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Pricing strategies of smallholder farmers in Zambia: Challenges and implications for income and sales

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Abstract

The Paper presents a study that analyzed the pricing strategies employed by smallholder farmers in Zambia and their effects on income and sales volume. A mixed-methods approach was used, surveying 80 farmers from Luapula and other provinces. Findings reveal that 51% of farmers use market-based pricing, 31.4% use cost-plus pricing, 8.8% use penetration pricing, and 8.8% use skimming pricing. Market research is conducted by 85% of farmers, yet 52.9% rely primarily on peer information. Key challenges include fluctuating market prices (29.7%), crop seasonality (20.3%), inconsistent production costs (17.6%), and limited access to market information (16.2%). Correlation analysis showed market-based pricing positively correlates with income and sales volume ($\rho = 0.226$, $p = 0.044$), while cost-plus pricing showed a negative correlation ($\rho = -0.302$, $p = 0.006$). Skimming pricing negatively correlated with market-based pricing ($\rho = -0.236$, $p = 0.035$), and penetration pricing showed no significant effect. These findings suggest that strategy effectiveness depends on crop type, market conditions, and access to accurate pricing information. Recommendations included strengthening market information systems, cooperative marketing, cost analysis training, and diversified pricing approaches.

Keywords: Smallholder farmers; Pricing strategies; Challenges; Income; Sales volume and Zambia

1. Introduction

Agriculture is central to Zambia's economic development, with over 70% of the population relying on farming for their livelihoods (World Bank, 2022). Smallholder farmers, who cultivate most of the country's arable land, play a pivotal role in the production of staple crops such as maize, rice, ground nuts, and soybeans (Chikowo, 2013). These farmers are critical to both food security and rural economic development, yet they face significant challenges in establishing effective pricing strategies for their agricultural products. Limited access to market information, fluctuating commodity prices, high input costs, and dependence on intermediaries often constrain their ability to set competitive and profitable prices (Chapoto, 2016; Mwanaumo et al., 2018; Ngalande, 2022).

A primary obstacle to confronting smallholder farmers is the lack of comprehensive and accurate market information. Many farmers rely on local traders or middlemen to sell their produce, often without sufficient knowledge of prevailing market prices, regional demands, or national trends (Chisanga, 2019). This information asymmetry leaves farmers vulnerable to exploitation, as middlemen frequently set prices below fair market value. Seasonal fluctuations further exacerbate the challenge, as supply and demand variations result in price volatility, complicating long-term planning and the development of stable pricing strategies (Burke & Harrison, 2011; Larson, 1990). Zambia's agricultural market is also influenced by external factors, notably government policies. Price stabilization interventions, such as the Food

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Reserve Agency's (FRA) floor prices for maize, are designed to support farmers' incomes and mitigate market fluctuations.

However, these mechanisms have not consistently reached smallholder farmers, who often encounter logistical barriers or lack information about the programs (William & Harrison, 2011; Chisanga, 2019). Consequently, many smallholders continue to face constraints in accessing fair and profitable prices for their products (Chapoto, 2016).

Technological innovations offer potential solutions to these challenges. Mobile technologies and digital platforms for price discovery and market access can provide real-time information, reduce reliance on intermediaries, and enable farmers to make informed pricing decisions (Crawford, 2009 & Derek, 2017). Access to such tools can empower farmers to negotiate better prices, identify profitable markets, and enhance income stability.

In addition to technology, cooperative marketing, value addition, and direct-to-consumer strategies have emerged as viable approaches to improving price outcomes. These interventions allow farmers to pool resources, access larger and more diverse markets, and reduce dependence on intermediaries, thereby increasing bargaining power and income potential (Ngalande, 2022). Nevertheless, adoption of these strategies remains limited, with many smallholders operating independently, underscoring the need to expand access and support.

Hence the study sought to analyze the pricing strategies employed by smallholder farmers in Zambia, by examining the factors that influence their pricing decisions and exploring approaches to enhance their effectiveness. The study specifically analyzed how market access, production costs, government interventions, bargaining power, and value addition affect pricing outcomes. Furthermore, the study incorporated statistical findings from a survey of 80 smallholder farmers, which revealed that 51% use market-based pricing, 31.4% apply cost-plus strategies, and 85% conduct market research to inform their pricing decisions. Challenges identified included fluctuating market prices (29.7%), seasonality (20.3%), inconsistent production costs (17.6%), and limited access to market information (16.2%).

By integrating empirical data with a review of existing literature, the study aimed to provide evidence-based recommendations for developing effective pricing strategies that enhance profitability, sustainability, and resilience among smallholder farmers in Zambia's agricultural sector (Antonaci & Demeke, 2014; Chisanga, 2019).

1.1. Problem Statement

Smallholder farmers constitute the backbone of Zambia's agricultural sector, providing the bulk of staple food production and contributing significantly to rural livelihoods and national food security. Despite their centrality to the economy, these farmers face persistent challenges in securing fair and competitive prices for their produce. A major constraint lies in the absence of effective pricing strategies, which is compounded by inadequate access to market information, seasonal fluctuations in commodity prices, and escalating production costs. These factors often force smallholder farmers to sell their produce at prices below production costs, thereby reducing profitability and undermining their capacity to reinvest in agricultural productivity.

One of the most critical issues is the lack of timely and reliable market information, which leaves many smallholders dependent on intermediaries who exercise considerable power in price negotiations. This asymmetry in market knowledge often results in exploitative pricing practices that disadvantage farmers. The seasonal nature of Zambia's agricultural market further exacerbates this problem, as oversupply during harvest periods drives down prices, leaving farmers vulnerable to income instability. Although government interventions, such as the Food Reserve Agency's (FRA) price floors for maize, are designed to stabilize prices, they have not consistently benefited smallholders due to limited awareness, weak institutional capacity, and logistical barriers in accessing such programs.

The absence of a comprehensive framework for understanding the determinants of pricing strategies in Zambia's agricultural sector has led to fragmented and often ineffective approaches to price setting among smallholder farmers. Consequently, many farmers continue to grapple with low incomes and limited economic empowerment, thereby constraining agricultural growth and rural development.

This study therefore sought to analyze the pricing strategies currently employed by smallholder farmers in Zambia, identify the key challenges they face, and propose evidence-based solutions to strengthen their pricing decision-making processes. By addressing these gaps, the research aims to enhance the profitability, sustainability, and competitiveness of smallholder farming, thereby contributing to the broader objectives of agricultural transformation and rural development in Zambia.

1.2. Main Aim

To analyze the pricing strategies of smallholder farmers in Zambia and the factors influencing their pricing decisions.

1.2.1. Main Objectives

- To analyze the current pricing strategies employed by smallholder farmers in Zambia.
- To identify the key challenges faced by smallholder farmers in determining effective pricing for their products
- To examine the implications of these pricing strategies and challenges on farmers' income and sales performance.

2. Literature Review

2.1. Introduction

Agriculture is the backbone of Zambia's economy, employing over 70% of the population and contributing significantly to food security and rural livelihoods (World Bank, 2022). Smallholder farmers, who cultivate most of the country's arable land, are central to the production of staple crops such as maize, rice, ground nuts, and soybeans (Chikowo, 2013). Despite their critical role, these farmers face substantial challenges in accessing fair and competitive prices for their produce. Factors such as limited market information, seasonal fluctuations in supply, high production costs, dependence on intermediaries, and ineffective government interventions often undermine their ability to adopt effective pricing strategies (Chapoto, 2016; Ngalande, 2022; Chisanga, 2019). Consequently, smallholder farmers frequently sell their produce at prices below production costs, reducing profitability and limiting opportunities for investment in improved farming practices. Thus, study sought to analyze the pricing strategies employed by smallholder farmers in Zambia, identify the factors influencing their pricing decisions, and explore strategies to enhance market access, profitability, and sustainability in the agricultural sector.

2.1.1. Agricultural Pricing Strategies for Smallholder Farmers in Zambia: Challenges and Opportunities

Research indicates that smallholder farmers employ both cost-based (cost-plus) and market-based pricing strategies in determining the prices of their agricultural produce. Cost-plus pricing ensures coverage of production costs but may reduce market competitiveness, whereas market-based pricing aligns with prevailing supply and demand conditions, potentially increasing sales volume but exposing farmers to income volatility (Bhasin, 2019; Crawford, 1997; Burke & Jayne, 2011). In Zambia, the effectiveness of these pricing strategies is constrained by several challenges, including limited access to market information, the influence of intermediaries, seasonal variations in crop production, and price fluctuations (Ngalande, 2022; World Bank, 2022).

2.1.2. Market Information and the Role of Intermediaries

A fundamental challenge confronting smallholder farmer in Zambia is the limited availability of reliable and timely market information. Chapoto and Zulu-Mbata (2016) highlight that rural smallholders often rely on local traders or intermediaries who set prices below prevailing market rates. These middlemen exert considerable power over farmers due to the asymmetry of market information and farmers' dependence on them for transporting produce to larger markets. Weak bargaining power, exacerbated by limited market knowledge, further leaves farmers vulnerable to exploitation (Ngalande, 2022). Seasonal fluctuations in supply and demand exacerbate this situation, creating pronounced price volatility and undermining the ability of smallholders to develop stable and effective pricing strategies (Chikowo, 2013; Burke & Harrison, 2011).

2.1.3. Government Interventions

External factors, particularly government policies, play a critical role in shaping agricultural pricing strategies. In Zambia, the Food Reserve Agency (FRA) implements price floors for staple crops such as maize to stabilize markets and protect farmers. However, these interventions often fail to reach smallholders effectively due to logistical challenges and inadequate dissemination of information (Chisanga, 2019). Antonaci and Demeke (2014) further caution that while price controls are intended to protect farmers, they may inadvertently distort market signals, potentially undermining long-term market dynamics. These observations underscore the need for more efficient, transparent, and inclusive policy interventions to ensure that smallholder farmers can fully benefit from government support mechanisms.

2.1.4. Technological Innovations and Cooperative Structures

Technological innovations offer promising solutions to some of the challenges faced by smallholder farmers. Mobile technologies and digital platforms can provide real-time market price information, enhance transparency, and enable direct interactions between farmers and buyers, reducing reliance on intermediaries (Desktop, 2024). Additionally, agricultural cooperatives allow farmers to pool resources, access larger markets, and enhance their collective bargaining power, thereby mitigating some of the limitations imposed by middlemen and limited market knowledge (Derek, 2017; Ngalande, 2022). Despite these advantages, the adoption of both technological solutions and cooperative strategies remains limited due to inadequate infrastructure, low awareness, and weak organizational capacity.

2.1.5. Price Volatility and Production Costs

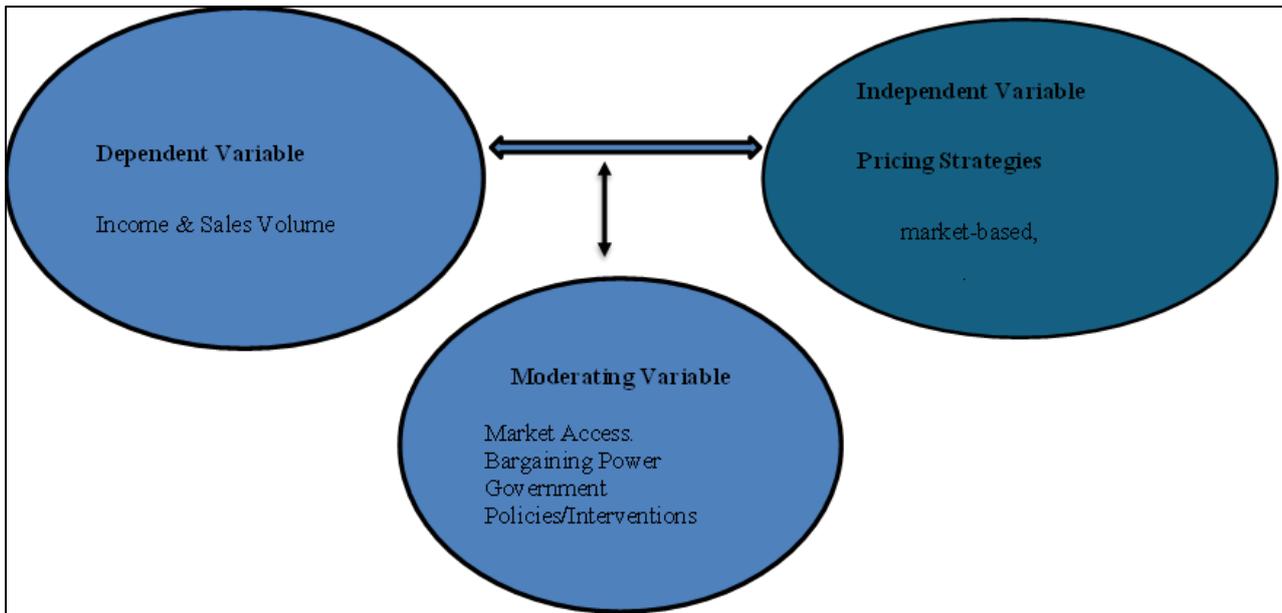
Price volatility represents a persistent challenge for smallholder farmers in Zambia. Fluctuating market prices, particularly for maize, undermine income stability and hinder effective financial planning (Burke & Harrison, 2011). Larson (1990) notes that global commodity price dynamics further exacerbate local price instability, complicating efforts to develop sustainable pricing strategies. High and inconsistent production costs including expenditures on seeds, fertilizers, and labor often result in farmers receiving prices below production costs, limiting profitability and the capacity for reinvestment (Burke & Harrison, 2011 & Crawford, 2009).

2.2. Theoretical Framework

This study draws on two complementary economic theories to analyze agricultural pricing strategies: Price Theory and Bargaining Power Theory. Price Theory, grounded in classical economics, explains the relationship between supply, demand, and price determination. It provides insights into how smallholder farmers adjust prices in response to market signals, seasonal variations, and government interventions such as FRA price floors. Bargaining Power Theory examines the asymmetric power dynamics between buyers and sellers, emphasizing that smallholder farmers typically possess limited leverage in negotiations with intermediaries. Enhancing market access, promoting cooperative marketing, and leveraging technology can increase farmers' bargaining power and improve pricing outcomes (Ngalande, 2022; Crawford, 1997).

2.3. Conceptual Framework

The conceptual framework links key variables that influence pricing strategies, including market access, pricing approaches, bargaining power, government policies, and the availability of market information (Chapoto & Zulu-Mbewe, 2016; Chisanga, 2019). Market access enables farmers to reach buyers through direct sales or cooperative structures, reducing dependence on intermediaries. Pricing strategies are influenced by production costs, market information availability, and external conditions. Bargaining power reflects the capacity of farmers to negotiate fair prices, while government interventions can either stabilize or distort market conditions. Accurate and timely market information underpins all these variables, enabling informed decision-making and effective price setting.



Author: 2025

Figure 1 Conceptual framework

2.4. Previous and Comparative Studies

Extant literature emphasizes the multifaceted challenges smallholder farmers face in Zambia and similar agricultural economies. Chapoto and Zulu-Mbewe (2016) highlight the limitations of FRA interventions in providing equitable access to price stabilization programs. Bhasin (2019) stresses the importance of understanding production costs, market demand, and seasonal trends in formulating effective pricing strategies. Chisanga (2019) notes that government pricing policies are often inaccessible to smallholders, while Ngalande (2022) underscores the critical role of cooperative structures in enhancing bargaining power. Crawford (1997) and Wroblewski et al. (2009) emphasize the value of market knowledge and production cost data in optimizing pricing outcomes. Comparative studies from other sub-Saharan African countries demonstrate the effectiveness of digital platforms, cooperative marketing models, and targeted policy interventions in improving pricing and market access for smallholder farmers.

The literature reviewed highlights that smallholder farmers in Zambia face complex and interrelated challenges in establishing effective pricing strategies. Key constraints include limited market information, reliance on intermediaries, price volatility, high production costs, and suboptimal government interventions. Potential strategies to mitigate these challenges include the adoption of technological innovations, cooperative marketing, and evidence-based policy reforms. Building on existing scholarship, the study aimed to analyze current pricing strategies among smallholder farmers in Zambia, identify the factors influencing these strategies, and propose recommendations to enhance pricing decisions, profitability, and sustainability within the agricultural sector.

3. Methods and Materials

To address the objectives, the study adopted a mixed-methods approach, integrating both quantitative and qualitative techniques to provide a comprehensive understanding of the factors influencing pricing decisions. By combining numerical data with in-depth qualitative insights, the study ensured a holistic examination of the challenges faced by smallholder farmers in price determination. The target population consisted of smallholder farmers engaged in the production of staple crops such as maize, beans, groundnuts, cassava, and soybeans across selected rural districts of Zambia, with an estimated total of 200 farmers. This group represented diverse levels of market access, production scales, and pricing practices, offering a broad perspective on the dynamics of agricultural pricing. From this population, a sample size of 80 farmers equivalent to 40% of the total was selected using a stratified random sampling technique to ensure inclusivity across different sub-sectors and production levels.

Data collection employed both quantitative and qualitative methods. Structured surveys were administered to all 80 farmers to capture information on pricing strategies, decision-making processes, market access, the role of intermediaries and cooperatives, government policy impacts, and awareness of price fluctuations. Surveys were conducted both in person and via telephone, each lasting approximately 30 to 40 minutes. Responses were analyzed

using descriptive statistics, including frequencies, percentages, and means, to identify trends and relationships. Complementing the surveys, semi-structured interviews and focus group discussions (FGDs) were conducted with a subset of 15 to 20 farmers. The interviews explored farmers' understanding of pricing factors and market trends, perceived barriers to accessing fair prices, the role of technology and information dissemination in pricing decisions, and the influence of government policies. FGDs, consisting of 5 to 8 participants each, encouraged interactive dialogue and collective reflection on pricing challenges. All qualitative data was recorded, transcribed, and thematically analyzed to identify recurring themes and contextual patterns shaping pricing practices.

For data analysis, quantitative responses were processed using SPSS version 30. Descriptive statistics summarized the data, while correlation analysis was applied to examine potential relationships between variables such as market access, production costs, and pricing strategies, thereby highlighting broader trends affecting farmers' pricing decisions. Qualitative data, on the other hand, were analyzed through thematic analysis, which involved coding transcripts to identify emerging themes and patterns. This approach provided deeper insights into the contextual factors influencing pricing strategies, including the roles of market information, government interventions, and intermediary actors. Together, the mixed-methods design enabled a robust analysis of pricing strategies among smallholder farmers in Zambia, ensuring both breadth and depth in the examination of the research problem.

4. Discussions and Findings

The findings of the study based on data collected from 80 smallholder farmers across Zambia. The results are organized around demographics, agricultural production, pricing methods and strategies, challenges in price-setting, and the impact of pricing on income and sales outcomes.

4.1. Demographics and Landholding

The demographic profile revealed a balanced gender distribution (51% male, 49% female) and an active participation of youth and middle-aged farmers, with 31.2% aged 18–24 years and 28.8% aged 35–44 years. Landholding was predominantly small-scale, with 30% cultivating less than one hectare. These findings align with previous studies showing that smallholder farmers in Zambia typically operate on less than two hectares, reflecting constraints in land access and capital (Burke & Harrison, 2011; Chikowo, 2013)

4.2. Agricultural Products

Maize dominated production (88.6%), followed by groundnuts (41.8%), vegetables (30.4%), soybeans (20.3%), cassava (17.7%), and beans (15.2%). Crop diversity suggests attempts to mitigate production and market risks, consistent with evidence that smallholder farmers diversify crops to reduce income volatility and enhance food security (Chapoto 2016; Antonaci & Demeke, 2014).

4.3. Pricing Methods and Strategies

Market-based pricing was employed by 51% of respondents, cost-plus by 31.4%, and penetration and skimming by 8.8% each. While 85% of farmers conducted market research, over half (52.9%) relied on peer networks, and 68.8% negotiated prices at sale points. This indicates persistent vulnerability to weak bargaining power, echoing findings by Ngalande (2022) that smallholder farmers often lack leverage against intermediaries. The results reinforce the importance of Price Theory, where alignment with supply-demand conditions influences profitability (Crawford, 1997), and Bargaining Power Theory, which highlights asymmetries between small-scale producers and market actors (Chisanga, 2019).

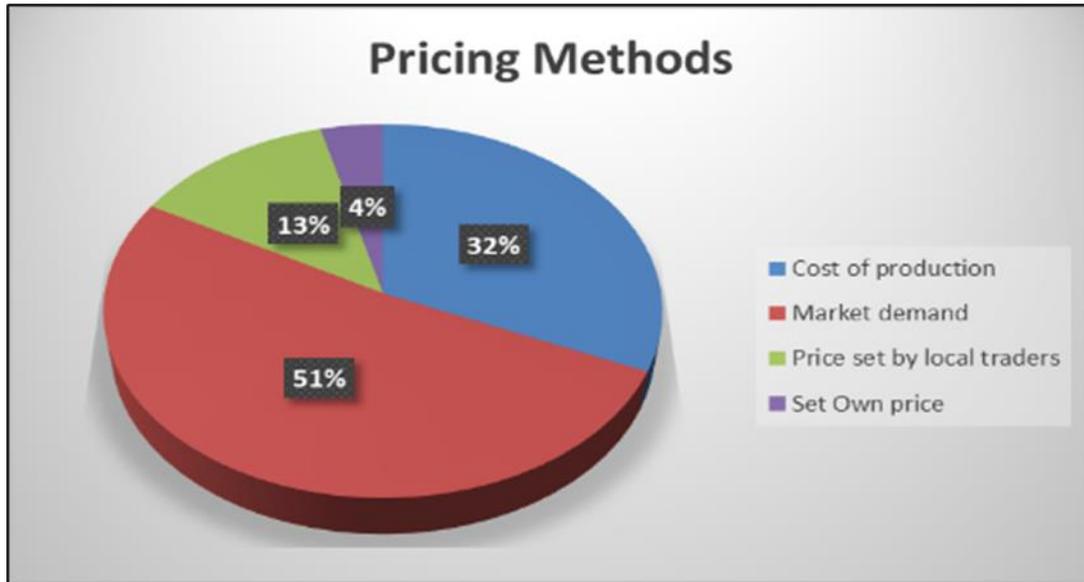


Figure 2 Pricing Methods and Strategies

4.4. Challenges in Price-Setting

Key challenges included fluctuating market prices (29.7%), seasonality (20.3%), inconsistent production costs (17.6%), and limited market information (16.2%). Although the influence of middlemen was acknowledged (16.2%), structural constraints such as market volatility and input cost variability were more significant. These findings support earlier studies showing that information asymmetry, price volatility, and reliance on intermediaries constrain effective pricing (Chapoto, 2016). Government interventions, such as FRA price floors, while intended to stabilize markets, often fail to reach farmers effectively due to logistical and informational barriers (Chisanga, 2019 & Antonaci 2011).

Table 1 Challenges in Setting Prices

		Responses		Percent of Cases
		N	Percent	
CHALLENGES IN SETTING PRICES	Fluctuating Market Prices	44	29.7%	55.0%
	Lack of Market information	24	16.2%	30.0%
	Influence of middlemen	24	16.2%	30.0%
	Inconsistent production cost	26	17.6%	32.5%
	Seasonality of crop	30	20.3%	37.5%
Total		148	100.0%	185.0%
a. Dichotomy group tabulated at value 1.				

Correlation analysis provided deeper insights into the effectiveness of pricing strategies. Market-based pricing was found to be positively correlated with income and sales volume ($\rho = 0.226, p = 0.044$), indicating that alignment with market demand can boost returns when conditions are favorable. Conversely, cost-plus pricing showed a significant negative correlation with income and sales ($\rho = -0.302, p = 0.006$), suggesting that while it provides stability, it may reduce competitiveness in highly elastic markets. Skimming pricing was negatively correlated with market-based pricing ($\rho = -0.236, p = 0.035$), reflecting its limited suitability outside niche or differentiated markets. Penetration pricing showed no significant correlation with income outcomes ($\rho = -0.068, p = 0.548$). (Bhasin, 2019; Burke & Harrison, 2011).

4.5. Qualitative Insights from Interviews and Focus Group Discussions

Qualitative data obtained from semi-structured interviews and focus group discussions provided deeper insights into the contextual factors influencing pricing decisions among smallholder farmers. Several recurring themes emerged, including limited access to reliable market information, dependence on intermediaries, and challenges associated with price volatility.

Many farmers indicated that they relied heavily on informal sources such as fellow farmers or local traders for price information. One farmer from Luapula Province noted that *"we usually depend on other farmers or traders to know the price because we do not always receive official market updates."* This reliance on informal networks often results in information gaps that disadvantage farmers during price negotiations.

Participants also highlighted the strong influence of intermediaries in determining final selling prices. Several farmers explained that middlemen frequently dictate prices due to their control over transportation and access to larger markets. As one participant stated, *"the buyer often decides the price because they are the ones who transport the produce to town markets."*

Furthermore, farmers emphasized that seasonal price fluctuations create uncertainty in income planning. During harvest periods, increased supply often leads to lower prices, forcing farmers to sell quickly due to limited storage capacity. These qualitative insights reinforce the quantitative findings by illustrating how structural constraints such as information asymmetry, weak bargaining power, and market volatility shape pricing decisions among smallholder farmers in Zambia.

Overall, the findings indicate that no single pricing strategy guarantees success for smallholder farmers. Market-based pricing offers greater income potential but exposes farmers to volatility, whereas cost-plus pricing provides predictability but limits profitability. Skimming and penetration pricing remain marginal strategies with context-specific utility. The effectiveness of each approach depends largely on crop type, access to reliable market information, and farmers' ability to respond to fluctuating market conditions. These results highlight the urgent need for targeted interventions that strengthen market intelligence systems, reduce dependence on informal networks, and enhance the bargaining power of smallholder farmers in Zambia.

Demographics and Landholding: Of the respondents, 51% were male, 49% female. Age distribution showed 31.2% between 18–24 years and 28.8% between 35–44 years. Landholding was small, with 30% of farmers cultivating less than 1 hectare.

Agricultural Products: Maize was the most widely cultivated crop (88.6%), followed by ground nuts (41.8%), vegetables (30.4%), soya beans (20.3%), cassava (17.7%), and beans (15.2%). Crop diversity helps mitigate production and price risks.

Pricing Methods and Strategies: Market-based pricing was used by 51% of farmers, cost-plus by 31.4%, and penetration and skimming by 8.8% each. 85% conducted market research, but 52.9% relied on peer information. Despite research, 68.8% negotiated prices at point of sale, often resulting in lower income.

Challenges in Price-Setting: Key challenges include fluctuating market prices (29.7%), seasonality (20.3%), inconsistent production costs (17.6%), and limited market information (16.2%). Influence of middlemen was less significant (16.2%).

Impact on Income and Sales: Correlation analysis revealed:

- Market-based pricing positively correlates with income and sales volume ($\rho = 0.226$, $p = 0.044$).
- Cost-plus pricing negatively correlates with income and sales volume ($\rho = -0.302$, $p = 0.006$).
- Skimming pricing negatively correlates with market-based pricing ($\rho = -0.236$, $p = 0.035$).
- Penetration pricing shows no significant correlation ($\rho = -0.068$, $p = 0.548$).

This indicates that no single strategy guarantees success; effectiveness depends on crop type, market access, and timely information.

5. Conclusion

Most smallholder farmers rely on market-based pricing, which drives sales volume but increases income volatility. Cost-plus pricing offers predictability but may reduce competitiveness. Major challenges include fluctuating market prices, seasonality, and limited access to accurate market information. The study recommends the following actions:

- Strengthening market information systems via mobile platforms and radio updates.
 - Training farmers in cost analysis and record-keeping.
 - Promoting cooperative marketing to enhance bargaining power.
 - Diversifying pricing strategies by crop type.
 - Expanding government support mechanisms like minimum price guarantees and post-harvest storage.
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6. Future Research Directions

Future research should expand this study by including a larger and more geographically diverse sample of smallholder farmers across Zambia to improve the generalizability of the findings. Longitudinal studies could also examine how pricing strategies change over time in response to market dynamics, climate variability, and policy interventions. Additionally, further research may explore the role of digital market information systems and cooperative marketing structures in improving pricing decisions, market access, and income stability among smallholder farmers. Such studies would provide deeper insights into strategies that enhance profitability and sustainability in the agricultural sector.

Compliance with ethical standards

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Disclosure of conflict of interest

There was no conflict of interest based on our study.

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