

**IMPACT OF MARKET-LED AGRICULTURAL EXTENSION SERVICES (MLES) ON TOMATO PRODUCTIVITY AND INCOME OF SMALL-SCALE FARMERS IN BUEA, SOUTH WEST REGION, CAMEROON**

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**ABSTRACT**

This study examines the influence of Market-led Agricultural Extension Services (MLES) on tomato productivity and income on Small-scale in Buea South West Region Cameroon. amidst persistent challenges faced by not only tomatoes farmers but the general agricultural sector. These challenges include; limited market access, post-harvest losses, low productivity and low profitability.

Employing a descriptive survey design, data were collected through structured questionnaires and semi-structured interviews with 28 tomato farmers and some extension agents. SPSS was the statistical instrument used for data analysis. With the use of descriptive statistics, the study reveals that while 60.7% of farmers have access to extension support, substantial gaps still exist in service availability and effectiveness. Key support services include training on tomato production and post-harvest handling but critical elements like market linkage and financial literacy remain largely unaddressed. Notably, 50% of farmers reported improved yields due to support from extension services, 34.3% achieved greater market access, with increase income attributed to the received extension services. Nevertheless, challenges such as high transportation costs and price fluctuations persist thus, limiting farmer overall success. The study concludes that MLES has potential to positively affect productivity and promote economic outcomes, but infrastructural and systemic barriers must be overcome for full benefits to be realized. The study therefore recommends that, expanding MLES coverage, enhancing infrastructure, utilizing digital tools for market information, and fostering cooperative farming initiatives can greatly boost the general economy for tomatoes farmers.

**Keywords:** Agricultural Extension, Market-led Extension, Tomato Farmers, Agricultural Productivity.

## **INTRODUCTION**

Agriculture plays a vibrant role in the economic development of most African countries, including Cameroon where agriculture contributes approximately 20% to the national GDP and providing employment for over 60% of the rural population (MINADER, 2022). Tomato farming is an important economic activity for many smallholder farmers in the South West Region especially in Buea.

The region's favorable climatic conditions and rich volcanic soils offer an enabling environment for the cultivation of tomatoes, which is a widely consumed vegetable in both rural and urban areas. Despite this potential, tomato farmers face numerous challenges that limit productivity and profitability which include inadequate access to inputs, insufficient technical knowledge, high post-harvest losses (estimated at 30–40% by FAO, 2021), and limited access to reliable markets.

However, many extension programs continue to focus exclusively on boosting production through inputs and pest control, ignoring the critical need to empower farmers with market-oriented skills such as value addition, branding, and consumer targeting. As a result, tomato quality remains inconsistent, further reducing buyer confidence.

In some African countries like South Africa used informal markets and linkage to market information is through cell phone. Even though farmers still face major challenges when accessing market like transportation and inadequate market information (Agricultural science and technology 2023).

Empirical studies across Sub-Saharan Africa provide useful insights into how market-led extension services influence farming outcomes. A study by Davis (2010) in Kenya found that market-led extension significantly increased smallholder farmers' income through improved market access and better price negotiation skills. Farmers who received training on market dynamics and value chain linkages earned higher margins than those who did not.

In Nigeria, Olomola (2015) observed that integrating extension services with market information helped tomato farmers reduce post-harvest losses and increase returns. The provision of market intelligence enabled farmers to time their harvest better and negotiate more favorable terms with traders.

In Cameroon, few studies have directly examined the impact of market-led extension services on tomato farmers. However, work by Njukwe (2017) in the Southwest Region noted that many tomato farmers lacked access to structured markets and often relied on middlemen. large number

of engaged smallholders' farmers face significant structural challenges that limit profitability and economic empowerment. Middlemen continue to dominate the agricultural sector with smallholder's farmer being trapped in the paradox due to poor market-linkages where farmers continue to experience poverty and market exclusion.

The absence of market-focused advisory services contributed to low profitability and high post-harvest losses. Their study recommended the strengthening of extension services to include marketing skills, business development, and cooperative formation will spore growth among not only tomatoes farmers but general agricultural sector in Cameroon.

Another study by Nchinda and Mendi (2008) in the Mount Cameroon area indicated that while agricultural extension services existed, they were largely production-oriented. Farmers often lacked up-to-date market information, limited access to formal markets, absence of market-oriented advisory service. These constraints reduced the economic viability of tomato farming despite the favorable agro-ecological conditions in Buea Njong and Tawah (2020).

Additionally, Empirical studies have demonstrated the positive impact of market-led extension services on smallholder farmers, including those cultivating tomatoes. For instance, a study by Okanju (2021) in Cameroon found that farmers receiving market-led extension services experienced a 30% increase in tomato yields and improved access to lucrative markets, resulting in higher incomes.

Similarly, research by Njo and Mbenga (2019) highlighted that market-oriented extension programs helped tomato farmers reduce post-harvest losses by 20% through better handling and storage techniques. These services also enhanced farmers' negotiation skills and market information access, leading to better prices.

Among the most pressing concerns is market asymmetry, farmers lack timely information on market prices, demand forecasts, and quality requirements, leaving them vulnerable to opportunistic buyers. This gap often results in hasty sales at suboptimal prices, especially during peak harvest periods when market gluts are common. Heightening this are logistical constraints where just about 15% of farmers have access to cold storage, and about 80% rely on poorly maintained, unpaved roads that hamper timely transport of produce to urban centers (Buea Local Council,2023). The supply chain, controlling an estimated 85% of tomato sales in the area (Cameroon Farmers' Union, 2022), effectively determining prices and limiting producers' bargaining power.

In Buea, tomato farming is the primary livelihood activity, with over 70% of households engaged in small-scale cultivation (Buea Agricultural Development Office, 2023). Tomatoes are not only a dietary staple but also a critical cash crop, supplying urban markets in Douala and Yaoundé.

Despite these advantages, tomato farmers in the region face systemic challenges. Middlemen often exploit farmers by offering prices 50–60% below market rates, forcing smallholders to sell immediately after harvest to avoid spoilage. Additionally, reliance on traditional farming techniques limits yields, with average productivity stagnating at 10–12 tons per hectare, far below the global average of 30–40 tons (World Bank, 2023).

Historically, Cameroon's agricultural extension services have prioritized increasing production through subsidized inputs and training on pest management. However, these efforts overlook market dynamics, leaving farmers unaware of consumer preferences, quality standards, or pricing strategies. This misalignment has perpetuated cycles of poverty, as farmers produce surpluses but lack avenues to sell profitably. Globally, the shift toward market-led extension services (MLES) has demonstrated success in countries like Kenya and Ghana, where integrating farmers into value chains boosted incomes by up to 35% (IFAD, 2022).

Traditionally, agricultural extension services in Cameroon have focused predominantly on increasing yields through production-centric interventions. While these services have had some positive impacts, they often neglect the critical aspect of market orientation. As a result, farmers may produce more but remain unable to sell their products at profitable prices.

The global trend in agricultural development now emphasizes market-led extension services (MLES), which seek to align production with market requirements that is to prioritize aligning production with consumer's demand. These services go beyond traditional advisory roles by equipping farmers with market information, supporting value addition, and building linkages between producers and buyers. By emphasizing a value chain approach, market-led extension services aim to ensure that farmers not only produce efficiently but also sell their produce at competitive prices. This shift is particularly relevant in addressing the persistent market-related challenges faced by tomato farmers in Buea.

In this context, the present study aims to investigate the impact of market-led extension services on tomato productivity and income among farmers. The study is anchored in the broader objective of supporting Cameroon's National Agricultural Development Strategy (SNDA) 2030, which advocates for a transition to a market-oriented agricultural sector.

The shift toward market-led extension services has gained momentum, prioritizing alignment of agricultural production with market requirements. This approach integrates training on agronomic practices, value addition, market information systems, and buyer linkages. Despite its potential, the adoption of this model in Cameroon, particularly in tomato farming communities, remains underexplored. This study investigates how market-led extension services influence the productivity, income, and sustainability of tomato farmers in this region, contributing to

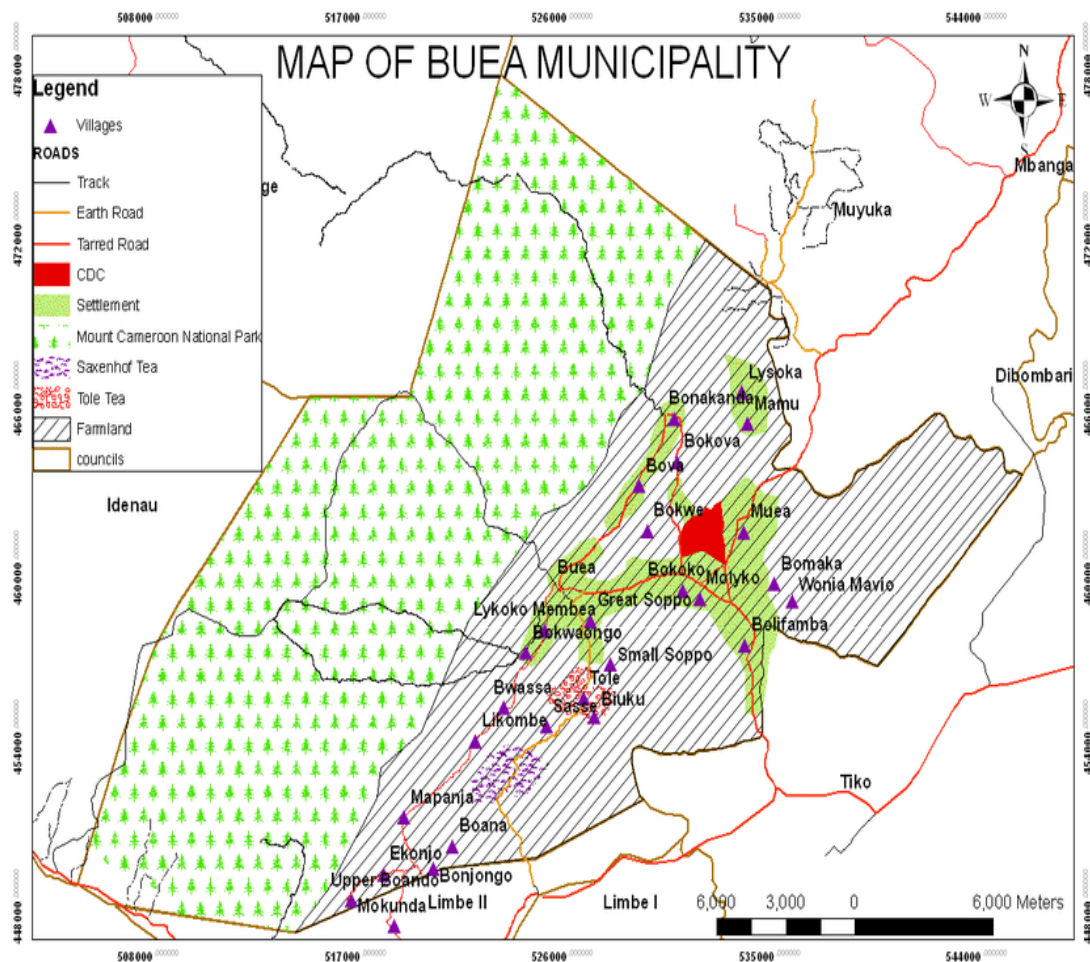
Cameroon's National Agricultural Development Strategy (SNDA) 2030 goals of market-oriented agriculture. This study is covered by the following research objectives;

1. To evaluate the influence of market-led extension services on tomato farmers.
2. To identify challenges limiting tomatoes farmers from accessing the market
3. To analyze the effects of market-led extension services on productivity and income

## **MATERIALS AND METHODS**

### **Area of Study**

The study was carried out in Buea South West Region located at the foot of Mount Fako in the South West region of Cameroon. Buea is one of the biggest towns in the English-speaking region of Cameroon. It's the capital of the South West Region of Cameroon. The town has a very long and rich history. It has a surface area of 25410km<sup>2</sup> and a population of over 1553320 inhabitants. Even though it is a cosmopolitan area with a mix cultural background. The tallest mountain in the whole of West and Central Africa, known as Mount Cameroon is found in this historic town. This mountain attracts tourists from all over the world. Buea was selected as the study area because of its significant concentration of tomato farmers in the area and the presence of agricultural extension programs. This area is characterized by a humid tropical climate, fertile volcanic soils suitable for tomato production. Tomato farming is a key source of income for many households in Buea making it an ideal location to examine the impact of interventions aimed at improving tomato production and market access.



Map of Buea municipality

## Research Design

This study adopts a descriptive survey research design. This design is chosen because it allows the collection of both qualitative and quantitative data from a specific population within a natural setting. The descriptive nature of the design makes it suitable for understanding the current state of agricultural market-led extension services and how they influence tomato farmers in Buea. Quantitative data was gathered through structured surveys to measure key variables such as tomato yield, income, adoption of improved farming practices, access to market information, and access to credit while qualitative data was collected through semi-structured interviews with farmers, extension officers to gain a deeper understanding of the mechanisms through which market-led extension services affect tomato farmer. The survey approach provides a balanced structure that facilitates the collection of standardized data while also capturing in-depth perspectives from participants.

### **Population of the Study**

The population of the study consists of 28 tomato farmers selected in Buea.

The target population comprises registered tomato farmers identified through local farming groups, cooperative societies, and ministry of agriculture. The study was strictly focused on availability of farmers who were willing to participate in the study during the data collection period. These farmers operate small- to medium-scale tomatoes farms.

### **Sampling Procedures and Sample Size**

A Simple random sampling was used to select tomato farmers from the accessible population to ensure every individual has an equal chance of being included. The study focuses on 28 small scale tomato famers in Buea, Buea, interview was also carried out on some available extension agents at the Divisional Delegation of Agriculture Buea. The study also employs a Purposive sampling technique to identify key informants such as extension workers, cooperative leaders, and farmers with significant market engagement.

### **Data Collection**

Data collection was carried out through field visits using both the questionnaires and interviews. The questionnaires were administered face-to-face with the use of local language and pidgin English which helps reduce language barriers and improve response accuracy. Interviews with key informants were conducted at mutually convenient times and locations, with participants' consent. The collection period spans over two weeks to allow ample time for follow-up and clarification where necessary.

## **RESULTS AND DISCUSSION**

### **Demographic Information**

Following a demographic survey conducted on gender involvement in tomato production Buea, it was realized that 82.1% of the respondents are male, while 17.9 are female. This implies that tomato farming in Buea is dominated by male by farmers. The females are involved in other petty trading activities beside reproductive activities. The majority of farmers 39% are above 46 years while a few of them 35.7% fall between 36-45 years, even though we still have those are fall below 30 years who makes up 3.6% who make up 3.6% of the study. This indicates that tomato farming is mostly practiced by old and middle-age individuals, with very few youths engaged in tomato farming.

Level of Education 42.9% have primary education and 39.3 % reached secondary education while only 10.7% attained tertiary education and 7.1% had no formal education. This implies that most

farmers have basic education while just few have attained tertiary education, which might affect how they access and apply agricultural innovations.

Years in Farming 57.1% have been farming for over 5 years showing more experience while 28.6% have 2-5 years of experience and 14.3% have farmed for less than 2 years.

This demographic information implies that the dominance of male farmers (82.1%) and older age groups (75% aged 36+) reflects gender and generational gaps in tomato farming. Limited formal education (only 10.7% tertiary) suggests potential barriers to adopting market-led extension services (MLES), which often require literacy for digital tools or complex market strategies. However, extensive farming experience (57.1% >5 years) indicates receptiveness to practical Market-Led Extension Service interventions. These factors directly influence Market-Led Extension Service accessibility and effectiveness, as younger, educated farmers may adapt quicker to market-oriented training.

### **Impact of training tomato production**

**Improved Yield** 50% of the farmers acknowledge increased crop yields. While 46.4% said no change in crop yield and 3.6% were not sure of increase in their yield which suggest a mixed outcome in terms of productivity. It is evident that farmers who receive training can have high yields as they are exposed to modern technology in tomato farming.

**Better Market Access** 64.3% of the farmers said they gained better access to markets while 35.7% of the farmers do not have better access to markets suggesting that extension services may help link farmers to buyers. However, most of them have access in the local markets around the town of Buea while the farmers are yet to create access to regional and international markets. With regards to Profits made from tomato production majority of the farmers 53.6% accept that they make reasonable profits while 42.9% of the farmers said they have no profits and a 3.6% of the farmers were unsure of increased profit. Those with increased profit can be attributed to the fact that a majority of them have idea of technology in tomato production.

**Learned Strategies** 60.7% of the farmers said they learned new marketing strategies while 39.3% of the farmers did not learn new marketing strategies. This indicates a positive knowledge transfer effect from extension service. The impact on farming and marketing shows tangible benefits such as yield where 50% of the farmers report increased yields, validating Market-Led Extension Service's role in improving farm practices. Market Access where 64.3% gain better entry, confirming Market-Led Extension Service bridges market gaps. Income where 53.6% profit growth demonstrates Market-Led Extension Service's economic impact. Strategies 60.7% of the farmers adopt new marketing tactics, enhancing resilience. However, 42.9% see no profit increase due to unaddressed challenges (transport, middlemen).

**Table 1: Impact of Marking on tomatoes Farmers**

Improved Yield	Frequency	Percent
No	13	46.4
Not sure	1	3.6
Yes	14	50.0
Total	28	100.0
Better Market Access		
No	10	35.7
Yes	18	64.3
Total	28	100.0
Increased Profits		
No	1	3.6
No	12	42.9
Yes	15	53.6
Total	28	100.0
Learned Strategies		
No	11	39.3
Yes	17	60.7
Total	28	100.0

**Challenges faced by tomato farmers in accessing the market**

42.9% of the farmers face high transportation cost as their major challenge followed by a 25.0% on price fluctuation and the least being a 7.1% on limited market information. This indicates that most of the farmers faced challenges on transportation cost.

Top constraints such as high transport costs (42.9%) and price fluctuations (25%) undermine Market-Led Extension Service gains. Middlemen exploitation (7.1%) persists due to weak buyer linkages. These systemic issues require infrastructural investments and cooperative models to sustain Market-Led Extension Service outcomes.

**Table 2: Challenges Faced by tomato farmers in Buea**

<b>Challenges</b>	<b>Frequency</b>	<b>Percent</b>
High transportation cost	12	42.9
Lack of storage facilities	5	17.9
Limited market information	2	7.1
Middlemen exploitation	2	7.1
Price fluctuation	7	25.0
Total	28	100.0

**Effects of market-led extension services on tomato farmers**

Most of the farmers 28.6% experience increase yield and income as their benefits from market-led service while 35.7% of the farmers have no benefit from market-led extension service. This indicates that most of the farmer biggest benefits is increase yield and income.

Increased yield/income 28.6% and direct urban market sales 14.3% reflect Market-Led Extension Service success in boosting productivity and bypassing intermediaries. Yet, 35.7% report no benefits, signaling service deficiencies like irrelevant training, poor targeting.

**Table 3: Effects of Market-led Extension Services on Tomato Farmers**

<b>Biggest Benefit</b>	<b>Frequency</b>	<b>Percent</b>
Increase in yield and income	8	28.6
Know planting and harvesting season	2	7.1
No benefit	10	35.7
Received farm equipment and seeds	4	14.3
Selling directly to urban market	4	14.3
Total	28	100.0

**CONCLUSION**

The study concludes that market-led extension services have the potential to enhance tomato productivity and income in Buea. However, their current implementation is partial and uneven. While a majority of farmers acknowledge benefits such as improved yields, better market access,

and increased income, the full potential of market-led extension service is hindered by infrastructural limitations, inadequate access to services, and a lack of integration with other essential supports such as buyer linkage and financial education. The presence of traditional market constraints such as price control by middlemen and high transportation costs continues to limit farmers' profitability. Moreover, the insufficient coverage of extension services and the absence of strategic marketing training undermine the goals of market-led extension service.

## **RECOMMENDATIONS**

**Expand Extension Coverage:** Government and development agencies should increase the reach of market-led extension services, ensuring that more farmers receive regular and comprehensive support.

**Link Farmers to Markets:** Future MLES initiatives should include formal mechanisms to link farmers to buyers, processors, and cooperatives. This will reduce dependence on middlemen and enhance farmers' bargaining power.

**Enhance Infrastructure:** Investment in rural infrastructure such as roads, cold storage facilities, and market centers should be prioritized to ease access and reduce post-harvest losses.

**Capacity Building:** Continuous training should include not only production and post-harvest techniques but also financial literacy, market analysis, and negotiation skills to improve decision-making and profitability.

**Promote Farmer Cooperatives:** Encourage the formation and strengthening of farmer cooperatives that can collectively market produce, access bulk inputs, and lobby for better prices.

**Utilize Digital Platforms:** Introduce mobile-based market information systems to provide real-time data on pricing, weather forecasts, and buyer contacts.

**Policy Support:** Develop national guidelines that institutionalize MLES as a core component of agricultural policy, supported by funding and monitoring frameworks.

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