as a barrier	94	2.30	2.00	1.181
Overall effectiveness of NGO market linkages	94	1.56	2.00	0.526

Source: Primary data, 2026.

The perceived complexity of joining and using NGO-facilitated market linkages recorded a mean score of 2.82(SD=0.386) and a median of 3.00. Transportation costs recorded a mean of 2.30 (SD=1.81) and a median of 2.00. The relatively higher standard deviation for transportation costs indicates huge variations in respondents' perceptions of transport cost as with perceived complexity of joining the market linkages. Whereas overall-effectiveness of NGO-facilitated market linkages recorded a mean of 1.56 (SD=0.520) and a median of 2.00. The findings suggest that the procedural complexity and transport costs were not generally perceived as major barriers.

Table 23: Perceived Complexity of joining and Using NGO Markets Linkages by Ward

Ward	Somewhat Complex, n (%)	Simple, n (%)	Total
Kalonda	7 (17.1)	34 (82.9)	41
Bbilili	6 (14.3)	36 (85.7)	42
Total	13 (15.7)	70 (84.3)	83

Source: Primary data, 2026.

The findings indicate that perception of the complexity of joining and NGO-facilitated were similar across two wards. The majority of the respondents in both wards describing the process as "simple", Kalondo ward accounted for 82.9% and 85.7% in Bbilili ward. This suggest that the complexity was not perceived as a major barrier to participation in NGO-facilitated market utilization in either ward.

Table 24: Transportation Costs as a Barrier by Ward

Ward	1, n (%)	2, n (%)	3, n (%)	4, n (%)	5, n (%)	Total
Kalonda Ward	16 (35.6)	9 (20.0)	10 (22.2)	8 (17.8)	2 (4.4)	45
Bbilili Ward	12 (27.9)	18 (16.3)	7 (16.3)	3 (7.0)	3 (7.0)	43
Total	28 (31.8)	27 (30.7)	17 (19.3)	11 (12.5)	5 (5.7)	88

Source: Primary data, 2026.

The findings showed that the perception of transportation cost showed differences between the two wards. In Kalondo ward, 22.2% respondents selected the two highest values on the scale, compared with 14.0% in Bbilili ward.

Table 25: Overall Effectiveness of NGO Market Linkages by Ward

Ward	Very effective, n (%)	Somewhat, n (%)	Not effective, n (%)	Total
Kalonda Ward	22 (48.9)	22 (48.9)	1 (2.2)	88
Bbilili Ward	17 (39.5)	26 (60.5)	0 (0.0)	88
Total	39 (44.3)	48 (54.5)	1 (1.1)	88

Source: Primary data, 2026.

The findings showed that 48.9% of the respondents in Kalondo ward rated the NGO-facilitated market linkages as "very effective", compared with 39.5% respondents in Bbilili ward. Bbilili ward recorded the highest proportion of respondents in rating the effectiveness of these market linkages, with 60.5% of the respondents rating the effectiveness as "somewhat effect". These findings indicate a favorable perceptions of NGO-facilitated market linkages across both wards.

Table 26: Chi-Square Test of independence: Complexity of join and use the NGO market linkages and Overall effectiveness of NGO market linkages Cross tabulation

N	X^2	df	P	Cramer's V
89	8.298	1	0.004	0.305

Source: Primary data, 2026.

A Chi-square test of independence was conduct to examine the association between perceived complexity in joining and Using NGO market linkages and the respondents' overall assessment of the effectiveness of them markets. The results indicated that there was a statistically significant association between the two variables, X2(1, N=89) =8.30, p=.004, Cramer's V=0.305, indicating a moderate association. Respondents who Perceived those processes as more complex were less likely to rate the linkages as effective.

The findings provides empirical support for alternative hypothesis (H3) that farmer cooperatives encounter significant challenges in utilizing NGO-facilitated market linkages and that these challenges have a measurable

bearing on how effective the linkages.

4.5 Discussion of research findings

4.5.1 TEffectiveness of NGOS Facilitated Market Linkages in Improving Access for Smallholder Farmers to Competitive Markets

The findings on market access is a contrast between availability of NGO-facilitated market linkages and utilization frequency by farmers. More than half of the respondents (52.1%) reported never having used these linkages, while 47.7% used them on a monthly. Among those who utilized the linkages, mainly it was occasional rather than frequently.

The ward comparison provide an in-depth understanding of market access. The significant association between ward and utilization, X2 (1, n=88) =15.12, p<.001, with Cramer's V=.414, shows that famers' experience varied according to location. Farmers in Kalonda ward reported a higher utilization than those in Bbilili ward. The moderate strength of association indicates a meaningful association between location and the utilization of NGO-facilitated market linkages. Orejudos *et al*. (2022) [25] and Methamontri *et al*. (2022) [18] highlighted that participation in collective market participation was highly influenced by institutional factors such as access to extension services, information and membership in farmers' organization. The recent studies demonstrated that even when institutional factors negatively influencing the underutilization of these market linkage are taken care of, the utilization of these linkages can still remain low.

The observed disparities across the two wards are consistent with the findings of Upla *et al*. (2022) [29] which found that farmer in kalomo face challenges associated with transport, market access and credit. Similarly, Iddrisu *et al*. (2025) found that distance to market negatively affected market participation among small holder farmers in Ghana. Magakwe and Olorunfemi (2024) [15] also identified high transactional costs, inadequate information, weak infrastructure and weak extension services as barriers to collective market linkages in the Sub-Saharan Africa.

The findings reveal that NGO-facilitated market linkages were perceived to offer favorable price. Among the farmers who utilized NGO-facilitated market linkages, 38.0% considered the prices offered much better than those offered by local traders, while 30.4% considered them slightly better. Thus, 68.5% of the respondents perceived NGO-linked market prices as being better than those offered by local traders. This argument aligns with the findings by Magakwe and Olorunfemi (2024) [15] that collective marketing improves market access, bargain power, income and livelihoods by helping individual farmers overcome transactional cost and resource constraints. Similarly, the study indicates that cooperatives strengthens farmers' bargaining position by aggregating their produce as a way of improving market access.

Despite the favorable price perceptions, the qualitative finding showed that better prices do not necessarily translate into stronger barging power. A theme generated from 16 participant responses "buyers-determined prices with limited farmer bargaining power." Indicated that farmers had limited influence on the final price. This aligns with Ma, Sonobe and Gong (2024) [14], who found that collective bargaining power helps smallholder farmers improve their market position. Strengthening of farmers' bargaining opportunities remains relevant even with the current support of NGO-market linkages.

The finding on income demonstrates positive livelihood effect. While 57.4%, reported an increase in income, 41.5 % reported no change and only 1.1% reported a decrease since engaging with NGO-facilitated market linkages. The theme generated from 14 participants, though moderate showed that additional income helped farmers meet their house hold needs, replay loans and also save money. This agrees with Kalogiannisdis, Karafolas and Chatzitheodoridd (2024), who associated agriculture cooperatives contribute to stable income and improved market access through shared resources, information and bargaining power.

Transactional inefficiencies, a theme from the responses of 12 participants reported that transaction disruptions involving delayed collection, quality rejection and changes in quantity requirements. The challenges highlight the need for reliable collection schedules, clear quality and quantity requirements, because exposes farmer to post harvest losses and forces them to seek alternative buyers who might exploit them. Orejudos *et al*. (2022) [25], found that delayed payment and unfavorable market conditions discouraged collective market participation. The findings indicates that effectiveness of NGO-facilitated market linkages depends on the reliability of completing all transaction process smoothly.

NGO trainings plays a vital role in market participation. Responses of 17 participants highlighted the value of NGO training, inputs and demonstrations. This indicates that market linkages operate well when combined with production knowledge and resources that help farmers in meet market requirements.

Post-harvest handling was another important finding. 15 participants reported using practices such as early harvesting, sorting and storing of produce in secure storage rooms. These practices help preserve produce quality and meet competitive market requirements. This finding suggests that NGO-facilitated markets linkages influence production and post-harvest behavior of farmers aside from market access.

Farmers also remained exposed to market and production risks, this was derived from the theme generated from the responses by 13 participant which states "identified Income uncertainty driven by price, market demand and weather volatility". This aligns with the sustainable Livelihood Framework, which recognized vulnerability such as climate shocks and economic changes.

In general, the findings suggests that NGO-facilitated market linkages are associated with more favorable prices, high income benefits, improved post-harvest management and strong stakeholder relationships. These findings provide empirical evidence for the alternative hypothesis H1, that NGO-facilitated market linkages effectively improve smallholder farmers' access to competitive markets.

4.5.2 Effects of NGO-Facilitated Market Linkages in the Adoption Sustainable Agriculture

The findings indicate high adoption of sustainable agricultural practices. Nearly all the respondents reported adopting new farming practices, while 1.1% reported not having adopted them. Regarding training, 59.6% of the respondents it as excellent and 40.4% rated it as good. These findings are supported by qualitative responses from 19 participants who identified soil building and low-input practices as beneficial and impactful. Both findings suggest

that the capacity building component of the NGO intervention support sustainable agriculture adoption. The findings are in agreement with Mpinda *et al*. (2025) [20] who found that extension services, climate-smart agriculture trainings and information enhance the adoption of improved seeds and crop diversification. Similarly, Gudina and Alemu (2024) [9] identified extension services, training and field-day participation as importance factors influencing climate smart agriculture adoption.

The findings further show that approximately 63.8% of respondents reported reduced use of chemical fertilizer and pesticides, while 20.2% reported an increase and 16.0% reported not change. Qualitative responses from 19 participants indicated that intercropping and crop rotation helped improve soil fertility and reduce pest infestation. These findings suggest a shift towards lower usage of chemical inputs among smallholder farmers. The reduction in chemical dependence is consistent with the environment dimension of sustainable agriculture as it aims at protecting soil health, water quality, biodiversity and environment in general. The findings are in agreement with Sithole and Olorunfemi (2024) who identified crop rotation, intercropping, improved seed varieties, use of manure and mulching as the most commonly adopted sustainable agricultural practices in Sub-Saharan Africa. Tembo *et al*. (2025) [28] similarly found that conversation, soil management, mixed farming and intercropping contributed to productivity and resilience among Zambian smallholder farmers.

The Chi-square results revealed a significant association between training quality and changes in chemical input use X2 (2, n=94) =10.51, p<.05, with Cramer's V=.334. The moderate association provides quantitative evidence for the importance of training in the adoption of sustainable agriculture practices. The findings align with the qualitative evidence from 19 participants, who recognized the benefits of soil-building and low-input practices, suggesting that practical knowledge contributes to changes in farming behavior.

Qualitative findings from 14 respondents, further showed that sustainable agriculture adoption was also influenced family land legacy and environmental protection, rather than income alone. This demonstrates the social and environmental dimension of sustainability, aligning with sustainable Livelihood Framework which considers natural capital as an important livelihood asset. Maintaining soil fertility, water resource and productive land means protecting natural assets upon which smallholder farmers depend on for their livelihood.

Despite high adoption rates, qualitative findings indicated that technical knowledge gaps persisted. Sixteen participant identified gaps in trainings, particularly in chemical-free pesticides and disease control. Farmers recognized the importance of reducing chemical use some lacked the practical knowledge on chemical-free pesticides. The findings corresponds with Mazibuko *et al*. (2023) [17] who identified economic constraints and ineffective technology transfer as barrier to sustainable vegetable production. Gudina and Alemu (2024) [9] also identified lack of capital, inadequate information, labour shortages and limited technical knowledge as barriers to climate-smart agriculture adoption. Ouko *et al*. (2024) [26], who found that weak market linkages and limited technical knowledge remain barriers to agro ecology adoption.

Ward-level comparisons revealed disparities in the training offered and chemical input use. In Nantele ward 82.2% of respondents rated the trainings as "Excellent" compared to 39.5% in Bbilili ward. Nevertheless, 69.8 % of respondents indicating a decrease in chemical usage in Bbilili ward as compared to 55.6% in Nantela ward. Qualitative findings highlights that 10 participants reported sudden pest infestations encouraged farmers to return to chemical input usage. These findings suggest that the training quality alone may not fully explain the adoption patterns.

Generally, the findings suggests NGO-facilitated market linkages support the adoption of new farming practices, this is evident through the high adoption rates, positive trainings assessments and the significant association between the quality of training and changes in chemical input use.

The findings therefore provide empirical evidence for the Alternative hypothesis H2, there is significantly positive relationship between NGO-facilitated market linkages and the adoption of sustainable agriculture practices.

4.5.3 Challenges Farmer Cooperatives, Encounter in Utilizing NGO-Facilitated Market Linkages

The quantitative findings showed that while 82.0% of the respondents described joining and using NGO-facilitated market linkages as "simple," 18.0% considered it to be "somewhat complex." This suggests procedural complexity was not a major challenge utilizing NGO-facilitated market linkages for most famers.

Transportation costs as a barrier also received relatively low ratings, with 63.8% of the respondents selecting the two lowest barrier categories. However qualitative findings revealed that 18 participants identified transport unreliability as costly to farmers, because delays contributed to spoilage and reduced produce value. The findings suggest that transport costs were less of concern than unreliable transportation. These findings partly relate to Wale, Chipfupa and Hadebe (2021) [30] who identified land tenure insecurity, access to land without complementary resources and distance from irrigation schemes as barriers to entrepreneurship.

Recordkeeping challenges emerged as the recurring administrative among 17 Participants. This challenge relates to the descriptive statistics on education background, which revealed that 92.6% of the respondent had attained secondary education or below. Simplified recordkeeping systems and practical training would help address this challenge.

Another important theme reported by 9 participant highlighted the importance of pricing transparency and consistent timely engagements. Although farmers viewed NGO-linked markets prices favorable, limited information about price determination affected the farmer's confidence to participate. This agrees with the findings of Magakwe and Olorunfemi (2024) [15], who identified mistrust among members as a barrier.

Unclear communication channels and NGO contact person were identified by 15 participants. This highlights the need for better information dissemination and transparency. The finding agrees with the findings by Hassan *et al*. (2025) [11], that inadequate funding, inadequate sensitization and bureaucratic procedures were major barriers to cooperative participation in Nigeria.

The association between complexity of joining market linkages and perceived effectiveness has important implications. It suggests that simplifying processes and

providing clearer guidance which would enhance the effectiveness of NGO-facilitated market linkages. The findings relate to Magakwe and Olorunfemi (2024) [15] who found that weak farmer organizations and gaps in supporting policies hinder collective marketing participation.

The Chi-square test analysis revealed a statistically significant association between perceived complexity and the overall effectiveness and using NGO-facilitated market linkages and overall effectiveness, X2 (1, n=89) =8.30, p=.004, with Cramer's V=.305. The results suggest that while majority of the farmers do not finding the process very complex, slight significant minority do and this complexity negatively affects their perception of effectiveness.

In general, the he findings demonstrates that farmer cooperatives encounter several challenges in using NGO-facilitated market linkages, particularly recordkeeping, unclear communication, pricing transparency and transport reliability. However, it indicated that complexity of joining NGO-facilitated market linkages was perceived not be complex. Further, procedural complexity was significantly associated with perceived effectiveness.

The findings therefore provide empirical evidence for the Alternative hypothesis H3, there is significantly positive relationship between complexity of joining NGO-facilitated market linkages and the perceived effectiveness of NGO-facilitated market linkages.

5. Conclusion and Recommendations

5.1 Overview

This chapter presented the conclusion and recommendations of the study on examining the effectiveness of NGO-facilitated market linkages on sustainable agriculture: a case study of farmer cooperatives in selected wards of Kalomo District. The conclusion will be drawn from the major findings discussed in chapter four and five and presented in accordance with the study objectives, research questions and hypothesis. The chapter also offers recommendations based on the findings of the study and recommendations for further research.

5.2 Conclusion

The study examined the effectiveness of NGO-facilitated market linkages on sustainable agriculture among farmer cooperatives in selected wards of Kalomo District. The study was focused on three areas, namely the effectiveness of NGOs facilitated market linkages in improving access for smallholder farmers to competitive markets, the effects of NGO-Facilitated Market Linkages in the adoption sustainable agriculture and the challenges farmer cooperatives, encounter in utilizing NGO-facilitated Market Linkages. The findings provide empirical evidence that NGO-facilitated market linkages contribute to improved market access, and the adoption of sustainable agricultural practices. However, the benefits are not experienced uniformly and utilization of market linkages continue being encountering several challenges.

The study found that while NGO-facilitated market linkages were available, but utilization remained limited. More than half of the respondents (52.1%) reported never having used these linkages, while 47.7% used them on a month basis. Among those who utilized the linkages, the benefits were visible. About 68.5% of the respondents perceived prices as being better than those offered by local traders, while 57.4% reported an increase in income since engaging with NGO-linked markets. Significant ward disparity were observed, in Kalonda ward, 64.4 % of respondents used NGO-facilitated markets on a monthly basis, compared to only 23.3% in Bbilili ward, whereas 76.7 % reported never using them. The findings there indicate that the effectiveness of market linkages depends on both the availability and the utilization of by farmers.

The study found that the adoption rate of new farming practices with the support from NGO was nearly-universal. The training received by the farmers were positively rated, with 56.5 % rating it "Excellent" and 40.4% rating it "Good". With regards to decrease in the use of chemical input, 63.8% reported a decrease, while 20.2% reported an increase and 16.0% reported not change.

A Chi-square test revealed a statistically significant association between quality of training and reduction in the use of chemical inputs. This suggests that respondents who rated NGO training more highly were more likely to report a reduction in chemical fertilizer and pesticide use.

A cross tabulation revealed ward level differences in the quality training received, with 82.2% respondents in Kalonda wards rating the training as "Excellent" compared to 39.5% in Bbilili ward. In terms of decrease in the chemical input utilization, the study observed an inverse relationship to the quality of trainings, with Bbilili ward reporting the highest reduction rate of 69.8% compared to Kalonda with 55.6 % reeducation rate.

The study found that 82.0% of the respondents descried the process of joining and using NGO-facilitated market linkages as "simple," 18% found it "somewhat complex." Transportation costs on the other hand, were identified as a barrier by a minority of responses, with 63.3% of the respondents selecting the lowest points on the barrier rating scale. The overall effectiveness of the market linkages was positively rated, with 44.7% describing it as "very effective" and 54.3% as "somewhat effective."

A Chi-square test revealed a statistically significant association between perceived complexity and overall effectiveness, indicating that respondents who found the process more complex were less likely to rate the linkage as effective.

5.3 Recommendations

1. Strengthen Market infrastructure: The government, in collaboration with NGOs and private sector partners, should invest in improving rural roads infrastructure and transportation networks to reduce transportation costs and unreliability. This specifically important for Bbilili ward, where utilization of NGO-facilitated market linkages was significantly lower.
2. Support Cooperative Development: Policymakers should prioritize strengthening farmer cooperatives through capacity building, access to credit and technical support. Stronger cooperatives can enhance collective bargaining power, improve market access and facilitate adoption of sustainable agricultural practices.
3. Align Trade Policies with smallholder farmers' Interests: The government should review trade restrictions, such as maize export bans, which have been shown to cost farmers approximately US$97 million annually. Policies should be designed to protect

smallholder farmers' access to regional and international markets while ensuring national food security.
4. Simplify Processes and Improve Communication: NGOs should simplify the process of joining and using market linkages, improve communication channels to ensure farmers understand how the linkages operate, how buyers are selected and how prices are determined. This is critical for building trust and enhancing perceived effectiveness.
5. Strengthen Internal Governance for Cooperatives: Framer Cooperatives should strength their internal governance structures to ensure transparency, accountability and equitable participation of all members. This includes rules for decision-making, pricing and distribution of benefits.
6. Invest in Member Training: Cooperatives should invest in training their members on sustainable agricultural practices, recordkeeping and market negotiation. This will enhance the collective capacity of the cooperative to utilize NGO-facilitated market linkages effectively.
7. Diversify Market Outlets: Cooperatives should explore diverse market outlets, including regional and international markets, to reduce dependency on a single buyer or market. This will enhance resilience to market shocks and price volatility.

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