

# Assessing the Welfare Effects of Cooperative Membership Among Smallholder Farmers in Zambia: Evidence from Chisamba and Chibombo Districts

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## Abstract

Agricultural cooperatives are frequently promoted as vehicles for improving rural welfare, yet district-level empirical evidence from Zambia remains limited. This article assessed the welfare effects of cooperative membership among smallholder farmers in Chisamba and Chibombo Districts using data from a quantitative cross-sectional survey of 398 respondents. Primary data were collected through structured face-to-face interviews. The welfare analysis focused on respondents' retrospective before-and-after assessments of access to agricultural inputs, markets, credit, agricultural knowledge, socio-economic support, maize productivity per hectare, and household meals consumed per day. Descriptive statistics were used to summarize the distributions, while symmetry chi-square tests and the Stuart-Maxwell marginal homogeneity test were employed to evaluate statistically significant shifts in paired ordinal responses. The descriptive results showed marked improvements following cooperative membership. Easy access to agricultural inputs increased from 10.81% to 89.95%, market access from 12.57% to 87.69%, credit access from 8.29% to 88.19%, knowledge access from 13.32% to 95.23%, and socio-economic support from 15.33% to 93.46%. Farmers producing at least 25 bags of maize per hectare increased from 11.05% to 81.15%, while households consuming three or more meals per day rose from 12.31% to 91.96%. The symmetry chi-square and Stuart-Maxwell tests showed statistically significant improvements across all welfare dimensions examined, namely access to agricultural inputs, market access, credit access, knowledge access, socio-economic support, maize production per hectare, and number of meals consumed per day (all  $p < .001$ ). The findings suggest that cooperative participation is strongly associated with multidimensional welfare improvement among smallholder farmers. Strengthening cooperative service delivery, accountability, and sustained member participation could deepen welfare gains in rural Zambia.

**Keywords:** cooperative membership, welfare, smallholder farmers

## Introduction

Agricultural cooperatives are voluntary, member-owned enterprises through which farmers organize to meet shared economic and social needs. In smallholder settings, they are expected to lower transaction

costs, strengthen bargaining power, improve access to services, and reduce the disadvantages that arise when farmers operate individually in imperfect markets (International Cooperative Alliance [ICA], 2005; Markelova et al., 2009; Shiferaw et al., 2011). Their importance is particularly pronounced in rural economies where households face recurrent constraints in input access, output marketing, information flows, and finance.

A growing body of evidence shows that collective action through farmer organizations can improve agricultural performance and household welfare. Studies from Ethiopia and Kenya report that cooperative participation is associated with higher technical efficiency, stronger market participation, and better welfare outcomes among smallholders (Abate et al., 2014; Bernard & Spielman, 2009; Fischer & Qaim, 2012; Geffersa, 2024). These benefits are often realized through bundled services such as input procurement, training, extension support, market aggregation, and social intermediation. At the same time, the magnitude of these gains depends on cooperative functionality, member commitment, and the broader institutional environment.

The Zambian case makes this question especially important. Agriculture remains central to rural livelihoods, and smallholder production continues to dominate much of the country's agrarian economy (Chisanga & Chapoto, 2015). Rural poverty also remains disproportionately high, making institutional mechanisms that can improve production and welfare particularly relevant (United Nations Development Programme [UNDP], 2017). In response, cooperatives have been promoted as channels for linking farmers to inputs, technology, finance, and organized markets. However, empirical evidence from Zambia indicates that benefits are uneven and that cooperative performance varies substantially across contexts (Blekking et al., 2021; Manda et al., 2020; Mundia et al., 2023).

Despite this policy emphasis, there is still limited district-specific evidence on how cooperative participation relates to multidimensional welfare outcomes. Much of the available literature emphasizes input access or generalized livelihood improvement, with less integrated attention to markets, credit, knowledge, socio-economic support, productivity, and food security within the same empirical frame. This article addresses that gap by assessing the welfare effects of cooperative membership among smallholder farmers in Chisamba and Chibombo Districts of Zambia. Specifically, it examines retrospective changes in access to key productive resources, maize production per hectare, and household food security, while also drawing on complementary income-related evidence from the wider dissertation.

## **Methodology**

### **Study design and setting**

The study employed a quantitative cross-sectional survey design. It was conducted in Chisamba and Chibombo Districts of Central Province, Zambia - two agriculturally important districts characterized by strong smallholder farming activity and a dense cooperative presence. The design allowed the researcher to collect information on respondent characteristics, welfare indicators, and cooperative participation at one point in time while also capturing respondents' retrospective assessments of their welfare conditions before and after cooperative membership.

### **Population, sample size, and sampling**

The target population comprised registered smallholder farmers in the two study districts. According to district agricultural records used in the dissertation, the study population was approximately 83,600 farmers. Sample size determination followed Yamane's formula for finite populations with a 5% margin of error, yielding a required sample of 398 respondents (Yamane, 1967). A combination of stratified and

cluster random sampling was used to draw the sample from cooperative-dense farming areas across the two districts.

$$n = \frac{N}{1 + Ne^2}$$

with  $N = 83,600, e = 0.05 \Rightarrow$

$$n = \frac{83,600}{1 + 83,600(0.05)^2} = \frac{83,600}{1 + 209} = \frac{83,600}{210} = 398.1 \approx 398.$$

### **Data collection and measures**

Primary data were collected through structured face-to-face interviews. The questionnaire captured socio-demographic characteristics, cooperative participation, household welfare indicators, and complementary income-related information. The welfare indicators analyzed in this article were access to agricultural inputs, access to markets, access to credit, access to agricultural knowledge, access to socio-economic support, maize production per hectare, and the number of meals consumed per day. The instrument was pre-tested in both districts, and the dissertation reported acceptable internal consistency reliability for the core scales (Cronbach's alpha = 0.80).

### **Data analysis**

Data were entered, cleaned, and analyzed using IBM SPSS Statistics version 27, together with Microsoft Excel and Stata 17 for selected stages of the wider study analysis. For the present article, descriptive statistics were used to summarize respondent characteristics and the distribution of welfare indicators. Symmetry chi-square tests and the Stuart-Maxwell marginal homogeneity test were applied to assess whether the retrospective before-and-after changes in paired ordinal welfare responses were statistically significant. All tests were interpreted at the 5% significance level.

### **Ethical considerations**

Ethical clearance was obtained from the University of Lusaka Ethics Committee before fieldwork commenced. Administrative permission was also secured from the relevant district agricultural offices and local authorities. Participation was voluntary, informed consent was obtained from all respondents, and confidentiality was maintained through anonymized data handling and secure storage of completed research materials.

## **Results**

### **Respondent characteristics**

A total of 398 smallholder farmers participated in the study. Table 1 shows the key socio-demographic and farm characteristics of the sample. Women accounted for 56.3% of respondents, and nearly three-quarters were married. The age structure was concentrated in the mature farming years, with the largest single age group being 52-57 years (17.8%). Most respondents had primary education (61.1%), half had more than 10 years of farming experience (50.8%), and crop farming was the main occupation for 93.7% of the sample. Almost all respondents reported owning land, although only 14.3% held formal land titles. The study dataset also indicated that 87.4% of respondents were current cooperative members.

**Table 1 Selected socio-demographic and farm characteristics of respondents (n = 398)**

Characteristic	n (%)
<b>Gender</b>	
Male	174 (43.7%)
Female	224 (56.3%)
<b>Age group (years)</b>	
16-21	2 (0.5%)
22-27	12 (3.0%)
28-33	24 (6.0%)
34-39	56 (14.1%)
40-45	59 (14.8%)
46-51	62 (15.6%)
52-57	71 (17.8%)
58-63	61 (15.3%)
>64	51 (12.8%)
<b>Marital status</b>	
Single	48 (12.1%)
Married	295 (74.1%)
Divorced	13 (3.3%)
Separated	5 (1.3%)
Widowed	37 (9.3%)
<b>Education level</b>	
Primary education	243 (61.1%)
Secondary education	120 (30.2%)
Tertiary education	19 (4.8%)
Never attended school	16 (4.0%)
<b>Farming experience</b>	
Less than 2 years	14 (3.5%)
2-5 years	82 (20.6%)
5-10 years	100 (25.1%)
More than 10 years	202 (50.8%)

<b>Main occupation</b>	
Crop farming	373 (93.7%)
Livestock keeping	9 (2.3%)
Business	4 (1.0%)
Other	12 (3.0%)
<b>Household size</b>	
1	22 (5.5%)
2	106 (26.6%)
3	149 (37.4%)
4	89 (22.4%)
>5	32 (8.0%)
<b>Land ownership</b>	
Yes	390 (98.0%)
No	8 (2.0%)
<b>Land title ownership</b>	
Yes	57 (14.3%)
No	341 (85.7%)
<b>Current cooperative membership</b>	
Yes	348 (87.4%)
No	50 (12.6%)

*Note. Percentages are based on the full sample of 398 respondents and may not sum to exactly 100.0% because of rounding.*

### **Changes in welfare indicators before and after cooperative membership**

Table 2 presents the full descriptive distributions for the welfare indicators before and after cooperative membership. Before joining a cooperative, the majority of respondents rated access to agricultural inputs, markets, credit, knowledge, and socio-economic support as difficult or not accessible. After joining, the distributions shifted sharply toward the very easy and fairly easy categories. The same pattern was observed for maize productivity and household meals consumed per day, indicating substantial gains in both production capacity and food security.

**Table 2**
**Descriptive distribution of welfare indicators before and after cooperative membership (n = 398)**

Welfare indicator	Category	Before joining n (%)	After joining n (%)
<b>Access to agricultural inputs</b>			
	Very easy	22 (5.53%)	101 (25.38%)
	Fairly easy	21 (5.28%)	257 (64.57%)
	Difficult	341 (85.68%)	34 (8.54%)
	Not accessible	14 (3.52%)	6 (1.51%)
<b>Access to markets</b>			
	Very easy	13 (3.27%)	122 (30.65%)
	Fairly easy	37 (9.30%)	227 (57.04%)
	Difficult	340 (85.43%)	37 (9.30%)
	Not accessible	8 (2.01%)	12 (3.02%)
<b>Access to credit</b>			
	Very easy	7 (1.76%)	142 (35.68%)
	Fairly easy	26 (6.53%)	209 (52.51%)
	Difficult	339 (85.18%)	45 (11.31%)
	Not accessible	26 (6.53%)	2 (0.50%)
<b>Access to knowledge</b>			
	Very easy	21 (5.28%)	209 (52.51%)
	Fairly easy	32 (8.04%)	170 (42.71%)
	Difficult	325 (81.66%)	19 (4.77%)
	Not accessible	20 (5.03%)	0 (0.00%)
<b>Access to socio-economic support</b>			
	Very easy	15 (3.77%)	171 (42.96%)
	Fairly easy	46 (11.56%)	201 (50.50%)
	Difficult	321 (80.65%)	24 (6.03%)
	Not accessible	16 (4.02%)	2 (0.50%)
<b>Maize production per hectare (50 kg bags)</b>			
	Less than 10	143 (35.93%)	22 (5.53%)

	10-25	211 (53.02%)	53 (13.32%)
	25-40	34 (8.54%)	81 (20.35%)
	More than 40	10 (2.51%)	242 (60.80%)
<b>Meals consumed per day</b>			
	1 meal	34 (8.54%)	3 (0.75%)
	2 meals	315 (79.15%)	29 (7.29%)
	3 meals	49 (12.31%)	312 (78.39%)
	More than 3 meals	0 (0.00%)	54 (13.57%)

Note. Each indicator is reported using the original categorical distribution from the dissertation. The before-membership value for “more than 3 meals per day” was recorded as 0 (0.00%). Percentages are column percentages within each indicator.

The shift was especially pronounced for knowledge and socio-economic support. Before membership, 81.66% of respondents reported difficult access to agricultural knowledge and 80.65% reported difficult access to socio-economic support. After membership, these shares fell to 4.77% and 6.03%, respectively. For credit, the proportion reporting very easy or fairly easy access increased from 8.29% before membership to 88.19% after membership. Similarly, the share of respondents producing more than 40 bags of maize per hectare increased from 2.51% to 60.80%, while the share consuming at least three meals per day rose from 12.31% to 91.96%.

**Table 3**

**Inferential tests for changes in welfare indicators before and after cooperative membership**

Welfare indicator	Symmetry $\chi^2$	Df	P	Stuart-Maxwell $\chi^2$	Df	p
Access to agricultural inputs	293.11	6	< .001	288.06	3	< .001
Access to markets	288.87	5	< .001	287.93	3	< .001
Access to credit	307.28	6	< .001	302.00	3	< .001
Access to knowledge	336.51	5	< .001	318.28	3	< .001
Access to socio-economic support	321.21	6	< .001	305.94	3	< .001
Maize production per hectare	303.98	6	< .001	288.59	3	< .001
Meals consumed per day	328.46	6	< .001	317.47	3	< .001

Note. All symmetry and Stuart-Maxwell tests were statistically significant at  $p < .001$ , indicating that the distribution of responses changed materially after cooperative membership across all welfare indicators.

The inferential evidence in Table 3 confirms that the observed welfare shifts were not random. All symmetry and Stuart-Maxwell statistics were highly significant, with the largest Stuart-Maxwell values recorded for access to knowledge ( $\chi^2 = 318.28$ ), meals consumed per day ( $\chi^2 = 317.47$ ), and socio-

economic support ( $\chi^2 = 305.94$ ). Taken together, the descriptive and inferential results point to broad welfare improvements associated with cooperative participation.

Additional descriptive evidence reinforces this pattern. The main household food source was either own production alone (46.73%) or own production supplemented by food purchases from shops (48.99%), while reliance on donated food was minimal (1.01%). Furthermore, 70.1% of respondents reported that their household income had generally improved due to cooperative membership, and the dissertation found a statistically significant association between cooperative membership status and perceived household income improvement (Pearson  $\chi^2 = 14.623$ ,  $p = .002$ ).

## Discussion

This study provides strong evidence that cooperative membership is associated with multidimensional welfare improvement among smallholder farmers in Chisamba and Chibombo Districts. The most immediate gains were observed in the domains that shape day-to-day agricultural viability: access to inputs, markets, credit, knowledge, and socio-economic support. The pattern is important because it shows that cooperatives matter not only as input channels, but also as institutional platforms through which farmers gain information, networks, and practical livelihood support.

The substantial improvements in access to agricultural inputs and markets are consistent with the logic of collective action. When farmers organize through cooperatives, they are better positioned to aggregate demand for inputs, reduce procurement costs, coordinate sales, and negotiate more favorably with traders and service providers (Markelova et al., 2009; Shiferaw et al., 2011). The present findings therefore reinforce earlier evidence that farmer organizations can reduce market frictions and improve the terms under which smallholders participate in agricultural value chains (Bernard & Spielman, 2009; Fischer & Qaim, 2012). In Zambia specifically, the results align with studies showing that cooperative structures can expand access to agricultural inputs and technology adoption, while also extending the evidence to welfare domains beyond input delivery alone (Blekking et al., 2021; Manda et al., 2020).

The gains in knowledge access deserve particular attention. Agricultural knowledge is a decisive welfare channel because it influences production decisions, risk management, post-harvest handling, and marketing behavior. The sharp post-membership shift toward very easy and fairly easy access suggests that cooperatives in the study area are serving as conduits for training, extension, peer learning, and practical information exchange. This finding is consistent with broader evidence that cooperative membership can support learning effects and strengthen farmers' capacity to adopt more productive practices (Abate et al., 2014; Geffersa, 2024).

The results on maize productivity and meals consumed per day strengthen the welfare argument further because they capture both production and consumption outcomes. The rise in the proportion of farmers producing more than 40 bags of maize per hectare, together with the large increase in households consuming at least three meals per day, indicates that cooperative participation may improve welfare through interlinked pathways: better access to inputs and knowledge can raise output, while better output and market access can improve food availability and purchasing power. In rural Zambia, where food security remains a central component of household welfare, these improvements are highly consequential (UNDP, 2017).

The supplementary income-related evidence points in the same direction. Most respondents reported that cooperative participation had improved household income, and the dissertation showed that active membership status was significantly associated with perceived income improvement. This finding

suggests that cooperative benefits may be strongest where membership is not merely nominal but functionally active, financially current, and tied to real service access. In practice, this means that the strength of cooperative institutions and the quality of member engagement are likely to shape the extent of welfare gains.

These findings should nevertheless be interpreted with caution. The study used a cross-sectional design and relied on retrospective self-reporting of conditions before and after membership, which means the results are best understood as strong associations rather than definitive causal effects. Recall bias and subjective response tendencies may also have influenced some assessments. Even so, the study remains important because it examines multiple welfare dimensions simultaneously, applies appropriate inferential tests for paired ordinal data, and provides detailed district-level evidence from a large sample of smallholder farmers.

### Conclusion and Policy Implications

The evidence presented in this article indicates that cooperative membership is strongly associated with improved welfare among smallholder farmers in Chisamba and Chibombo Districts. After joining cooperatives, farmers reported markedly better access to agricultural inputs, markets, credit, knowledge, and socio-economic support. They also reported substantially higher maize productivity and better household food security, reflected in the sharp increase in the number of households consuming at least three meals per day. Taken together, these results position cooperatives as broader welfare-enhancing institutions rather than narrowly transactional organizations.

The policy implications are clear. First, government and development partners should strengthen the service delivery capacity of agricultural cooperatives, especially in input procurement, market coordination, knowledge transfer, and rural financial intermediation. Second, cooperative support should place greater emphasis on governance, accountability, and member trust so that members remain active and financially committed. Third, food security and productivity interventions should be integrated more deliberately into cooperative development strategies, given the strong linkage observed between cooperative participation, maize output, and meals consumed per day. Finally, future research should build on these findings using longitudinal or quasi-experimental designs that can estimate the welfare effects of cooperative membership with greater causal precision.

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### Data Availability

The data is available from the corresponding author upon reasonable request.

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