

Marketing Institutional Arrangements on Livelihood Outcomes of Conservation Agriculture Farmers in ASAL Areas in Kenya.

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ABSTRACT

Agriculture is the main livelihood source for most rural households in Sub-Saharan Africa, making improved farming practices essential for poverty reduction and sustainable livelihoods. This study examined the effect of marketing institutional arrangements on livelihood outcomes among Conservation Agriculture (CA) farmers in Makueni and Machakos Counties, Kenya. A cross-sectional survey design was employed. Data were analysed using descriptive and inferential statistics. The findings indicate that CA farmers access both direct and indirect marketing channels, with direct marketing being the dominant approach. Both marketing arrangements positively contributed to livelihood outcomes by enhancing market access and income opportunities. The study concludes that marketing institutional arrangements play a significant role in improving livelihood outcomes among CA farmers. It recommends that national and county governments, together with development partners, strengthen market linkages, particularly through contract farming, to expand commercial opportunities and improve livelihoods of Conservation Agriculture farmers.

Keywords: Livelihood outcomes, Conservation agriculture, Marketing institutional arrangements, direct marketing, indirect marketing.

INTRODUCTION

Background to the Study

Agriculture remains a critical pillar of Kenya's economy and livelihoods, employing over 70% of the rural population either directly or indirectly and contributing significantly to food security and income generation (World Bank, 2023). However, agricultural productivity in Kenya, particularly in the Arid and Semi-Arid Lands (ASALs), continues to face significant challenges due to poor agronomic practices, land degradation, and increasing climate variability. Studies have shown that recurrent droughts, erratic rainfall patterns, declining soil fertility, and unsustainable land-use practices have contributed to reduced agricultural productivity and weakened livelihood resilience among smallholder farmers in ASAL regions (Mwangi et al., 2021). In addition, land degradation resulting from soil erosion, overgrazing, and inappropriate land management practices has diminished the productive capacity of agricultural land, further constraining agricultural output (Mganga et al., 2018). In response to these challenges, both government and development partners have promoted Conservation Agriculture (CA) as a climate-smart and sustainable farming approach. Conservation Agriculture is defined by the Food and Agriculture Organization as a resource-efficient agricultural system based on three interlinked principles: minimum soil disturbance, permanent soil cover, and diversified crop rotations (FAO, 2020). Rather than a single technology, CA represents a suite of adaptable practices that, when applied together, enhance soil health, improve water use efficiency, and stabilize yields under variable climatic conditions. These attributes make CA particularly suitable for ASAL contexts where resource constraints and climatic risks are pronounced. However, despite sustained promotion efforts, the adoption of Conservation Agriculture among smallholder farmers in Kenya remains relatively low and uneven. Evidence suggests that many farmers adopt only selected CA practices rather than the complete package of principles due to socioeconomic, institutional, and biophysical constraints, thereby limiting the realization of its full benefits (Cherono et al., 2021; Musafiri et al., 2022).

Empirical evidence across Sub-Saharan Africa indicates that CA can improve soil structure, reduce erosion, increase organic matter, and enhance crop productivity over time (Steward et al., 2018; Thierfelder et al., 2021). Recent studies in Eastern Africa further demonstrate that CA adoption can reduce production costs, enhance yield stability, and increase farm profitability, thereby contributing to improved household food security and resilience (Kassam et al., 2022; Corbeels et al., 2023). Despite these benefits, the livelihood gains from CA adoption remain uneven, particularly among smallholder farmers in marginal environments. This variation suggests that the benefits derived from CA are influenced not only by production-related factors but also by farmers' ability to convert increased output into income and other livelihood outcomes. Where market access is limited, transaction costs are high, or farmers possess weak bargaining power, productivity gains may not translate into meaningful improvements in household welfare. Consequently, the institutional arrangements through which farmers access and participate in agricultural markets become critical in determining the extent to which CA adoption contributes to sustainable livelihood improvement. Where such arrangements are weak or absent, the economic incentives for adopting and sustaining CA practices are significantly reduced.

One critical but often under-examined factor influencing the livelihood outcomes of CA farmers is the nature of marketing institutional arrangements. In ASAL areas, smallholder farmers frequently face weak market linkages, limited access to structured markets, price volatility, high transaction costs, and inadequate market information (USAID, 2021; IFAD, 2022). Marketing institutions such as farmer cooperatives, contract farming schemes, aggregation centers, and public-private partnerships play a vital role in linking farmers to input and output markets, stabilizing prices, improving bargaining power, and facilitating access to credit and extension services.

Recent literature suggests that improved institutional market arrangements can enhance the welfare impacts of sustainable agricultural practices by enabling farmers to translate productivity gains into higher and more stable incomes (Barrett et al., 2020; Minten et al., 2021). For CA farmers in Kenya's ASALs, effective marketing institutions may therefore be a key pathway through which CA adoption contributes to broader livelihood outcomes, including income diversification, asset accumulation, food security, and resilience to climate shocks.

Research Objective

The study sought to assess marketing institutional arrangements on livelihood outcomes of Conservation Agriculture farmers in ASAL areas in Kenya.

Research Hypothesis

H0₁: There is no significant effect of marketing institutional arrangements on livelihood outcomes of Conservation Agriculture farmers in ASAL areas in Kenya.

LITERATURE REVIEW

Institutional arrangements are the formal and informal rules, contracts, and governance structures that regulate economic exchanges and coordinate activities among actors pursuing shared or individual objectives (Ménard & Shirley, 2014). In agricultural markets, marketing institutional arrangements include contracts, cooperatives, farmer groups, trader networks, and public-private partnerships that shape how farmers access markets, negotiate prices, and enforce agreements. These arrangements are particularly important for smallholder farmers operating in marginal environments such as Kenya's Arid and Semi-Arid Lands (ASALs), where markets are often fragmented and risky. Smallholder farmers dominate Kenya's agricultural sector, accounting for approximately 75% of total agricultural output and about 70% of marketed agricultural produce, while large-scale producers contribute a relatively smaller share of marketed output. In the ASAL regions, where agricultural production is predominantly undertaken by smallholder crop and livestock producers, farmers often face high transaction costs, weak market linkages, limited access to market information, and low bargaining power. Consequently, effective marketing institutional arrangements play a

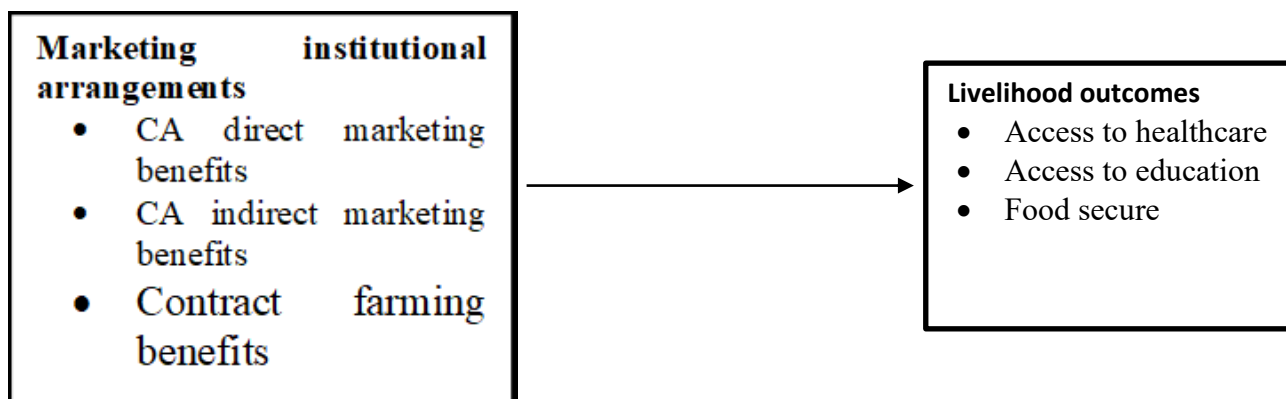
critical role in facilitating market participation, reducing transaction costs, and improving household incomes among smallholder farmers. (Muricho, 2015; Ogada, 2014; Ministry of Agriculture and Livestock Development, 2021).

Transaction cost economics provides a useful framework for understanding the role of marketing institutions. Transaction costs refer to the resources expended in exchanging goods and services, including costs associated with searching for market information, negotiating agreements, and monitoring and enforcing contracts (Fafchamps, 2020). In smallholder agricultural marketing, these costs are often high due to poor infrastructure, price volatility, quality uncertainty, and information asymmetries.

Recent literature categorizes transaction costs into three broad types. Search and information costs arise when farmers seek buyers, price information, and quality standards, a process that is particularly costly in remote ASAL areas (Minten et al., 2021). Bargaining and decision costs emerge during price negotiations and contract formulation, often exacerbated by unequal bargaining power between farmers and traders (Sitko & Jayne, 2014). Monitoring and enforcement costs relate to ensuring compliance with agreed terms and are heightened by weak legal and institutional enforcement mechanisms common in rural markets (Poulton et al., 2018).

For Conservation Agriculture farmers, effective marketing institutional arrangements are critical in translating productivity gains into improved livelihood outcomes. Although CA can enhance soil health and yield stability, the associated livelihood benefits depend on farmers' ability to access reliable and remunerative markets (Kassam et al., 2022). In Kenya's ASAL areas, weak marketing institutions may limit incentives for CA adoption and reduce its potential impact on income, food security, and resilience. This highlights the need to empirically examine how marketing institutional arrangements influence transaction costs, transaction risks, and livelihood outcomes among Conservation Agriculture farmers.

Conceptual Framework



Independent Variable

Dependent Variable

RESEARCH METHODOLOGY

The target population for this study was 5091 CA farmers Makueni and Machakos Counties out of which a sample of 384 CA farmers were selected based on the Cochran (1963) formula. Key informants were also selected and they included 55 group leaders of farmer group. Stratified sampling was employed to identify the CA farmers by dividing the population into strata or homogenous subgroups and then using systematic sampling to select the nth item by dividing the population in each strata by the sample size. Primary data was collected using face to face questionnaire survey. Guided by the Sustainable Livelihoods Framework (SLF), livelihood outcomes were operationalised using two household welfare indicators: (i) household food availability and (ii) the household's ability to cater for education and healthcare expenses. These indicators were selected because they represent immediate and observable welfare outcomes among smallholder

farming households in Kenya's ASAL areas where food security and expenditure on basic social services constitute key dimensions of livelihood improvement.

Piloting of the research instruments was conducted in Machakos County and the respondents who participated were not sampled in the main study. All Likert scale items were reliable since they had coefficients of at least 0.6. Data was analyzed using descriptive and inferential statistics with the help of Statistical Package for Social Sciences. The study employed descriptive statistics to measure the effects of the socioeconomic characteristics associated with conservation agriculture. In this regard, the study measured the mean for skills on conservation agriculture, non-farm activities and the access to income of the targeted farmers. This study relied on multi regression analysis to examine the effect of independent variables on the dependent variable. In addition to questionnaires, 34 out of 55 targeted leaders of the groups were interviewed.

RESULTS AND DISCUSSION

The questionnaire achieved a response rate of 70.29 % which statistically is considered more than sufficient for data analysis and was thus used for making inferences regarding the effect of marketing institutional arrangements on livelihood outcomes of conservation agriculture farmers in Makueni and Machakos counties.

Marketing institutional arrangements and Livelihood Outcomes

First, farmers were asked to indicate whether they had sold their produce in the last harvest season of which the majority, 68% said that they sold while the remaining 31.2% indicated to have never sold their produce in the previous harvest season. Second, for those who sold, the study sought to find out the price per kilogram at which they sold the main crop under CA produce. Summary findings are presented in Table 1 below.

Table 1: Descriptive Statistics on the Price of Produce (N=269)

Produce	Price in Kshs. /kg			
	Min	Max	Mean	Std. Deviation
Maize	40	80	55.50	0.450
Beans	95	130	92.5	12.213
Cowpeas	135	156	140.50	20.178

The price of maize produce ranged between a minimum of Kshs 40 to Kshs. 80 per kilogram while that of beans ranged between a minimum of Kshs. 95 to Kshs. 130 with a mean of Kshs. 92.50. For cowpeas, farmers sold at mean price Kshs. 140.50 per kg with a standard deviation of Kshs. 20.178.

Concerning the question of whether the price was better in the last harvest season, the majority of the farmers indicated no at 74.47%. With respect to marketing arrangements used to sell produce, the majority of the CA farmers adopted direct marketing (selling in the local village) while only a few farmers sold their produce through brokers. On payment, statistics show that farmers get paid immediately when they submit their produce to the buyers (within a week). This is attributed to direct marketing preferred by most of them in the previous harvest season. These findings imply that farmers get their dues faster and hence, the marketing arrangement is perceived to be very efficient.

Table 2: Descriptive Statistics on Marketing Arrangement

Variable	Frequency	Percent
Was the price better in the last season?		
Yes	20	23.53
No	65	74.47
Total	85	100.00
Market arrangement used for selling		

Sale in local village	62	73.2
Market arrangement used for selling		
Sale in local village	62	73.2
Sale to schools	9	10.8
Sale to contract farmers	3	3.3
Sale to brokers	11	12.6
Total	85	100.0
How long do you take to receive payment?		
Within a week (immediately)	75	88.1
1 Week	4	5.2
After a month	6	6.7
Total	85	100.0

In addition, farmers who had sold before (in the previous seasons) were asked to indicate their preferred marketing arrangement and the kind of agreement they had with their buyers. Table 3 below presents descriptive statistics.

Table 3: Descriptive Statistics on Preferred Marketing Arrangement

Variable	Frequency	Percent
Preferred Marketing arrangement		
Direct marketing-spot markets	112	41.6
Indirect marketing-contract farming (brokerage)	157	58.4
Total	269	100.0
What kind of agreement did you have with the buyer?		
Individual written contracts	31	11.5
Group written contracts	3	1.1
Individual verbal agreement	185	68.8
Group verbal agreement	50	18.6
Total	269	100.0

According to statistics, most CA farmers prefer indirect marketing-contract farming. This can be attributed to less complexities and exploitation associated with indirect marketing arrangements such as selling through brokers and contract farming. On the question of the kind of agreement the farmers had with the buyers, the study reveals that most farmers had individual verbal agreements. This supports the argument that most farmers sold their produce through direct marketing. Furthermore, farmers were asked to state the extent to which they agreed to statements related to marketing institutional arrangement on a scale of 1-5. Descriptive results are presented in Table 4 below.

Table 4: Descriptive Statistics on Marketing Institutional Arrangement (N=269)

Variable	SA	A	N	D	SD	Mean	Std. Deviation
	%	%	%	%	%		
The buyer normally collects farm produce from my farm;	69.5	20.1	0.00	10.0	0.40	1.52	0.95

The buyer caters for transportation cost of farm produce to the market;	54.3	10.4	0.00	33.5	1.90	2.18	1.42
There is a guaranteed market for farm produce;	4.8	0.00	0.00	94.8	0.40	3.91	0.43
The market prices for farm produce are adequate;	0.00	0.00	0.00	9.70	90.3	4.90	0.29
The buyer offers farm inputs;	0.00	0.00	0.00	8.90	91.1	4.91	0.29
The buyer offers extension services;	0.00	0.00	0.00	8.90	91.1	4.91	0.29
The buyer normally provides specifications with regard to quantity and quality of farm produce to be supplied.	21.2	29.0	39.4	8.90	1.5	2.41	0.97
Mean: Strongly Agreed=1.00-1.80, Agreed=1.81-2.60, Neither Agree nor Disagree=2.61-3.40, Disagree=3.41-4.20, Strongly Disagree=4.21-5.00							

The mean responses on marketing institutional arrangement range from strongly agree to strongly disagree. For instance, while farmers strongly disagree with the statement that the market prices for farm produce are adequate, the buyer offers farm inputs and that buyers offer extension services, they on the other hand strongly agreed that the buyer normally collects farm produce from their farms, the buyer caters for transportation cost of farm produce to the market and that the buyer normally provides specifications with regard to quantity and quality of farm produce to be supplied. This implies that the participants had mixed reactions on the marketing arrangements. The findings are consistent with a study conducted by Donkor et al., (2018) in Nigeria where it was reported that large households in rural areas are mostly constrained with financial burdens hence tend to avoid transaction costs and other marketing risks which are associated with the participation in the direct marketing channels. Another study conducted by Oyekale and Matsane (2014) in South Africa revealed that the return for the majority of the farmers for sale of vegetables was low.

Factor Analysis

The study conducted a factors analysis to extract components of marketing institutional arrangement. Table 5 below indicates that two factors were extracted from this process which adopted PCA. The extracted components account for 78.304 of variance in the whole dataset of marketing institutional arrangement.

Table 5: Total Variance Explained on Marketing Institutional Arrangement

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.323	61.752	61.752	4.323	61.752	61.752	4.177	59.670	59.670
2	1.159	16.553	78.304	1.159	16.553	78.304	1.304	18.634	78.304
3	.784	11.193	89.498						
4	.495	7.066	96.564						
5	.193	2.757	99.321						
6	.048	.679	100.000						

7	- .002E -013	-1.028E- 013	100.000						
Extraction Method: Principal Component Analysis.									

Next, the rotated component matrix shows that the first two variables associated with access to direct marketing are substantially loaded on the first component while the last five variables related to access to indirect marketing are adequately loaded on the second component (see Table 6 below).

Table 6: Rotated Component Matrix

Variables	Component	
	Access to direct marketing	Access to indirect marketing
The buyer normally collects farm produce from my farm;	.919	.007
There is a guaranteed market for farm produce;	.557	.029
The buyer caters for transportation cost of farm produce to the market	.029	.929
The market prices for farm produce are adequate;	.165	.959
The buyer offers farm inputs;	.149	.959
The buyer offers extension services;	.149	.959
The buyer normally provides specifications with regard to quantity and quality of farm produce to be supplied;	.103	.528

Table 7 below presents descriptive statistics of the extracted component on marketing institutional arrangement. According to the findings, farmers had a strong agreement on the statements associated with access to direct marketing with a mean of 1.32 and standard deviation of 0.20. In addition, there was a strong agreement among the CA farmers on the arguments associated with access to indirect marketing (contract).

Table 7: Descriptive Statistics on Marketing Institutional Arrangement

Component	Mean	Std. Deviation	Cronbach Alpha
Access to direct marketing	1.32	.20	0.90
Access to indirect marketing	1.20	.10	0.88
Mean: Strongly Agreed=1.00-1.80, Agreed=1.81-2.60, Neither Agree nor Disagree=2.61-3.40, Disagree=3.41-4.20, Strongly Disagree=4.21-5.00			

The means of the two components indicates that farmers strongly agreed on the arguments related to marketing institutional arrangement. For instance, the mean results indicate that farmers strongly agreed to accessibility to the direct market. In addition, they strongly agreed with statements concerning accessibility to indirect marketing. The findings, therefore, imply that farmers have access to both direct and contract marketing channels. These results tend to be inconsistent with a study by Umberger et al., (2015) where the authors found that in many SSA countries, the marketing of agricultural commodities remains a challenge for most smallholder producers.

Qualitative Findings on Marketing Institutional Arrangements

The qualitative interviews corroborated the quantitative findings by highlighting several mechanisms through which marketing institutional arrangements influence household livelihoods. Four dominant themes emerged.

First, respondents acknowledged that direct marketing provides immediate cash payments, enabling households to purchase food and meet urgent domestic expenses.

One group leader explained:

"When farmers sell directly in local markets, they receive cash immediately and can buy household necessities without waiting for long payment periods."

Second, although farmers preferred contract marketing because of the possibility of guaranteed markets and stable prices, very few had access to formal contracts.

Another respondent noted:

"Many farmers would like contract farming, but opportunities are few and buyers rarely enter formal agreements with small producers."

Third, inadequate institutional support emerged as a recurring concern. Most leaders indicated that buyers rarely provide extension services, production inputs, or reliable price guarantees despite expecting quality produce.

Finally, respondents observed that price fluctuations remained the greatest marketing challenge affecting household welfare despite improvements in market access.

These qualitative findings reinforce the quantitative evidence by demonstrating that while market access exists, institutional weaknesses continue to limit the livelihood benefits derived from Conservation Agriculture.

Regression Analysis on Marketing Institutional Arrangement and Livelihood Outcome

To investigate the effect of marketing institutional arrangement on livelihood outcomes, the study regressed livelihood outcome variables on the access to direct and access to contract marketing institutional arrangement variables with the aid of OLS estimator. The use of food availability and the ability to finance education and healthcare reflects key dimensions of household welfare that are particularly relevant in ASAL regions where food insecurity and limited access to essential social services remain major development challenges. While these indicators do not capture every dimension of the Sustainable Livelihoods Framework, they provide meaningful proxies for short-term livelihood improvement resulting from participation in agricultural marketing arrangements. Summary findings are presented in Table 8 below.

Table 8: Regression Results on the Effect of Marketing Institutional Arrangement on Livelihoods

	Model 1					Model 2				
	B	Std. Error	Beta	T	Sig.	B	Std. Error	Beta	T	Sig.
Independent										
(Constant)	-.815	.061		13.36	.000	.418	.071		5.8871	.000
Access to Direct Marketing	.107	.061	.107	1.749	.082	.119	.051	.312	2.333	.042
Access to indirect marketing	-.022	.081	-.022	-.272	.723	-.032	.041	-.02	-.780	.423
Dependent	Availability of food					Catering for education and healthcare				
R – squared	0.366					0.012				
Adj. R squared	0.327					0.004				

Std. Error	0.9978	.997
F – ratio (2, 263)	4.592	3.753
Prob. > F	0.040	0.000

The probability of the ANOVA test shows that the findings are statistically significant. The R squared statistic of 0.012 indicates that marketing institutional arrangement accounts for 1.2 % variation in the CA farmer's catering for education and healthcare while the R squared 0.366 shows that marketing institutional arrangement accounts for 36.6% changes in availability of food. This means that marketing institutional arrangement has a very low impact on catering for social services of the CA farmers.

The relatively low coefficient of determination, particularly for the education and healthcare model, suggests that livelihood outcomes are influenced by numerous socioeconomic and institutional factors beyond marketing arrangements. Variables such as household size, educational attainment, farm size, off-farm income, access to agricultural credit, extension services, and market distance may also influence household welfare but were outside the scope of the present regression models. Consequently, the estimated coefficients should be interpreted as representing the independent contribution of marketing institutional arrangements rather than the complete explanation of livelihood outcomes.

According to the findings, there is a positive and statistically significant relationship between access to direct marketing and catering for education and healthcare. Though the coefficient for availability of food is also positive, its p-value shows that the coefficient is not statistically significant. Concerning access to indirect marketing, the study has found a negative relationship with both availability of food and catering for education and healthcare. Nevertheless, these coefficients are not statistically significant. This could imply that access to indirect marketing among the CA farmers in Machakos and Makueni is not statistically significant when it comes to availability of food and catering for education and healthcare which are the variables for livelihood outcomes.

Hypothesis Testing

The study conducted Hypothesis testing based on regression analysis output. Rejection or acceptance of a hypothesis depends on the p-values. In this study, the null hypothesis was rejected when $p < 0.05$, otherwise accepted. Table 9 shows that the null hypotheses was rejected given the p-value of less than 0.05. This means that there is a significant influence of marketing arrangement on livelihood outcomes.

Table 9: Summary of Hypothesis Testing

No	Hypothesis	P value	Verdict
H0 ₁	There is no significant effect of marketing institutional arrangements on livelihood outcomes in ASAL areas in Kenya.	0.000<0.05	Reject

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary of the Findings

The study examined the effect of marketing institutional arrangements on the livelihood outcomes of Conservation Agriculture (CA) farmers in Machakos and Makueni counties. Descriptive findings showed that although most farmers (68%) sold their produce during the previous harvest season, nearly three-quarters (74.5%) perceived that prices were not better than those obtained in previous seasons. This suggests that while market participation among CA farmers is relatively high, favourable prices remain a challenge, potentially limiting the livelihood benefits derived from agricultural production.

The study further established that direct marketing, particularly the sale of produce within local villages, was the most commonly used marketing channel. Farmers also reported receiving payment promptly, with the majority being paid within one week of delivery. These findings indicate that direct marketing provides quick cash flow, which is important for meeting immediate household needs such as food, education, and healthcare. However, despite its widespread use, farmers expressed dissatisfaction with market prices, implying that timely payment alone does not necessarily translate into improved income if prices remain low.

Interestingly, when asked about their preferred marketing arrangements, a larger proportion of respondents expressed a preference for indirect marketing through contract farming. This suggests that although farmers predominantly engage in direct marketing because it is more accessible, they recognize the potential advantages of contract arrangements, including market security, reduced marketing risks, and greater price stability. However, the relatively low participation in contract marketing indicates the existence of barriers such as limited access to formal buyers, inadequate contractual opportunities, or insufficient institutional support.

The factor analysis further strengthened these findings by identifying two distinct dimensions of marketing institutional arrangements: access to direct marketing and access to indirect marketing. Both dimensions demonstrated high internal consistency and explained a substantial proportion of the variation in the data, indicating that the measurement construct was statistically reliable. Farmers strongly agreed that they had access to both forms of marketing arrangements, suggesting that multiple marketing options exist within the study area. Nevertheless, responses also revealed that buyers rarely provided farm inputs, extension services, guaranteed markets, or satisfactory prices. This indicates that while physical market access exists, the institutional support necessary to maximise farmers' livelihood outcomes remains inadequate.

Regression analysis provided further insights into the relationship between marketing institutional arrangements and livelihood outcomes. Access to direct marketing exhibited a positive and statistically significant influence on farmers' ability to cater for education and healthcare expenses, implying that direct market participation contributes to household welfare by generating income that can be used to finance essential social services. Although direct marketing also showed a positive relationship with food availability, the effect was not statistically significant, suggesting that improvements in food security may be influenced by additional factors beyond marketing arrangements alone.

In contrast, access to indirect marketing recorded negative but statistically insignificant relationships with both food availability and the ability to cater for education and healthcare. These findings suggest that although contract farming and brokerage arrangements exist, they have not yet translated into measurable improvements in livelihood outcomes among the sampled CA farmers. This may be attributed to the limited participation in such arrangements, the small number of farmers engaged in formal contracts, or the relatively weak institutional structures supporting contract marketing within the study area.

Overall, the findings demonstrate that marketing institutional arrangements contribute to livelihood outcomes primarily through direct marketing channels, which provide immediate market access and timely payments. However, the descriptive findings also reveal persistent challenges relating to low produce prices, limited institutional support, and inadequate market guarantees, all of which constrain the full livelihood benefits that farmers can derive from agricultural marketing. Despite the limited contribution of indirect marketing at the household level, the overall hypothesis test showed that marketing institutional arrangements significantly influence livelihood outcomes, leading to the rejection of the null hypothesis. This finding underscores the importance of strengthening both direct and indirect marketing systems to enhance the welfare of Conservation Agriculture farmers.

Conclusion

From the findings, the study concludes that direct marketing remains the predominant marketing channel among Conservation Agriculture (CA) farmers, with the majority selling their produce directly to customers

within local markets, while only a few participate in contract marketing or brokerage arrangements. Although direct marketing enables farmers to receive payments promptly and contributes positively to household welfare, farmers remain dissatisfied with the prices received, suggesting that market access alone does not guarantee improved incomes. The regression results further indicate that direct marketing significantly enhances farmers' ability to cater for education and healthcare, whereas the influence of indirect marketing on livelihood outcomes was not statistically significant. The study therefore concludes that strengthening both market access and institutional support mechanisms is essential for improving the livelihood outcomes of CA farmers.

Study Limitations

This study has several limitations, which are discussed below:

1. The cross-sectional research design captures relationships at one point in time and therefore cannot establish causal relationships between marketing institutional arrangements and livelihood outcomes.
2. The study relied primarily on self-reported information, which may be affected by recall bias and social desirability bias.
3. Although the regression models identified statistically significant relationships, livelihood outcomes are influenced by numerous household, institutional, and environmental factors that were not included in the present models, creating the possibility of omitted variable bias.
4. The findings are based on Conservation Agriculture farmers in Machakos and Makueni Counties and therefore should be generalised cautiously to other ASAL regions with different institutional and market contexts. Nevertheless, the relatively large sample size and the use of mixed methods strengthen confidence in the findings.

Recommendations

Based on the study findings, which indicate that the majority of Conservation Agriculture (CA) farmers market their produce directly to customers and that both direct and indirect marketing positively influence livelihood outcomes, the following recommendations are proposed to enhance market access and improve farmers' livelihoods:

1. Diversify marketing channels: CA farmers should diversify their marketing channels beyond direct sales by exploring contract farming, cooperative marketing, and other structured market arrangements to enhance income security, reduce market risks, and improve market resilience.
2. Strengthen market linkages and extension support: Agricultural extension services should facilitate stronger linkages between CA farmers and reliable markets while providing timely market information and training on effective marketing strategies to enable farmers to make informed marketing decisions.
3. Improve market infrastructure and farmer organizations: Government and development partners should invest in market infrastructure, including storage facilities, aggregation centres, and rural road networks, while supporting the formation and strengthening of farmer organizations to improve market access, increase bargaining power, and maximize the livelihood benefits derived from both direct and indirect marketing channels.

Suggestions for future research

Future studies should adopt longitudinal research designs to establish causal relationships between marketing institutional arrangements and livelihood outcomes. Further research should also incorporate additional livelihood indicators such as household income, asset accumulation, resilience to climate shocks, and

subjective well-being to better reflect the multidimensional nature of livelihoods under the Sustainable Livelihoods Framework. Incorporating household socioeconomic characteristics, access to financial services, and market infrastructure into regression models would further improve explanatory power and provide a more comprehensive understanding of factors influencing livelihood outcomes.

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