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Linking smallholder farmers to markets: The role of extension in market information distribution for poverty reduction in Fako, Cameroon

by

Namah Taku - Forchu

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of
MASTER OF COMMUNITY AND REGIONAL PLANNING

Major: Community and Regional Planning

Program of Study Committee:
Francis Owusu, Major Professor
Carlton Basmajian
Ebby Luvaga

The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this thesis. The Graduate College will ensure this dissertation is globally accessible and will not permit alterations after a degree is conferred

Iowa State University
Ames, Iowa
2019

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DEDICATION

This thesis is dedicated to my mum Christina Taku for her constant prayers
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Special thanks to my major professor Dr. Francis Owusu, whose guidance and reviews was vital to this thesis. I am also thankful to my committee members Dr. Carlton Basmajian, and Dr. Ebby Luvaga for their guidance during this research process. I have a lot of appreciation to the family of Dr. Riad Mayahni for providing me with the Dr. Riad Mayahni Civic Planning Award that helped me carry out my research on the field.
Access to markets and market information are essential in promoting agricultural sales and improving smallholder farmers’ revenue. The agricultural sector in Cameroon employs majority of the workforce and contributes greatly to agricultural households’ livelihoods. Many smallholder farmers are increasingly producing for commercial purpose, however majority of them lack access to markets and market information thereby hindering them from connecting their local markets to national markets. Extension can be useful in overcoming this information asymmetry, by providing smallholder farmers with relevant and reliable agricultural market information. This study explored the challenges faced by tomato value chain actors in Fako Division, Cameroon. Using “Making markets work better for the poor” (M4P) framework, we identified the main actors in the value chain from producers in Fako through to urban retailers in Douala. We employed mixed research method and used interview guides and focus group discussions to collect data from farmers, wholesalers, transporters, and extension workers. Based on our analysis, we identified inadequate source of market information, poor state of infrastructure, and low prices during peak season as the main challenges faced by actors in the value chain. We then examined the role of extension staff in mitigating these challenges and explore strategies for making the value chain efficient. We argued that enhancing market information could be a useful way to link farmers to markets and bypass wholesalers. In addition, with increased use of mobile phones, mobile phone technology has a potential to destabilize the value chain by making it possible for farmers to communicate directly with retailers in urban markets. We also make a case for developing programs on local radio, and in newspapers and bulletins where extension staff could provide up-to-date market information on prices of agricultural products the different markets.
CHAPTER 1: BACKGROUND

Agriculture in Sub-Saharan Africa (SSA) is vital as it serves as a source of food and raw materials for industries, provides employment to the majority of the population, and raises income of the poor, thereby reducing poverty. According to Wiebe (2009), with a projected world population of approximately 9 billion by 2050, food production is estimated to increase by 70% globally to ensure food security. It is forecast that most of this future population increase will occur in SSA and South Asia which are places that currently face a lot of food insecurity, with smallholdings representing about a third of agriculture land (Coff, 2015). More than 80% of food supplied in SSA and Asia is produced by smallholder farmers1, with farm size of less than one hectare² (AGRA³, 2017; Arias, Hallam, Krivonos, & Morrison, 2013). Smallholder farmers are drivers in SSA economies.

According to Coff (2015), in SSA approximately 2.5 billion people living in poor countries depend directly on agriculture for their livelihood, of which 1.5 billion people live in smallholder households with a majority of these smallholder households living in extreme poverty and usually produce for subsistence (Coff, 2015). Studies have shown that growth created by agriculture can reduce poverty more than four times compared to growth in other sectors (Ferris, Robbins, et al., 2014; Seville, Buxton, & Vorley, 2011). Improving productivity, profitability and sustainability of smallholder farming is an effective way out of poverty. Participation of smallholder farmers in markets could alleviate poverty and improve food security (Gani & Hossain, 2015). This is possible when smallholder farmers switch from producing for subsistence to commercialization.

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1 About 70 percent of the 1.4 billion people who are extremely poor live in rural areas. Smallholder farmers make up approximately 75 percent of the world’s poorest people where agriculture remain their main source of food, income and livelihood.
2 1 hectare is equal to 2.47 acres of land (U.S).
3 Alliance for a Green Revolution in Africa
In a majority of African countries, most smallholder farmers working on 1-2 hectares (ha) are engaged in subsistence farming with little prospects to transform to commercial agriculture AGRA (2017). Benefitting from commercialization opportunities is not void of challenges. Poor access to credit, inadequate infrastructural facilities, and poor access to market information has increased transaction costs and farmers lack strong bargaining power to negotiate with traders (Barrett, 2008; Tollens, 2006). However, commercialization through coordinated practices along value chain⁴ could increase farmers competitiveness, even for those with efficient production level (FAO, 2013). Linking smallholder farmers to markets to sell their products provide them with the opportunity for more income and a sustainable livelihood that improves smallholder farmers welfare and poverty reduction (Mkhari et al., 2014).

According to Machete (2004), commercialization of agriculture leads to higher income and creation of more jobs. This is possible through good policies, improvement of weak marketing structures, infrastructure development, increase access to finance, access to market and increase access to market information for smallholder farmers (Poulton, Dorward, Poulton, & Kydd, 2006). Most smallholder farmers sell their products in nearby open-air markets, others through intermediaries, which is often less rewarding. This is due to high transaction costs involved in reaching faraway markets. Also, lack of ability to conform with volume, quality and timely supply required by modern agricultural value chain, information and organizational resources is lacked by many smallholder farmers (Arias et al., 2013).

There has been limited study on how smallholder farmers’ involvement in local and national markets can improve farmers revenue for better livelihood, with more studies focusing on fostering increase participation of smallholders in global value chains (D. Ricketts, G. Turvey, &

---

⁴ Value chain are sequence of activities and actors involved in the process from when food leaves farm gate to when it gets to the market.
I. Gómez, 2014; Kilelu et al., 2017; Lee, Gereffi, & Beauvais, 2010; Zylberberg, 2013). Moreover, in high market value chains, smallholder farmers have limited control. Such chains may be less appropriate for smallholder actors to comply with the increasing amount of regulations and standards (Lee et al., 2010). Also, smallholder farmers usually have little capital for investment, high dependence on family labor, poor access to information, lack of supporting infrastructure, and usually do not have contact with market players in major markets (Trienekens, 2011). Therefore, local value chains that cater for increased local demand might be within reach for smallholder farmers. Smallholder farmers usually sell at local markets near farms and at low prices (immediately after harvest) due to low production rate and do not meet up with high value market standards. A great majority of smallholder farmers operate and sell in local and national food markets.

**Smallholder Vegetable Agriculture in Cameroon**

Agriculture remains a major economic activity in Cameroon employing approximately 70 percent of the population and contributes about 23 percent to the country’s Gross Domestic Product (GDP) (Djoumessi, Afari-Sefa, Kamdem, & Bidogeza, 2018). Food production for both domestic and international markets is a major component of Cameroon’s agriculture. Boosting food production for smallholder farmers and establishing a suitable policy platform for commercialization will help Cameroon achieve its goal of poverty reduction. Vegetable production is a growing food sector and an important economic activity in Cameroon and is done by smallholder farmers. Vegetable production represents approximately 22.9 percent of Cameroon’s total agricultural production, providing 64 percent of the final production value, at 98.5 billion
francs CFA ($186 million USD) for fruits and vegetables (Bidogeza, Afari-Sefa, Endamana, Tenkouano, & Kane, 2016)

Tomato is a major fresh vegetable market gardening activity that more and more people are getting involved. With its great nutritive potential and importance in reducing unemployment, tomato is also a major input in agro-allied industry (Tabe-Ojong & Molua, 2017). According to the Food and Agricultural Organization (FAOSTAT, 2017), in 2016 Cameroon produced approximately 1.2 million tons of tomatoes on 92,626 hectares of land, approximately 12,955kg/ha. Most of it is sold in its fresh form at local markets, close to farms due to the perishable nature of the crop. Growers are usually forced to sell at plummeted prices specifically during peak harvest season when supply is high and due to the absence of appropriate storage and processing facilities. This causes smallholder tomato farmers in Cameroon not to adequately benefit economically from tomato production. Many farmers in Cameroon are producing tomato for commercialization, but to what extent does tomato commercialization lead to improve livelihood of smallholder farmers remain an important concern that many researchers want to understand.

Enhancing tomato value chain will improve revenue for growers and reduce unemployment (ILO, 2014). Processing tomato adds value to the crop and extends the shelf life. This results in higher profits, since growers are not forced to sell at low prices at harvest or peak production time fearing spoilage. However, only a small quantity of tomato crop is processed into tomato paste for sale within Cameroon and other markets. A value chain study would be beneficial for smallholder farmers. Understanding the challenges face and identifying opportunities to help link smallholder farmers to markets for increase revenue through commercialization of their produce would be vital.

Commercialization prospects at the local and national level remain challenging to millions of these smallholder farmers. Overcoming the challenges of commercialization requires an
upgrading process, reduction of value chain actors, provision of market information, local infrastructural development, strengthening business services, and farmer skills improvement (Ferris, Robbins, et al., 2014). Addressing inefficiencies would improve the value chain. Studies have focused on increasing smallholder farmers participation in global value chains which may be less appropriate for smallholder actors not equipped adequately to handle these dynamic markets (Kilelu et al., 2017). Governments and institutions can play a significant role for agricultural commercialization through improvement of value chain inefficiencies.

**Extension Services in Cameroon**

Farmers are presently seekers of information, advice and opportunities that would not only help boost production level but will enhance marketing of their produce for increase profitability and more revenue for their families. Agricultural extension service to assist farmers achieve the said goal is essential since focus have moved from conventional function of providing knowledge on innovative production practices, they are now expected to help link farmers to export and high-value markets through market information provision (Ferris, Robbins, et al., 2014). Provision of market information would have positive benefits for smallholder farmers, and up-to-date market information provide farmers with greater impetus to negotiate with traders and make the value chain efficient (Ferris, Robbins, et al., 2014; Zanello & Srinivasan, 2014a).

Extension services started in Cameroon in 1916 during the British and French colonial period with the creation of institutions for extension and marketing purpose. The goal was expanding export crops through vast plantations with the use of indigenous labor which is cheap and available (Qamar, 2013). The extension staff was mostly used for the promotion of export
crops during the colonial period. The colonial masters put in place agricultural policies that guided extension.

After independence the government continued with the policies that were put in place by the colonial masters. However, the extension period was followed by a period of modernization which focused on peasant transformation with limited government intervention. By 1988, the World Bank started financing the National Agricultural Extension Program (NAEEP) that concentrated on extension, training and information provision and the National Program for Agricultural Extension and Research (PNVRA) was the pilot program (Qamar, 2013).

The National Agricultural Extension and Research Program (PNVRA) started in 1998 in Cameroon and aimed principally at improving production and revenue of livestock farmers and food producers in Cameroon. The PNVRA was a program also, geared at supporting value chains (Qamar, 2013). This program promoted innovation practices, agricultural extension, support towards producer organizations and associations, agricultural research and a Monitoring and Evaluation (M&E) extension program impact (Achancho, 2013). Although the PNVRA program was terminated in 2018, the Program for the Improvement of Competitiveness of Family Agro-Pastoral Farms with its French acronym (ACEFA) gained precedence and continue with the provision of extension and advisory services to farmers.

Extension services in Cameroon are more focus on educating and training farmers on new methods and new technics of production with little attention paid to commercialization. Agricultural policies in Cameroon since 1999, concentrated on farm modernizing for more efficient techniques of production (Achancho, 2013). With the development of regional and sub-regional markets access with prospects of providing market opportunities for domestic products, rehabilitating rural roads and participatory management of grassroot infrastructure, continue
efforts to increase access to inputs, access to land, and improve access to credit were all in a bit to increase farmers link to markets to ensure higher revenue. Cameroon also, developed and continued to support programs that supports value chains to boost farmer’s income. However, extension does not only focus on agricultural activities in Cameroon but also on promoting rural development for livelihood promotion, rural infrastructure development to ensure economic, infrastructure, and social benefits for the poor.

**Statement of the Problem**

Vegetables are increasingly being produced for commercial purpose and provide smallholder farmers with capacity to feed themselves, source of employment, and additional revenue to cater for other non-vegetable needs (Bidogeza et al., 2016). However, smallholder vegetable farmers face a lot of challenges, including inadequate access to land, limited credit, poor infrastructural development, and inadequate access to extension services (Djoumessi et al., 2018). Prior studies and policies in Cameroon have focused on improving agricultural production, technical efficiency of food crops, how agricultural programs affects food production (Djoumessi et al., 2018; Nchare, 2007; Tabe-Ojong & Molua, 2017) with limited focus on how extension through information and technology would help improve inefficiencies in the value chain. With the increasing awareness that food production is not considered complete until food leaves the farm and gets to the plate, how all these processes relates back to the farmer in terms of increasing their revenue remain a call for concern.

After harvest, smallholder vegetable farmers are compelled to sell their produce immediately at the farm gate and for a low price due to perishability. This is because they do not have the luxury to hold their products for long. More importantly, they also do not have access to
timely information on how much their products will be worth in the urban markets. This information gap has created opportunity for an industry to sprang up along the value chain made of wholesalers, transporters, and retailers. This reduce smallholder farmers profitability who every season struggle to access needed inputs, quality fertilizer, improve seed variety, and how to cater for their crops to get maximum yield and good quality. Often there is a great difference between price paid by the consumer in the urban markets and the farmers’ revenue – with the difference going to the stakeholders that connect farmers to consumers. On this basis, it is important to explore how and if farmers can increase their share of the price of their products through effective extension service.

**Objectives of the Study**

Against this backdrop, this study has following objectives:

(i) Identify the main actors in the tomato value chain in Fako, Cameroon.

(ii) Examine market challenges faced by the value chain actors.

(iii) Analyze the role of extension in enhancing an efficient value chain.

(iv) Recommend strategies for improving farmers’ income.

**Thesis Organization**

This thesis is organized into five chapters. Following the background information, statement of the problem, and objectives of the study. Chapter 2 focuses on literature review where the value chain concept is defined, the pro-poor value chain approach and making markets work better for the poor (M4P) framework is reviewed. Also, literature on linking smallholder farmers to markets and inefficiencies in the value chain is reviewed. A conceptual framework
with focus on the role of extension’s in enhancing an efficient value chain was developed. Chapter 3 focuses on methodology of the study. In this chapter the study area, research design, data collection, data analysis, study procedure, and limitation of the study are presented. Chapter 4 focus on analysis of results. And chapter 5, we present the conclusion and recommendations of the study.
CHAPTER 2: LITERATURE REVIEW

Overview

This chapter reviews the value chain concept to get an understanding of how a product moves from the farmer to the consumer. In this section the pro-poor value chain approach and the Making Markets Work Better for the Poor (MP4) framework was reviewed. The M4P framework assist us map out actors and their activities in the value chain and help identify challenges faced by value chain actors. Literature with focus on linking farmers to markets for a pro-poor impact on reducing poverty by enhancing smallholder farmers’ participation in major markets was reviewed. Examining inefficiencies in the value chain guided the study in its conceptual framework development. The conceptual framework is developed with focus on examining the role of extension in establishing an efficient value chain.

Definition of Value Chain Concept

Value chain

Chains compose of how individuals or companies interact to supply products and services. They are varyingly referred to as value chains, production chains, marketing chains, supply chains, filière or distribution chains. These concepts just vary in their focus, activity emphasis, and the way it is applied. However, it all describes the interaction and processes needed to deliver products to consumers and aimed at identifying constraints and opportunities for increasing productivity (Webber & Labaste, 2007).

Value chain describes a portion of an economic system where producers are linked to technical, economic, institutional and social relationships. The concept of value chain was developed by Michael Porter in his influential 1985 book titled “Competitive Advantage” (Ferris,
Engoru, & Kaganzi, 2014). The value chain provide us with understanding on how products flow (measure of input-output relationships along the chain and ensure consistency of physical flows along the chain), financial flows (value added net benefits at each activity), and the information flow (prices, quantity and quality feedback of produce), all actors involved in an economic activity which utilizes inputs and services to develop output destined to final consumer (Ferris, Engoru, et al., 2014). The concept of value chain, therefore, showcases the entire range of activities from initial production stage to final market destination with a stress of value addition at each stage (D. Ricketts et al., 2014; Roger Norton, 2014; Webber & Labaste, 2007).

Norton, (2014) defines value chain as the flow of products, knowledge, information, payments and finance needed to organize producers and communities. Information is important to all value chain actors as markets inform producers of price, quantity, quality needed, and product handling. Whereas, producers inform processors and markets on quantity available, locations, production and timing issues. While processors or marketing agents may provide producers with credit, input provision, and training with innovative ways of production. Kaplinsky & Morris (2000), describe value chain as the full range of actions that creates and add value to products or services, that is the different phases through which goods produced are channeled to final consumer and disposed of after use.

**Theories of Value Chain**

Value chain is establishing what goes on from the product conception phase to when product gets to end user. There is growing interest in most SSA countries to promote value chains, value addition, and rural economy diversification and contribute to increase rural household income (Webber & Labaste, 2007). Value chain approach provide us with understanding on how
a product moves from farm to market, provide mechanisms that enhance increasing efficiency, and possible ways that farmers can increase productivity and add value. Also, the Making markets work better for the poor (M4P) framework would help us map out actors along a value chain and identify challenges faced getting products to market for a pro poor impact (Ferris, Engoru, et al., 2014).

**Pro-Poor Value Chain Approach**

Governments and organizations are adopting value chain developments to address poverty reduction and economic development goals. Designing programs that will help smallholder farmers to climb out of poverty through enterprise organization, when the enterprise link them to business partners, and when the value chain actors could have a right mix of business, financial and technical services (Orr, Donovan, & Stoian, 2018). Value chain development could be used as a key element by governments and development organizations in their development strategies (Barker, 2002). Value chain remain an important development approach that is useful for poor producers and low-income countries who are trying to expand their domestic markets and enter international markets. The pro-poor value chain development approach is an important approach that governments in SSA countries should embrace as a policy development strategy to enhance livelihood development by improving access of the poor to markets and ensuring that additional income generated is beneficial to the poor.

Zylberberg, (2013), used a value chain approach in a study on smallholder flower production in Kenya to represent a unique opportunity to influence large scale production of producers. Using a case study, she provides a model that smallholders can incorporate themselves into high growth, high value markets and increase their market participation with the aim to reduce
poverty. Her analysis highlighted the importance of governance, upgrading, and strong intermediaries for including smallholders in horticulture value chain (Zylberberg, 2013).

Freeman, (2013), in a pro-poor market intervention study in Ethiopia, used value chain development framework to investigate how NGO’s have pulled smallholder farmers into specific markets and successfully integrated themselves into the economic dynamics in which they had previously been excluded or participated under very unfavorable provisions. This was accomplished through building and enhancing linkages between traders, exporters, processors and farmers organizations and the markets. It was suggested that ensuring supply capacity through increase productivity and producing farm products at lower costs and meets market expectations will increase farmers participation in the markets they were once excluded from.

Barrett, (2008), investigated smallholder market participation and focused on staple food grains in Eastern and Southern Africa. He identifies interventions that were most likely to break smallholder farmers from the semi-subsistence poverty trap in some parts of rural Africa. His empirical and conceptual evidence suggest the need for interventions geared at facilitating smallholder organization, reducing intermarket commerce costs, enhance access to improve technologies and productive assets by poorer households. This was central in promoting smallholder market participation and an escape from semi-subsistence poverty traps.

Furthermore, smallholder farmers remain major contributors to food supply and a reduction of food insecurity, and poverty alleviation remains a major challenge in the world at large. Poverty reduction is achievable when agricultural transformation diverts from producing for subsistence to producing for the market by smallholder farmers (Maponya & Heever, 2016; Mkhari et al., 2014). Producing for the market leads to higher income generation. Market systems should be design in
ways that incorporate smallholders and enhance commercialization of their products for increased
revenue and poverty alleviation.

**Making markets work better for the poor (M4P) framework.**

This framework was developed by Van Den Berge in 2008. Many organizations and
governments have adopted it for their policy development. M4P framework provides an inside of
market systems and guiding actions aimed at improving the way market systems serve the poor by
addressing market challenges and identifying actors involved and their role in the value chain. It
strengthens the link between what exist between value chain analysis and development
interventions in a bit to improve opportunities available to the poor (Humphrey, 2014).

Ferris, Engoru, & Kaganzi, (2014), analyzed Van Den Berg’s M4P framework of value
chain which is based on three main concepts: the concept of filière, porter framework, and the
global approach. The filière concept encompassed mapping the flow of goods and identifies the
different actors and activities involve in the value chain. The porter’s framework which he drew
from the works of Porter (1985), focused on a competitive advantage concept. This framework
assists firms to position themselves in markets and establish the relationship that exist between
producers, suppliers, buyers and competitors with the strategy of reducing cost. The global
approach maps out all range of activities and constraints that take place along a chain by analyzing
a breakdown of total value earnings that is achieved by the different actors in the chain. This
provide us with the most accurate way of understanding the distribution of earnings. Collectively,
they describe the interaction and processes needed to deliver products to consumers and identifying
constraints and opportunities for value chain upgrade. Breaking down core processes by actors
into specific activities through pro-poor value chain mapping help us identify the poor as actors at
different levels of the value chain. Van Den Berg, identified that in an agricultural value chain, the poor are the primary producers, although the poor can be involved in other processes such as small-scale traders or labor (Ferris, Engoru, et al., 2014).

Figure 1: Value chain
Source: (Ferris, Engoru, et al., 2014)

Figure 1 shows an M4P value chain framework from input provision to when product gets to retailer in the market, showing the different actors involved and the activities that take place at each stage in the value chain. From an operational perspective, the M4P framework, emphasize the role of actors, and offer guidance in each element of the realization process in the market system. Policy development by governments are key drivers for market systems that benefit the poor to work effectively and efficiently. This is possible by bringing new insights to program designs and policy developments that strengthens market systems to meet the needs of the poor. The M4P also provides an enabling business environment, reducing market failure, and stepping up productivity and incomes in sectors that the poor are currently earning their livelihoods. The M4P identify ways of strengthening the pro-poor functioning in markets and guide policy
formulation by recognizing that even successful market development sometimes neglects pro-poor outcomes (Department for International Development – (DFID, 2005).

The M4P framework has become key components for many development agencies (Habib & Arts, 2011; Humphrey, 2014; Orr et al., 2018). It is used as a key element by governments and development organizations in their development strategies. Value chain is an important development approach useful for poor producers and low-income countries who are trying to expand their domestic markets and to enter international markets (Barker, 2002). Low-income countries most especially in SSA, in their policy front have embraced value chain development approach to foster livelihood development by improving access of the poor to major markets and ensuring that additional income generated benefits the poor and marginalized groups (ILO, 2014). This pro-poor concept builds on the idea that the market success of poor people can provide a sustainable solution to poverty problem (Habib & Arts, 2011; Kilelu et al., 2017).

There is a growing trend of value chain development as a mechanism for promoting growth involving smallholders, harnessing market forces for poor livelihood improvement. Value chain development is suggested by international organizations as a new tool for pro-poor growth and poverty reduction (Freeman, 2013).

Habib & Arts, (2011), developed a pro-poor value chain guidance based on the M4P framework that organizations, and governments interested in identifying the potentials of any sector or region could use. This is because countries increasingly focus their development initiatives by improving access to existing markets for poor farmers and producers as an economic growth drive or poverty reduction strategies. He identified that to promote poor producers, promoting value chains is one of the essential components amidst bigger economic and rural development programs. This is because value chain development offers expected benefits not only
to poor producers but also to poor consumers when interventions are well planned and based on adequate information.

Humphrey, (2014), in his analysis of market system approach, incorporate a series of principles around markets and the way it functions for the poor with the overall goal to reduce poverty. This is achievable when market systems are transformed so they can function more effectively for both producers in the market and consumers whose goods and services are provided by the market. Due to the importance of the M4P framework, influential organizations in Bangladesh utilized this framework whose results remain evidence of how market system approach could deliver positive benefits to the poor through timely interventions with goal at market enhancement.

According to Bokelmann & Adamseged, (2016), making markets and value chains work for poor producers is when enhancements through formation of farmers groups gives farmers a strong bargaining power, when farmers have access to information and knowledge about production practices and information on market prices and available opportunities, and when these markets have lower risk and less uncertainty.

The value chain approach and M4P framework are approaches designed with overall goal of reducing poverty through market systems transformation, so it functions more effectively for the poor. According to Humphrey, (2014), the poor who are highly reliant on markets are also the most disadvantaged due to the way markets operate. These approaches are guiding principles of way out of poverty by smallholder farmers and linking farmers to markets for a pro-poor impact.
Linking Smallholder Farmers to Markets

Agriculture food production and food value chains play a fundamental role in development. For development and poverty reduction to be achieved as a macro-economic perspective by governments in low-income countries, linking smallholder farmers to both domestic and international markets is important. Until food gets to consumer, production is not considered complete. In most low-income countries linking smallholder farmers to global markets remain a challenge. They face issues gaining access to credit, improved technology and market information, poor infrastructural facilities in addition to high transportation and transaction cost involved selling to distant urban markets. This causes smallholder farmers to sell their produce in local markets near farms soon after harvest and at low prices. Therefore, linking smallholder farmers with national markets is vital.

Linking smallholder farmers to markets will contribute towards global food production. Their own food security and nutrition would be maintained, and revenue increased. Wiggins & Keats, (2013), in their study on linking smallholder farmers to markets, saw that most farmers in developing countries were not linked to markets due to low production, remoteness, low prices at the farm gate, and lack of market information. Overcoming these market constraints in order to increase smallholder farmers’ access to markets, it was suggested that states should provide an enabling business environment and rural public goods provision was a necessary condition; also, with most smallholder farmers having limited access to inputs, access to credit and financial services and limited access to output markets, addressing these challenges will enhance agricultural development and increase commercialization of their products. They concluded that developing smallholder agriculture was an effective way in reducing poverty and hunger in SSA.
countries. They suggested that poverty reduction and increase revenue generation by poor farmers was achievable through sustainable access to markets (Wiggins & Keats, 2013).

Odendo & De Groote, (2008), in their study on linking farmers to markets, in the case of grain marketing information identified that when markets were liberalized in Kenya, it created a situation where grain prices was not guaranteed; there were no central source of information; and the need for market information increased. Unfortunately, farmers lack access to market information. He evaluated farmers’ perceptions of market information, identified farmers sources of information, and determine the confidence in and use of market information by the farmers. Using descriptive and logit models, the results depicts that market information is very important, and farmers got market information from multiple sources, though mainly from farmers and traders. However, the farmers who received this market information did not utilize it due to perceived unreliability of the information and poor access to competent infrastructure. This shows that access to reliable source of market information is a relevant issue to enhance smallholder access to markets for them to have higher revenue.

With great likelihood that linking farmers to market is fundamental and interventions to assist smallholder farmers acquire more revenue is relevant (Gramzow, Batt, Afari-Sefa, Petrick, & Roothaert, 2018; Odendo & De Groote, 2008; The Anh & Thanh Tung, 2012; Wiggins & Keats, 2013), identify the need to increase market access for smallholder farmers and value chain enhancement.

Gramzow et al., (2018), identified how registered farmer organizations and contract farming arrangements have been approaches that institutions in some areas in Tanzania have been using to integrate smallholder farmers into agricultural value chains. Comparing a farmer-based

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5 These are approaches used to enhance increase food and economic security with creation of more productive and inclusive value chains (Grewer, Bockel, Nash, & Galford, 2016).
organization and a contract farming approach to identify the most suitable approach to use in response to the fast-changing market conditions, it was found that farmer-based organizations benefit from trust amongst members. This enable them to procure assets jointly and stay dependent from single buyers. Forming farmer groups, they would benefit from government interventions through capacity building programs that could allow farmer groups share cost associated with input provision, transaction cost, capacity building and extension services. This enhance smallholder farmers’ position on the value chain and increase smallholder farm income.

Mckague, (2012), in the study on making markets work for the poor focused on how market-based approach is used to alleviate poverty for small holder farmers who are considered the poor on a value chain and primary producers involved in the value chain. He used a theoretical model that explain the process non state institutions use to enhance market practices strategically in ways that would reduce poverty for poor producers and improve overall market functioning. His findings suggest that meaningful improvement of income will enhance market practices that redirect control towards poor producers in ways that reduce market failures. He found that effectiveness of poverty alleviation and market development strategies would be moderated by the extent to which institutional leveraging to market changes are aligned with existing norms by offering an integrated approach where market-based approaches could alleviate poverty and grow an inclusive market for poor farmers. With evidence on how markets work for poverty alleviation of poor farmers, there is need to enhance smallholder farmers’ transition from subsistence to commercialized agriculture.

Commercialization of smallholder agriculture leads to greater market orientation, which is expected to lead to food self-sufficiency through transformation from subsistence to commercialized agriculture (Gani & Hossain, 2015; Jaleta, Gebremedhin, & Hoekstra, 2009). Yet
the commercialization process remains a challenge for many smallholder farmers in developing countries. Most countries are characterized by poor infrastructural facilities and poor links from farm to markets, insufficient access to market and market information, and inappropriate policies. Agricultural policies should not only boost food production but should also focus on agri-business. Since production cannot be considered complete until farmers’ products get to consumers, linking farmers to the market is vital to successful commercialization of smallholder agriculture.

Akinlade, Balogun, & Obisesan, (2013), in their paper on the commercialization of urban farming by Southwest vegetable farmers identified that to improve urban income in Africa, markets and market access were critical sectors to be improved upon. This is because of major limiting constraint faced by farmers due to poor market access links. Using a multi-stage sampling technique, they analyzed data using descriptive statistics and Tobit model. It was found that social capital significantly affects market participation. It was recommended that governments, development partners and NGO’s should take a proactive role in facilitating formation of smallholder vegetable farmer’s organizations and link them to markets to ensure increase in revenue.

Despite the role agriculture commercialization plays in achieving development and improving farmers income through value chain upgrade, enhancing smallholder farmers participation in major markets and improve their revenue through collective marketing, this phenomenon is however, not void of challenges. Poor and inadequate infrastructural facilities, limited access to credit, inadequate access to land, and poor access to market information are raised as challenges that hinder smallholder farmers selling their produce in major city markets.
In most SSA countries, smallholder farmers usually produce and sell at local markets close to production area due to challenges that deter them carrying their produce to distant markets to sell. This led to inefficiencies in the value chain.

**Inefficiencies in the Value Chain**

There exist inefficiencies in agricultural marketing value chain due to poor state of infrastructure (inadequate storage facilities, post-harvest management, and transporting), middlemen existence, that result to high cost of produce, poor access to credits by farmers and shortage of hired labor resulting from low pay for their services (Chand, 2012). There is need to address these inefficiencies in a value chain in order to check middlemen excesses, improve producers bargaining power and promote collective marketing to provide other avenues for farmers to sell more and make more money as they market their farm produce.

Gómez et al., (2011), in a study on how to advance food value chains establishing that food value chains comprise of agricultural production, processing, storage, marketing, distribution and consumption, and how does the poor in developing countries benefit in the process. To enhance marketing channel efficiency, it requires cost-efficient market intermediation which include aggregating product for sale, improved storage, processing the produce, and distribution in a more profitable manner. It was proposed that investing in infrastructure that reduce significant market costs, would enhance smallholder farmers in Kenya to deliver their crops to buyers. This is achievable when there is a reduction in market intermediaries which makes it cost efficient and consumers and producers who are identified as the poor on the value chain, producers would enjoy higher profits from produce sales while consumers would benefit from lower prices.

Cudjoe, Breisinger, & Diao, (2010), analyzed food price transmission in Ghana regional markets. They were investigating whether there exists high price transmission between producers
in regional markets and markets located in Ghana largest cities and whether distance between producer and consumer markets influence food prices. This results from high transaction cost involve taking the produce to markets located in cities which are usually far away from producer markets. Moreover, it was also found that people living in urban areas are those that are hardest hit by high food prices. Distance travelled in addition to poor transportation network would impact transaction costs increase in the fare price transporting food from the farm gate to major city markets.

Maponya et al., (2016), identified that in South Africa, smallholder agriculture does not only play a vital role in rural food security and income provision for poor households who are engaged in smallholder agriculture, but help reduce unemployment rate. They found that smallholder horticulture farmers’ market participation was insignificant resulting from inhibiting factors such as inferior infrastructure in rural areas, lack of access to market information, lack of access to market, and slow technology adoption. It was recommended that enhancing and removing barriers that hinder their market access will increase poor households’ income and reduce poverty.

This is in line with the Mwambi, Oduol, Mshenga, & Saidi, (2016). In their study they recommended that improving smallholder farmers’ access to both locally and international markets could be one of the strategies to achieve Kenya’s millennium development goal. With increase global consumption of fruits and vegetables, with a significant world’s rural poor engaging in its production, encouraging smallholder access to high value markets is vital in increasing incomes and alleviating poverty, which is predominant in SSA. However, farmers in SSA are faced with poor infrastructure, they lack up-to-date market information, inadequate post-harvest facilities for
the supply of high-quality products, and they face difficulty accessing technical advisory services. All these hinder smallholder farmers’ access to markets in Kenya.

Conditions of transportation network exerts a strong influence on agricultural marketing efficiency (Fafchamps, 2005), examined whether coffee producers who sold to traders at the farm gate or selling to distant markets if they got higher prices after incurring transportation cost. They found that selling to distant markets the probability was higher when the quantity sold is large. Increase production volume increased farmer’s likelihood to sell in markets, and to travel to distant markets. This was consistent with their ability to pay the cost of transporting their produce to distant markets (Fafchamps, 2005).

Eskola, (2005), described that Tanzania main trade impediment is physical infrastructure. Insufficient physical infrastructure in terms of roads would increase cost of transportation. This works as an informal market barrier and forms a block between producer price and consumer price, and an increase waste loss of perishable products. It was suggested that policy interventions should prioritize increase funding for physical infrastructure. Also, Policy should aim at improving market information dissemination in order to allow markets in Tanzania to work more efficiently. Mobile phone is a great way of information distribution in a growing world of technology and globalization.

**Information in overcoming market challenges**

As the world increasingly embraces the digital age, more personal digital devices are owned and used. Today digital devices are increasingly being used in the agricultural sector especially in the domain of agricultural marketing more specifically on market price information used by value chain actors to make informed decisions that promotes efficient trade (Jairath &
Mobile phone technology is an appropriate digital device that extension can use to gather and distribute market information and knowledge to help improve farmer’s income. Fu & Akter, (2016), examined how mobile phone technology impact agricultural extension services delivery in India. It was observed that the speed and quality of extension service delivery has improved significantly due to mobile phone and technology advancement. These would enhance farmers access to markets and market information.

According to Jain, Kumar, & Singla, (2015), there is a need to disseminate in a prompt and precise manner agriculture information (production systems and market information). He recommended the use of mobile technology which he relates to internet and mobile phones for farmers in India to deliver agriculture related information. He recommended the development of mass communication technology as a mobile system incorporating farmer’s native language to help in better understanding and timely delivery of agriculture information.

When farmers are provided agricultural information, they could sell for more money. Wyche & Steinfield, (2016), analyzed that with widespread ownership of mobile phone in Africa, this provides a realistic opportunity to boost information delivery even to farmers found in remote areas. In their study of why with technology affordance, there still exist barriers to market information distribution in Kenya. They found that there was a mismatch between agricultural market information service and perceptions by smallholder farmers on their mobile phone communication capabilities.

Kaske, Mvena, & Sife, (2018), examined how mobile phone is used to access agricultural information in Ethiopia. After collecting data from 320 household heads who own mobile phones, it was found that more than 90 percent use their mobile phones to make calls on agricultural purposes. It was concluded that mobile phones play a significant role in information distribution.
It was recommended that Ethiopia Ministry of Agriculture should develop a mobile-based agricultural information system that could be used to enhance information delivery most especially to rural households. Access to market information would improve total revenue realize from the sales of farm produce and help farmers access markets.

Access to market information would enhance farmers accessing major city markets to sell their produce and make more revenue. Rational production and marketing decisions are made when farmers have knowledge on prevailing prices, quantities and qualities as well as selling conditions in markets (Tollens, 2006). When farmers have information on current prices in nearby city markets, cost of transporting their produce, and information based on consumer appreciation, this creates opportunities where they can sell volumes of their produce, increase farmers bargaining power, raise farm revenue and reduction in poverty (Minot, 2011). Increase flow of market information could improve smallholder farmer access to markets. With reliable market information farmers are provided at the right time, farmers can improve their bargaining position, have the option of travelling to distant markets if that will provide them greater returns, and are able to choose the right sales time (Zanello & Srinivasan, 2014).

Magesa, Michael, & Ko, (2014), identified that access to agricultural markets and market information are factors that promote market competitiveness and agricultural sector development. They established that despite the advantages resulting from access to market information, majority smallholder farmers lack suitable access to markets for their products and are usually not provided agricultural market information. Deprived from these, smallholder farmers are usually exploited by traders (wholesalers) who pay low prices for farmers produce. This leaves the farmer at a precarious situation, they remain poor despite the time, money and energy exerted during and after production.
When there is flow of market information through different means of communication especially of market prices that entails in different markets, farmers would carry their produce from where there is surplus to markets where they can receive more revenue. Mabota, Arlindo, Paulo, & Donovan, (2003), carried a study on market information on agriculture market development. The Ministry of Agriculture and Rural Development in Mozambique, in alliance with the Agricultural Market Information System (SIMA) collected, processed and distributed weekly information through radio, newspapers, television and, with paper copy distribution. This resulted to an increase in farmers participation in markets. Their results show that farmers who had access to extension services also had access to market information (Mabota et al., 2003).

Access to markets and market information are important factors that propel access to markets by farmers, but these is not void of challenges. Lack of access to markets and linking farmers to markets are great challenges to smallholder farmers in SSA. There are different practices through which successful smallholder farmers have gained access to better remunerative markets. Mass production, forming organized groups, enhancing constant supply, and enhancing business development were best practices that could contribute to market access by smallholder farmers (Wiggins & Keats, 2013). Access to market information would enable farmers to gain higher revenue through crop sales more specifically when transaction costs plummet and better gains from trade could be enjoyed.

Zanello & Srinivasan, (2014), identified that marketing information flow to farmers in Ghana and reliability of market information that is price information obtained from extension agents had the likelihood of encouraging smallholder farm producers market participation in agricultural markets. Provision of right market information would improve farmers bargaining power and provide them with the option to travel to distant markets if that provide greater returns.
They identified a high probability that when farmers source of market information is from extension agents, farmers were more likely to travel to faraway markets. This trust made them to invest in transaction cost with intention to make greater profit.

**The role of extension in addressing market challenges**

The market provides solid foundation of economic growth and development. However, there exist multiple challenges in linking poor farmers to markets and ensuring that the changes result in a pro-poor orientation (Anh & Tung, 2012). Anh & Tung, (2012), identified that value chain development that incorporates smallholders is now being promoted since it supports rural development, incorporating market forces that help improve livelihoods of the poor. Their goal was to investigate what are the extension policies necessary to support value chain development. In understanding the poor in the market and intervening to bring change, linking farmers to markets bring in long term business relationships that can develop as value chains. These coordination, partnership and market orientation are basis of value chain optimization and continued market innovation. Therefore, farmers coordination through extension education is a way out of some major challenges and assist farmers possible access to major markets that might not be possible on an individual basis.

There is need for farmers to form groups that would help link smallholder farmers to markets (Gyau, Franzel, Chiatoh, Nimino, & Owusu, 2014; Kaganzi et al., 2009; Markelova, Meinzen-Dick, Hellin, & Dohrn, 2009).

Markelova et al., (2009), investigated on collective action for smallholder market access. They examined the opportunity smallholders may employ to raise income through market competition ability. They found that there are numerous market failures in rural markets in
developing countries that hinder smallholder farmer from gaining access to markets. To them understanding how collective action, problems of inefficiencies, and coordination or market access barriers is enhanced prerogative. The paper examined the conceptual and empirical evidence on collective action institutions role on improving market access for the rural poor and the conditions which facilitates effective producer organizations with emphasis of user groups, institutional arrangements, product type, markets, and external environment market access. They suggested policies and interventions developed by public and private sector, and or civil society was in the best place of providing interventions that facilitate collective action for market access among smallholder farmers (Markelova et al., 2009).

Kaganzi et al., (2009), saw that successful market linkage with producers is based on farmers becoming more organized in order to meet up with upgrades in terms of product quality for more secured value chains and a more efficient marketing and business management. In this light, it was found that collective action combined with strong leadership and an iterative market-led learning process enabled farmers to enter modern food markets in Uganda that had stringent quality control. The success in the market linkage resulted from effective support from both development and research providers and a strong entrepreneurial drive that farmer associations possessed.

Gyau et al., (2014), investigated whether collective actions were major determinants to improve market access for smallholder producers of agroforestry products in Cameroon. In their study they highlight that in recent years amidst academics and development practitioners there is growing agreement that improving market access for smallholder farmers would lead to increase in income and food security improvement. They suggested measures such as collective actions are a strategy to reduce risk of market participation. They concluded that the use of collective action
which include farmers’ own motivation, favorable environment and social activities inclusion in group activities implementation were institutional arrangements that improved market access for smallholder producers of agroforestry products.

Collective action would increase smallholder farmers bargaining power, spread of cost and benefit from economies of scale, gain access to markets and market information, get access to credits and farmers could collectively improve infrastructure development. This would upscale farmers revenue and extension could make available market information, cheaply, consistently and in an organized manner than treating with individual farmers.

According to Omiti, Otieno, Nyanamba, & McCullough, (2009), farmers who engage in market-oriented production have a high potential of unlocking possibilities for better income and sustainable livelihoods for farmers, with greater welfare improvement. This is achievable when challenges that hinder smallholder farmers from participating in markets and agro value chain are identified and addressed.

A study conducted by Tollens, (2006), examined the challenges and opportunities of market information systems in SSA which focused on the rise and emergence of market information systems in SSA. He highlighted on the existence of public and private market information systems and concluded that information dissemination using traditional (radio) or modern (ICT) systems was necessary. Moreover, market information alone would not catalyze market value chains. Therefore, gaining better access to markets in a more sustainable and remunerative manner by poor farmers, was a more needed component to just market information (Tollens, 2006).

Mukwevho & Anim, (2014), investigated on the constraints to smallholder farmers and its consequences for market access. Data was collected based on access to market information,
distance to markets, equipment used by smallholder farmers, agricultural extension education. They found that condition of roads to markets, distance to output markets were major factors identified affected smallholder farmers market access. It was recommended that for smallholder farmers to access markets for their agricultural produce, measures aimed at mitigating identified constraints need to be put in place.

An area demonstrated by research to overcome market challenges to enhance market access by smallholder farmers is using communication systems. Studies have explored how Information delivery systems are used to enhance farmers access to market information (Basavaraj, Rao, Pokharkar, & More, 2013; Kizito, 2011).

Kizito (2011), examined in his study factors that affect the reception of improved agricultural market information by farmers. Owning a radio, availability of cell phone networks in villages, proximity to road systems, membership into farmer groups, and access to extension services are factors that increases reception of agricultural market information. When farmers gain access to market information it increases farmers likelihood to participate in larger markets.

Information delivery system are important channels through which information of new adoption of innovative practices, and, market related information can be disseminated to farmers. Basavaraj et al., (2013), identified in their study that agricultural universities, input dealers, extension workers, neighboring farmers, radio, television, and mobile phones are major sources through which agricultural information is transmitted. However, market middlemen, and friends to farmers were primary sources patternning to market information. There is need for extension not to rely only on teaching farmers on best production practices and adoption of new innovative practices but should also focus on providing market information will go a long way to increase farmer’s profitability.
Linking farmers to markets and creating a strong interdependencies between agribusiness and agriculture will lead to growth in productivity (Haggblade, 2007). This can be necessitated when extension agents play the role of market knowledge provision relevant to boost agricultural productivity and sales growth.

Mtega, Ngoepe, & Dube, (2011), investigated on factors influencing access to agricultural knowledge of smallholder rice farmers in Tanzania, and the extent to which agricultural knowledge is important on farmers livelihood transformation and enhancing food security. He found that information infrastructure which influence information dissemination is not distributed uniformly within the country. This cause some farming communities more information rich and others information poor. However, the agricultural sector in Tanzania is characterized by farm level agricultural knowledge inaccessibility resulting from poor research-extension-farmers linkage. It was found that undertaking agricultural activities use and access to agricultural knowledge by farmers was paramount using extension to enhance access to agricultural knowledge in rural areas. Gaining access to agricultural knowledge through extension services is exquisite when farmers gain it collectively.

Coetzee, Montshwe, & Jooste, (2005), investigated on the constraints, challenges and implications for extension services on the marketing of livestock on communal lands in the Eastern Cape Province. They identified marketing constraints by smallholder farmers and suggested new strategies and implications to improve the marketing situation through agricultural extension. Their focus was using a model that uses extension services to address farmer’s problem. This model provided above other things that an incorporated approach was fundamental for an efficient provision of agricultural extension services which will improve agricultural productivity through adoption of new technological practices. This is likely to underpin an efficient livestock marketing
system within the small-scale livestock sector, leading to increase possibilities of high market take-off, and an increase in farmer’s profitability (Coetzee et al., 2005).

In the past, the role of extension has been to help farmers increase production. According to Ferris & Irwin, (2016), this was an effective way in the past when farmers sold to government cooperatives. But today the role of extension has broadened, and extension agents support farmers in different ways. According to them, an effective extension agent needs to identify appropriate markets for farmers to improve their revenue. This is achievable if extension have knowledge of markets, and agricultural value chain. Extension could play a significant role to link farmers to markets to increase their revenue.

**Conceptual Framework**

Developing a conceptual framework provide us with an understanding on what goes on in the value chain. This provide a link on what goes on from when food leaves the farm and when it gets to the plate. Mapping actors in the value chain is relevant as it assists us to identify actors and their activity in a given sector. Challenges faced by the different actors could be identified which sets guidelines to suggest opportunities. On this basis, providing recommendations to augment producer’s role and profitability as prime actors in the value chain is possible. This is because smallholder farmers remain the vulnerable players in the value chain since they often involve in informal chain that delivers produce to middlemen locally, with poor uniformity in quality, and in a less organized manner (Roger Norton, 2014).

According to Ferris, Engoru, et al., (2014), Van Den Berg established the M4P framework, making value chain work better for the poor, it is essential to identify and map out key actors and what they do in the value chain process. This framework served as a guide for us to develop the
conceptual framework for this study. Tomato value chain is essentially short with resulting impact to sell more and make more revenue. Three major actors in the value chain is covered in the study. The farmers who grow the vegetable, transporters who carry the produce to the market and the wholesalers who act as a link between the producers and retailers or consumers. However, retailers are also, actors involve in the value chain, as they distribute in smaller quantities to consumers. However, retailers were not covered in the study.

Figure 2: Value Chain Link


Figure 2 maps out value chain actors. The left side shows the link from when food leaves the farm to when it gets to the market. This shows the flow of goods and actors involve in the
chain. As the product moves from one stakeholder to the other, price inflates. This is to cover transaction cost and profits makeup included by the actors on the chain. The up and down arrows signify the flow of product and market information. The market informs the producer of the price, quantity, and quality needed, and product handling, while producers inform the markets of the quantity available, locations, and timing issues. The right-hand side of the figure, this is where the study come in to analyze the role of extension to link farmers to markets and bypass wholesalers. The link shows that only the services of transporters are utilized to transport the produce from the farmer to urban retailers. This shortens the value chain and price paid by the consumer can be reflected to the farmer as higher revenue.

Value chain with focus on strengthening the links between value chain actors and development interventions can improve opportunities available to the poor (Ferris, Engoru, et al., 2014). Mapping out value chain help identify actors and their activities on the value chain, and identify challenges faced by actors in the value chain. It also, determines the distributional outcomes of the production system, and a capacity that individual producers can use to upgrade their operations and launch themselves onto a sustainable income path. Value chain analysis, therefore, play a key role in identifying who benefits from participation in the chain and actors who can benefit from increased support or organization (Ferris, Engoru, et al., 2014). Smallholder farmers are identified as the poor in the value chain. It is essential to link farmers to markets and bypass some actors along the value chain to ensure more revenue. Enhancing collective marketing could increase farmers bargaining power and transaction costs spread among famers enhancing better profits after sales.

Agricultural extension could play a role to link farmers to markets. According to Ferroni & Zhou, (2012), extension has as objective to disseminate advice to farmers (production and
marketing of produce). This is possible when production and market information is based on efficient use of services. Quality inputs and better use of productivity enhancing tools, information on prices and markets are conveyed to farmers through extension service providers, and extension also, ensures collective value chain sales. Extension could achieve this outcome by organizing national seminars on agricultural extension by educating farmers on the benefits of collective marketing to establish direct sales of produce from the farmer to retailers and eliminate the wholesaler in the value chain.

Organizing farmer and market-led extension systems such as educating farmers on organizing farmers’ groups, for collective marketing of their produce, and publication of agricultural market information especially of prices in different markets could increase sales and farmers would make more money from sales of their farm produce (Ferris, Robbins, et al., 2014; Ferroni & Zhou, 2012). Educating and helping farmers form groups to jointly market their produce could also, increase their bargaining power and reduce transaction costs. Economies of scale could be enjoyed by smallholder farmers, and they can easily gain access to extension services as a group rather than as individuals. Also, extension should provide market information by working with local communication service providers to develop programs in local radio stations, local newspapers, and bulletins, which are more formal medium to disseminate market information to farmers.

When market information is provided in a formal and trusted manner, smallholder farmers can engage in taking their produce to distant markets where they can sell at a higher price. Bypassing some actors along the value chain would benefit the consumers and the farmers since money gained by wholesalers along the value chain could now be benefited by the farmer.
Through aggregating produce to transport and sell in large urban markets by farmers, costs of transportation would reduce, new markets with better sales price can be sorted, and collective marketing could be beneficial to smallholder farmers. This is necessitated when extension workers educate farmers on the benefits to form farmers’ groups, provide farmers with up-to-date market information. Therefore, linking smallholder farmers to markets and access to market information could be enhanced by extension workers which is a formal medium for information distribution to farmers. This would not only help link farmers to modern market chains but will help mitigate information asymmetry which is a challenge.

**Conclusion**

In the literature review chapter, the value chain concept is defined in terms of its applicability in the study context. The pro-poor value chain approach and M4P framework were analyzed. Review of literature provides insight and necessary backdrops on other people’s studies, by analyzing linking smallholder farmers to markets, identify the inefficiencies in the value chain, and the role of extension in addressing market challenges and enhancing an efficient value chain. Transportation difficulty resulting from poor physical infrastructure prevalent in most farming areas in Africa, access to labor, and inadequate technological development, inadequate flow of market information were some challenges identified in literature faced by actors in a value chain. Therefore, this study’s goal was to examine the role of extension in enhancing an efficient value chain bypassing some actors in the chain. This laid the basis for the conceptual framework and the aim of the study.
CHAPTER 3: METHODOLOGY

With value chain systems and relationships that exist among value chain actors, this research mapped out value chain actors and their activities along the value chain, examined the challenges faced by the actors, and analyzed the role of extension as a leverage to make the value chain efficient. This chapter will first outline the study area, and will then explain the research design, data collection, data analysis, procedure and limitations of the study.

The Study Area

The study area is Fako Division, which is located in the Southwestern part of Cameroon. Fako has a total population of 466,412 as of 2005 census, with a surface area of 2,093 km² (1300.53 miles). It is characterized by urban area representing 68.5% against rural settings of 31.5%. Situated at the foot of Mount Cameroon, it is bounded to the south by the Atlantic Ocean, the North, by Meme Division and the East by Wouri Division. This strategic location serves as a gateway of trade to Cameroon’s economic capital, Douala (Wouri Division), and Calabar in Nigeria. It has diverse ethnic groups, with mokwe being the native language of the indigenes. However, English and Pidgin English are the predominant languages spoken in this area. Figure 3 is the map of Cameroon showing its ten regions.
Figure 3: Map of Cameroon

Source: https://afriquemini.wordpress.com/2016/09/01/blog-post-title/
Cameroon is divided into ten Regions (eight French speaking regions and two English speaking regions). Each region is headed by a presidentially appointed governor. These ten administrative regions are divided into fifty-eight divisions. A division is a smaller administrative unit, with regards to regions, headed by a presidentially appointed divisional officer. The divisional officer performs the governors’ duties on a smaller scale. The divisions are further divided into sub-divisions and districts. Villages are communities within districts and are headed by chiefs⁶.

The areas selected for the study are the villages of Bokova, Wotutu and Ewongo located in Fako Division, Cameroon. These are areas where people are increasingly getting involved in tomato production. This results from the profits that was realized by farmers who engaged in this sector earlier. With friends and neighbors realizing the farmers are making revenue from growing tomato, interest grew and so many people became attracted and started producing tomato for commercial purposes.

Tomato is predominantly produced in this area due to its tropical wet climate and volcanic soils from Mt. Cameroon making it suitable for tomato production. These enriched soils make the area suited for tomato growth. Fako, located 42 miles from Douala, is also where the largest food market in Cameroon attract traders from neighboring countries such as Nigeria, Equatorial Guinea and Gabon. This market also serves as a food hub for the western and northwestern regions of Cameroon which are major vegetable producing areas as well; however, these two regions are not as close to the Douala food market as Fako (approximately 111 miles, and 135 miles respectively). Figure 4 shows the map of the southwestern region where Fako Division is located and the area where tomato is predominantly produced.

⁶ A chief is the head of a clan and the custodian of the people who belong to a tribe.
Figure 4: Map of Southwestern Region of Cameroon

Source: https://afriquemini.wordpress.com/2016/09/01/blog-post-title/
The study area includes communities situated in Fako Division commonly referred to as villages. Villages, in this context, refer to linear settlements containing households with approximately 8-10 family members living within the same household. These households are mostly engaged in agriculture with farms most accessed by foot, bicycles and motorbikes.

Agriculture is the mainstay in these communities, and it is mostly carried out at subsistence level. A variety of product is cultivated in these villages in Fako Division, such as maize, beans, cocoyam. Livestock production is done mostly at the household level, with women also engaging in other income generating activities such as small-scale trade in nearby markets on weekly routine for income generation. Other income generating activities include dress making, motorbike, bicycles and vehicles maintenance, repairs of agricultural inputs such as hoes, and cutlasses, and agribusiness shops where farm inputs and chemicals are retailed for smallholder farmers.

The smallholder farmers are mostly engaged in vegetable production with tomato production witnessing increase in the number of producers due to high profit that was enjoyed by initial farmers producing tomato. Tomato is produced in Fako in two seasons (rainy and dry season), with the rainy season being the most productive season for a greater number of farmers due to water availability. Moreover, this area is blessed with abundant rainfall and volcanic soil resulting from the sediments of Mt. Cameroon. Use of irrigation is limited, and only used by those who need to grow tomato at the heart of the dry season which is not a very common practice. However, this is not a common practice here since tomato can conveniently be grown in two seasons due to its tropical wet climate and availability of streams and running water in most parts of these villages. This increases soil fertility and high productivity of tomatoes.
**Research Design**

The research design adopted in the study is based on a mixed method case-study design. This study utilized both a qualitative and a quantitative method for data analysis. Using mixed methods approach helped strengthen weaknesses or bias that exist in both methods. Quantitative data used to address the objective often lack the in depth needed to elucidate challenges faced by value chain actors for profit enhancement which is addressed by qualitative data. Combining both, the research becomes both rich and objective.

**Data Collection and Analysis**

Field study took place in Fako, Cameroon from June to August (2018). Participants involved were tomato value chain actors – farmers, transporters, and wholesalers. Also, extension agents were interviewed when it was determined that access to market information was a huge challenge to smallholder farmers.

This process started by visits to local markets to understand the context of tomato value chain. The visits gave us the opportunity to meet tomato farmers and talk to them on an individual basis. During these visits, we identified reputable tomato farmers who have become unofficial leaders and role models among the farmers. We accessed the villages by contacting these well-respectable tomato farmers in the different villages, who acted as a liaison and organized a place for the focus group meetings to hold (see below). This was a gateway to access the community and established familiarity with tomato farmers thereby facilitating participation in the study. With the use of lead questions, we collected background information, information pertaining to tomato revenue, how they finance their production, where they sell their tomatoes, arrangements they have with the wholesalers and transporters, and the challenges they face marketing their produce. We
also, asked farmers if there were often visited by extension field workers, and what kind of services are offered by the extension agents (see appendix A).

Based on the information we gathered both open and close ended questionnaires were developed. Different questionnaires were developed for farmers, transporters, wholesalers, and extension field workers. Overall, 31 farmers, 10 transporters, 11 wholesalers and 8 extension agents in Fako Division were administered with questionnaires. Participants either completed questionnaires by writing on forms or verbally read them and responses registered upon requested.

Different questionnaires were administered to each of these actors that consisted on yes or no questions and open-ended questions. The focus of the questionnaire for farmers was to identify the major challenges regarding sales and transportation of their products, their relationship with wholesalers and transporters, and questions regarding information provided by extension agents. The questionnaire for wholesalers focused on the challenges related to tomato marketing, and their relationship with farmers and transporters. The questionnaire for transporters also focused on identifying the challenges faced in tomato transportation and the transporters’ relationship with farmers and wholesalers. Lastly, the questionnaire for extension agents dwelled on tomato marketing and challenges faced by extension agents on information provision regarding tomato marketing.

We also organized focus group discussions with farmers in the three villages – Bokova, Wotutu and Ewongo. These groups were made up of tomato farmers and averaged seven farmers per group. One group was intentionally limited to female farmers, another was with only male farmers, and the third one was a mix of both sexes. This was done to understand the nuances in this sector and provide an environment where all would feel comfortable contributing to the discussion. Most importantly this arrangement of the focus groups was in recognition of cultural
expectation that women would not contribute during public discussions, and especially, in the presence of men. This also facilitated conversation and better understanding of the challenges facing each gender and allowed for better understanding of how gender mediates tomato production in the community. The procedure before each focus group discussion was providing personal information to the participants: researcher name, reason for the research, as well as a request permission/consent to record the conversation. The participants were also made aware that the participation in the research was voluntary and the degree of confidentiality with information recorded.

**Limitation of the Study**

The field work for the study was heavily impacted by the civil war in the study area that escalated during the period of field work. The two English-speaking regions of Cameroon, especially the Southwestern region, has been in a crisis since 2016. However, the situation in five of the six divisions that make up the southwestern region deteriorated in October 2017, when some individuals marched through the streets seeking for an independent state. Even then, Fako remained relatively calm when the areas around Buea and Limbe were witnessing some level of peace and were seen as relatively safe places. This changed in July when the separatist’s fighters decided and made efforts to capture Buea, which they claim to be the headquarters of the English Cameroon.

The separatist’s forces made their way into the surrounding areas of Buea, most specifically the villages around Fako, and suddenly Fako region was transformed into a crisis zone. This all happened during the field work and as a result, the research areas became unsafe and were ripe with militarized with confrontations between the military and separatist groups. Some residents
had to relocate to other areas, people became less welcoming and skeptical of anyone not well known to members of the community – no one would allow a stranger in, let alone asking them to respond to questions. The situation worsened when some chiefs in Fako division were held captive by the separatist forces and one lost his life. Village residents felt they were no longer safe. It was impossible to determine the researcher’s intention, and this made further data collection impossible. People were kidnapped and ransom collected from their family upon release. Life threats became the norm. The villages around Fako became hideouts for some separatist groups and a lot of shooting went on in these areas. Families left for their safety and presently, the researcher cannot access the study area to collect data, as the area is deemed very unsafe (O’Grady, 2019; Searcey, 2018). This affected the researcher’s ability to collect more in-depth data from extension workers, which was the last phase of the study.
CHAPTER 4: ANALYSIS OF RESULTS

The analysis of the results follows the study’s objectives. This was achieved by mapping actors in the value chain and identifying their activities in the value chain. The challenges faced by the actors in the value chain are analyzed, and the role of extension in overcoming these challenges is explored. The challenges were classified into four categories of problems: production, transportation, marketing, and access-to-information problems. We also explored the role extension workers could play to potentially help link farmers to markets and bypass some of the value chain actors in order to increase smallholder farmer profitability.

Demographics of Tomato Actors Interviewed

Table 1: Demography of value chain actors

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Farmers (%)</th>
<th>Wholesalers (%)</th>
<th>Transporters (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Male</td>
<td>48.4</td>
<td>27</td>
<td>100</td>
</tr>
<tr>
<td>• Female</td>
<td>51.6</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 20-29 years</td>
<td>25.8</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>• 30-39 years</td>
<td>41.9</td>
<td>81.8</td>
<td>30</td>
</tr>
<tr>
<td>• 40-49 years</td>
<td>22.6</td>
<td>18.2</td>
<td>10</td>
</tr>
<tr>
<td>• 50-59 years</td>
<td>9.7</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Married</td>
<td>64.5</td>
<td>63.6</td>
<td>60</td>
</tr>
<tr>
<td>• Single</td>
<td>35.5</td>
<td>36.4</td>
<td>40</td>
</tr>
<tr>
<td><strong>Educational level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• No schooling</td>
<td>3.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Primary education</td>
<td>19.4</td>
<td>36.4</td>
<td>70</td>
</tr>
<tr>
<td>• Secondary/high school</td>
<td>64.5</td>
<td>54.5</td>
<td>30</td>
</tr>
<tr>
<td>• Degree and above</td>
<td>12.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Field survey, (2018)
Table 1 shows the demographic characteristics of actors in the value chain that were interviewed. About 52 percent of the farmers interviewed were women and 48 percent were male (see table 1). This gender-split in the respondents is interesting and reflects the fact that more women in the region are getting involved in producing tomatoes for commercialization, which has always been considered a male dominated sector. Women are known to participate in agricultural activities such as weeding and harvesting with minimal participation in the production stage (Doss, 2010). In addition, majority of the farmers who participated in the study are 30-39 years old, with a significant number having secondary and high school education. The seeming popularity of tomato farming among the youth and the educated is a reflection of lack of alternative employment in the area and the continuous sensitization by the government for youths to gain employment in the agricultural sector.

Women however dominate the wholesaling sector and again, most of them are in the age group of 30-39 years. Most of the wholesalers have attained secondary and some have some high school education. In Cameroon, wholesalers are locally referred to as “buyam-sellam”\(^7\). In other countries, for instance, in Ghana they are referred to as “market queens”\(^8\). These wholesalers form strong market associations and limit entry by other value chain actors from selling directly to retailers. They have spots in specific areas in the urban market allocated for the sale of specific products. Wholesalers also provide retailers with goods on hire purchase with payment made after the produce has been sold. This is because some wholesalers have long standing relationships and trust has been built over time with retailers in the urban markets.

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\(^7\) This are mostly women who buy farm produce from local farmers and sell to retailers in nearby markets or trade across long distant markets (Fonjong, 2004).

\(^8\) Market queens are a network of women traders that serve as a link between the local farmer and urban consumer (Robinson & Kolavalli, 2010).
Transportation is a male dominated sector in the area. All transporters surveyed were males and within the age group of 20-29 years old. Majority (70 percent) of them do have only primary school education (see table 1). Young people getting into the transportation business is on the increase in most parts of Cameroon. This is a common phenomenon for people who do not want to continue with education. Most of the young transporters own motor bikes and tricycles that they use for commercial transportation purposes. They transport tomatoes and other items from the farm to the local markets. Also, some of the transporters were urban transporters. They carry produce for wholesalers from the local markets to the urban markets. These drivers use buses and trucks to transport the produce. Their services are hired by the wholesalers who sometimes jointly hire a truck to transport their produce.

Demographics of extension workers
Agricultural extension in Cameroon is part of the public service sector where workers are recruited to educate and advise farmers on agricultural practices and development and enhance rural development. Extension services in Cameroon is run by the Ministry of Agriculture and Rural Development. Extension workers are hired and sent to the delegations of agriculture in the region to work with farmers in curved out farming zones. These extension workers are under the supervision of the divisional delegate for agriculture. Extension workers interviewed were those assigned in the zones that make up the Buea area. The three villages studied are part of the zones under the supervision of the divisional delegation for agriculture in Buea. They are expected to educate farmers on better agricultural practices and better ways of marketing to improve farmers’ revenue.
Table 2: Demographics of extension workers

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Percentages (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
</tr>
<tr>
<td>• Male</td>
<td>37.5</td>
</tr>
<tr>
<td>• Female</td>
<td>62.5</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>• 30-39 years</td>
<td>62.5</td>
</tr>
<tr>
<td>• 50-59 years</td>
<td>37.5</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
</tr>
<tr>
<td>• Married</td>
<td>37.5</td>
</tr>
<tr>
<td>• Single</td>
<td>62.5</td>
</tr>
<tr>
<td><strong>Educational Level</strong></td>
<td></td>
</tr>
<tr>
<td>• Secondary/High school education</td>
<td>57.1</td>
</tr>
<tr>
<td>• Degree and above</td>
<td>42.9</td>
</tr>
</tbody>
</table>

Source: Field survey, (2018)

Table 2 shows the demographic characteristics of extension workers surveyed for the study. Majority of the extension workers are female and within the median age of 35 years (see table 2). The predominance of women extension officers in this zone is unusual because extension in Cameroon has always been considered a male dominant sector. This female dominance could be as a result of the main office located in Buea which is an administrative town, therefore more attractive to these women extension officers. Most of the extension workers (about 57 percent) have secondary and high school education, and the rest (approximately 43 percent) have degree or higher level of education.

Identifying and Mapping main Actors involved in the Tomato Value Chain

One objective of the study was to map out actors in the value chain. Mapping actors is relevant since it helps us identify constraints and possible solutions that exist at different levels in the value chain, and to identify location and position of the poor in the value chain (Ferris, Engoru, et al., 2014). This study adopts the M4P theory of making value chains work better for the poor with focus on analyzing market development with the objective of making an impact on the poor,
by increasing the income from agriculture through market participation. Thus, we systematically identify and map actors and their functions in terms of the production, distribution, marketing and sales of tomato.

![Figure 5: Mapping out value chain actors and specific activities undertaken](Source: Ferris, Enguru, et al., 2014)

Figure 5 shows a simple linear value chain from production to when tomatoes get to the market, and the different actors involve and activities at each stage in the value chain. However, this study focuses on farmers, wholesalers and transporters. In the tomato value chain, the input providers sell fertilizers, seeds, and farm equipment to farmers. During planting seasons, the farmers grow tomatoes. When mature they harvest, pack into baskets and use the services of transporters to carry them to the local markets. The farmers often hire the services of the transporter to convey these baskets of tomatoes from the farms to the local markets. The transporters collect, load, and carry the tomatoes. The services of transporters are also hired by the wholesalers, who buy tomatoes from the local markets and carry them to urban markets. The wholesalers in turn sell the tomatoes to retailers in the city, who retail them in smaller batches and sell to consumers.

Tomato farmers are responsible for all production decisions. They acquire input, incur labor cost on production and harvesting and sell the final output to wholesalers and some to retailers. They produce tomatoes in two seasons because the area is characterized with rainfall in most part of the year due to its wet tropical climate. Some of the farmers own land, although
majority do rent land from indigenous people and pay rents on a yearly basis to produce tomatoes. These farmers who are smallholders in Fako Division produce tomatoes for commercial purpose. It provides employment to many and it is a source of livelihood for families where majority are poor households.

Transportation is a male dominated activity in Fako, Cameroon. Transporters carry produce from the farm to local markets and from local markets to major markets for sale. This transportation process is mostly done through prior arrangements between the farmer and transporter and between the wholesaler and the transporter. Tomato transportation from the farm to the local markets is done mostly using tricycles and motor bikes. This is because most farm to market roads are seasonal roads, that narrow as you move into the farming areas which makes access by vehicles impossible. Transporters also transport produce from local markets to major city markets. This negotiation is done mostly by wholesalers who come in and buy tomatoes in large quantities and the tomatoes are transported to the urban markets with the use of vehicles.

Wholesalers are traders who buy large amounts of products from farmers and sell to retailers and some is sold to consumers. They serve as a link between the local farmer and the food retailer in urban markets. They are mostly women and serve to improve the pathway from farm to plate. They sometimes finance farmers’ production during some seasons since they are more financially viable. This is done through prior agreements with the farmers. They also hire the services of transporters to carry their produce from the local markets to urban markets. They form a strong union in urban markets and would not allow farmers to sell directly to retailers in these markets.

There exist some relationships between actors in the tomato value chain. Some farmers surveyed arrange with transporters a day before harvesting, often with the use of mobile phones.
They call the transporters and make the arrangements on the time to pick up the tomato from the farm to the local market. This is the case with farmers who have developed long term relationships with transporters.

An interesting relationship found during the survey was one involving some farmers with wholesalers with regards to credits. Access to credit to finance tomato production is often a challenge faced by some farmers – about 52 percent of the farmers say they borrow to finance their production. Thus, some farmers would go into an agreement with wholesalers to finance their production. After harvest the farmer must give the entire product harvested to the wholesaler, who takes the produce to the urban markets to sell. When the product is sold, both the farmer and the wholesaler balance the accounts. The cost incurred during the production process is deducted and profit is shared on an agreed basis between the farmer and the wholesaler at the time the agreement was made. In the case where the total revenue realized does not cover the total cost incurred during the entire production process, the remaining cost is carried forward to the next planting season as debt to be paid by the farmer. This was raised by some farmers who engaged in this kind of arrangement as a challenge that can take time for the farmer to stabilize and be able to make revenue from tomato production.

A 35-year-old female farmer captured this arrangement with the wholesaler this way:

*The “buyam-sellam” gives us advance money to assist us produce tomato. After harvest we provide the “buyam-sellam” with all the tomato. She takes it to the city market and sell. We both share in the profits on a half/half basis, after all cost have been removed.*

Another 39-year-old female farmer recounts:

*The wholesaler provides me with money to work tomato. She collects everything I produce. She carries it to the city. She removes her capital she invested into the business, and for each basket she cuts 500 francs ($0.86). The buyam-sellam tells you whatever price she wishes since you don’t know the price a basket of tomatoes...*
is sold in the city. Sometimes you have worked for the season, but you are left with little income especially during seasons that prices get so low.

However, there were contrary views, as expressed by this 42-year-old male farmer:

Some seasons I don’t have money to buy fertilizers and seeds to produce. I receive money from a buyam-sellam. After harvest she collects the tomato and take to Douala to sell. We remove the money she put in and share the profits. I am comfortable with the arrangement. I don’t think I am exploited.

To the question of how the farmers finance their production, a 40-year-old female farmer responded this way:

I do not have enough capital. I started my business with past savings from my “njangi”9. My family members gave me some capital and I used to start my tomato production to sell and make money to provide needs for my household. This makes it difficult for me to expand my land for production.

Another male farmer put it this way:

I don’t have landed property to provide the banks or credit unions to take loan. I commit to taking money from a wholesaler before the start of planting season with an agreement that all that I grow will be collected and sold by the wholesaler. I don’t have any right to harvest and sell my tomato to someone else. The wholesaler collects all the tomato I harvest that season and sells. After sales, the cost incurred is deducted and the balance left (profit) is shared on a half/half basis. Most at times we don’t know the price a basket of tomato is sold in other city markets. The wholesaler tells you what the price is and sometimes they claim they did not recover the money they put in during production. The extra must be carried forward for the next planting season to enable them to recover the total amount of money put in. Since we were not present during the sales negotiation, we cannot debate it since we were not present at the sales point.

Lack of acceptable collateral security by farmers hinders them from obtaining loans and engaging in large scale production. Credit limitation also affects farmers access to land. Most of the farmers rent land and usually a few hectares of land. Majority of the tomato farmers produce on farmland less than two hectares. They comprise mostly of non-indigenes who moved to these areas to engage in agricultural production due to the wet tropical climate and fertile volcanic soils

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9 “Njangi” is an African support system where individuals decide to come together and form groups that meet on regular basis for purpose of saving and putting together money for all participant member’s benefit.
in the area due to the presence of Mt. Fako which is the highest peak in West Africa. Access to land is a major challenge in this area since they have to rent land from the few indigenous landowners (Bakwerians). Bakwerians own this fertile land but prefer white collar jobs to working on farms. They lease this land to farmers who pay rent on a yearly basis prior to usage.

A 43-year-old male farmer recounts:

When your landlord notice that you have high yields consistently, and believe you are making so much revenue, they become jealous, and may refuse to sign a new lease contract for the following year. They would give the land to someone who propose to pay a higher amount of money to rent the land. This is usually frustrating for us who do not own land in this area and constantly stay uncertain if our contracts would be renewed. It is a bad feeling to constantly fear the unknown.

Also, wholesalers have some relationship with transporters. They use the services of transporters to transport produce they buy from the local markets to urban markets. Wholesalers often make this arrangement with the drivers before buying from farmers at the local markets. Sometimes, a group of wholesalers will hire a single vehicle and jointly transport their produce to the urban markets to reduce transportation cost. Wholesalers have a stronger union and collectively determine the price they would pay for a basket of tomatoes before they get to the local market. Farmers are usually poorly organized and the wholesalers take advantage of their poor organization to exploit the farmers. The wholesalers would always walk away and could buy from another farmer or in different local markets if the farmers do not want to sell at the price proposed by the wholesaler.

**Challenges Faced by Actors in the Tomato Value Chain**

The research examined the challenges faced by the various stakeholders involved in the tomato value chain. This provided us with information that would support recommendations that could boost tomato commercialization to increase smallholder farmers income. These challenges
were classified under four categories: production problems, transportation problems, problems of marketing, and information problems.

**Production Problem**

Farmers raised the challenges faced in the production process. Access to labor during harvest season is a major constraint raised by the farmers. Farmers use both hired and family labor during the process of production. Although most of the labor used is hired labor. During harvest season most of the kids are often in school and so reliance on hired labor increases. During this season the demand for services for harvesters by tomato farmers increases. Moreover, availability of unskilled labor has reduced over time as a result of low wages paid for the services of harvesters. With increase in rural – urban migration by young people in pursuance of better paid jobs in cities, most rural areas are witnessing shortage in labor. About 42 percent of the farmers mentioned labor shortage as a challenge to their engagement in tomato production (see table 3). Even people who can provide unskilled labor who stay in these areas are now engaged in other activities such as riding motor bikes or doing petty trade that could raise better revenue for their households than earning menial pay from harvesting tomato. This limits the number of potential workers that can offer their labor services on hire basis.

*Table 3: Challenges faced during peak harvest season*

<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor shortage</td>
<td>41.9</td>
</tr>
<tr>
<td>Low prices</td>
<td>19.4</td>
</tr>
<tr>
<td>Transportation difficulties</td>
<td>29.0</td>
</tr>
</tbody>
</table>

Source: Field survey, (2018)
Transportation Problem

Transport facilities and state of farm to market roads, as in most SSA countries, remain a concern. Road infrastructure, especially farm to market roads, remain a neglected sector in Cameroon. Table 4 presents transportation challenges faced in getting tomatoes from the farm to the market. Poor state of vehicles, in addition to poor state of roads, cause damage to tomatoes during the process of transportation. A lot of food is lost as a result of poor transport infrastructure and lack of storage facilities that can help preserve tomatoes.

*Table 4: Transportation challenges*

<table>
<thead>
<tr>
<th>Values</th>
<th>Frequency</th>
<th>Percentages (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor state of roads</td>
<td>8</td>
<td>80</td>
</tr>
<tr>
<td>Poor state of vehicles</td>
<td>2</td>
<td>20</td>
</tr>
</tbody>
</table>

Source: Field survey, (2018)

The state of farm to market roads was identified as a challenge to tomato marketing. About 80 percent of respondents identified poor state of roads as a major obstacle to tomato marketing (see table 4). These roads, which are mostly unpaved, cause rumbling during the transportation process which leads to food loss. Transporting tomatoes in these road conditions create devastating effects to the product before it gets to its destination. Poor state of vehicles causes transportation difficulty and heavy loss resulting from poor state of roads and use of vehicles not adopted to conserve and protect the tomatoes during the process of transportation. This results in food loss and loss in revenue.

State of farm to market road

Infrastructure remains a major challenge in Cameroon as in other SSA countries. Farm to market roads are seasonal roads with potholes, and are slippery during rainy periods, therefore, transporting tomatoes from the farm to the market is a challenge.
Figure 6 shows the state of farm to market roads in the study area – roads to farms tend to be narrower with stones helping to bridge the way to cross gullies. For this reason, transporting tomatoes is mostly done using bikes and tricycles as seen in the pictures in figure 7.
Figure 7: Tomato transportation from farm gate to local markets

Source: Picture taken during field work

Figure 7 are pictures taken in local markets when farmers brought their tomatoes to sell to wholesalers after harvesting. Motor bikes and tricycles are the sure means that farmers use to transport their produce from the farms since most of the roads cannot be accessed by vehicles.

Also, farmers express their worries about the challenges faced transporting tomatoes from the farm to the market. The farmers raised the issue of transporters who are sometimes unreliable. Transporters do not keep to their words and sometimes keep these farmers waiting for several hours before the transporters show up to carry their produce to the local markets. This causes delay and could lead to spoilage when transportation takes place at night due to poor roads and improper handling.
A 35-year-old male farmer described the transportation problem this way:

We plan with transporters the day before harvesting to come and carry our produce from the farm and take to the market. But as more and more people need their services, they do not come on time and do not inform you of their delay. This is a means to get so many jobs in a day in order to compensate for periods when their services are lowly demanded. They do not turn down any job. Most at times they reach your farms in the night demanding more money before they can transport the produce to the market. Since they believe you are now in a desperate situation, they could take advantage of and make more income due to limited choice you could make later in the day. You also must pay for extra labor to make sure the loading goes fast, adding to the cost of transportation.

A 26-year-old male farmer put it this way:

The roads are very bad especially when it is rainy. This makes the roads to be slippery and transporting the baskets of tomato from the farm is sometimes difficult. We usually use motor bikes to do the transportation. The motor bike goes several trips to get the produce to the market. This is time consuming.

**Poor state of vehicles**

Transporting tomatoes from the local markets to urban markets is often done with private transport operators. The wholesalers often hire such vehicles to carry their produce from the local markets after buying from farmers at the farm gate. From observation on the field, these vehicles are always very old and look unreliable. They are also not adapted for tomato transportation. The baskets of tomatoes bought are packed one on the other, which often leads to food loss in the process.
Figure 8: Transporting tomato from local markets to urban markets

Source: Picture taken during field work

Figure 8 shows how tomatoes are often transported from the local market to urban markets. These vehicles are old, unreliable, and would probably break down somewhere on the way. The usage of a vehicle not adapted for tomato transportation has led to baskets being put on others, the result is food loss found in urban markets. As tomatoes move from the farmer to transporter, to the wholesaler before it gets to the retailer, transportation conditions are so poor leading to damage of the product. Consumers want to obtain maximum satisfaction together with food safety and so look for products that look fresh and in good condition. Thus, damaged tomatoes that cannot be sold by retailers are often thrashed in open spaces near the urban markets. This is a common practice in most urban markets in Cameroon.
Marketing Problem

Tomato marketing can be very frustrating for smallholder farmers in Fako. Most sell their tomatoes immediately after harvest, in their fresh form, at the local markets and for a low price. This is because they usually do not have the luxury of holding their produce for too long because of their immediate and dire need for money. The farmers often sell to wholesalers who take advantage of their desperation to pay low prices and sell them to large urban markets for huge profits.

Wholesalers are traders who buy large amounts of products from farmers and sell to retailers, and sometimes directly to consumers. They have more information and financial capacity and are therefore able to finance production for some smallholder farmers and collect their outputs after harvest to sell in the urban markets. After sales, cost is deducted, and profit is shared between the farmer and the wholesaler based on the agreement they had made. Also, some wholesalers buy tomatoes at the farm gate from farmers in larger volumes during tomato season and supply the produce to other retailers in some major city markets such as the Douala food market, Limbe market, and to wholesalers who come from neighboring countries such as Equatorial Guinea and Nigeria.

The wholesalers are usually more united than the farmers. Wholesalers who are involved in tomato marketing often come into an agreement before they buy from specific local markets. The wholesalers would sometimes link other colleagues with farmers in different markets where they could buy tomatoes. However, there are some marketing challenges that farmers and wholesalers encounter in marketing their produce.
**Farmers marketing challenge**

Farmers saw accessibility to urban markets as a major challenge. These markets are controlled by wholesalers’ associations and would not allow non-members to sell produce directly to retailers. Most wholesalers have bought spaces in urban markets specifically mapped out for the sale of tomatoes. Farmers who are not members of these market associations are often not allowed to sell to retailers directly since they do not own market spaces. They must sell to the wholesaler who in turn would sell to the retailer in these markets. This discourages farmers from taking their produce to these markets. These wholesalers agree on the price a basket of tomatoes would be sold for in the urban markets and how much they would be willing to pay the farmer for a basket of tomatoes.

![Figure 9: Challenges faced getting produce to the market](image)

*Source: Field survey, (2018)*

Figure 9 depicts that approximately 55 percent of farmers do not take their produce directly to major markets due to difficulty penetrating these markets. In most organized markets, wholesalers form cliques that restrict farmers from having direct access to sell their produce in the
A 36-year-old male farmer recounted the challenge in selling his produce in the market this way:

We carry our products to the big markets, but we are not allowed to sell directly to retailers or consumers in the market. We are forced to sell to the buyam-sellams. Buyam-sellams who have bought spaces in the markets know the market environment better and have customers to sell their produce to. Even when you want to be smart to sell directly to retailers, if they want to frustrate you, they could decide to step down their price and no other person would buy from you. You end up selling at that low price they have set in the market. Making sure you sell at a lost, this discourages you from taking the risk of carrying our produce to far away markets. We prefer to sell in the local markets closed to our farms where we are certain to spend about 150 to 200 francs to transport a basket of tomato from farm to market than to take the risk and carry to the cities and end up selling at a loss.

Another 41-year-old female farmer narrated her experience this way:

I take my tomato to the city to sell. As soon as I arrived, one buyam-sellam made a sign that I was a farmer. No one came to ask me how much I sell these tomatoes. I remained there for a long time. I only sold it later in the day when one buyam-sellam came to buy. At that time, they have decided how much they can pay. Since they know that you must travel back, they propose very low prices. I don’t want to go through such again, I sell me in nearby markets.

However, this 28-year-old female farmer had a different experience:

When I harvest my tomato, I call this wholesaler in Douala Sanaga market. We make arrangement with the driver who carry from farm to Douala. Sometimes I pay the driver and “motor boys”\(^{10}\) that load and off-load these baskets of tomato into the vehicle and out of the vehicle. When he sells based on the price at that point in time in the Douala market. For every basket sold, 200 francs (\$0.34) is deducted by the wholesaler and the balance is sent to me through my mobile money account.

Wholesalers marketing challenges

Low prices during peak season was the main concern of wholesalers. As every rational businessperson, their main goal is to maximize profit. As tomatoes leave the farmer, to the transporter, to the wholesaler who sells to the retailer, before it gets to the consumer, the price per

\(^{10}\) Motor boys are young energetic boys using headloads and shoulders, put things into a vehicle or take it out of the vehicle to destined location.
unit of tomatoes increases at each stage. However, during peak seasons where tomatoes come from different areas in Cameroon, such as the western region and the northwestern regions, the price of tomatoes in the urban markets can plummet. This is due to increase supply in the market at that point in time. This is a major concern because a basket of tomato that could be sold for about 4,000 francs ($6.87) during peak season, could be sold for 1,000 francs ($1.72).

Figure 10: Challenges of marketing tomato
Source: Field survey, (2018)

Figure 10 illustrates the challenges wholesalers encounter in marketing their tomatoes. Low prices affect wholesaler’s total profits. About 57 percent of wholesalers raised price fluctuation as a major hindrance to profitability. Price fluctuation is a major challenge to commercialization of agricultural produce, more so vegetables, due to their perishable nature. Prices rise during low harvest season and falls during peak season. This makes it difficult to predict profit margin from the sales of tomatoes due to frequent price fluctuations.

Wholesalers also provide retailers with tomatoes on hire purchase. These wholesalers have standing arrangements with the retailers they have developed with trust over time. They provide these retailers with tomatoes to sell and pay the wholesalers later. The farmers do not have this
luxury, they do not know these retailers in the urban markets and therefore cannot trust them with their produce to collect, sell, and pay later. Farmers also come from faraway and would not want to get into such arrangements with retailers whom they do not know.

However, there exist some challenges faced by wholesalers buying tomatoes from the farmers.

![Figure 11: Challenges wholesalers face in purchasing tomato from farmers](image)

Source: Field survey, (2018)

Figure 11 presents the challenges faced by wholesalers in purchasing tomatoes from farmers. Coming to an agreeable price between the farmer and wholesaler is a major issue. This is because farmers complain of being exploited by wholesalers who come and determine the price, which they claim reflects the price that pertain in major city markets, but this is often not the case. This results from lack of access to market information on existing market prices that entails in distant markets. Farmers usually doubt the prices provided by these wholesalers; it takes a long negotiation period to get them accept to sell their produce to the wholesalers due to loss of trust.

Some wholesalers were also concerned about dishonest farmers, who will hide tiny tomatoes and even bad ones, underneath the baskets and place fresh and big tomatoes at the top of
the baskets. This discourages retailers from buying tomatoes from them in the event of these situation. Grading is an important market phenomenon. Operating in a high value market entails assembling products based on grades and selling to different markets and at different prices. Farmers do not assemble tomatoes after harvest based on their grades. This is a barrier for farmers to get into high value markets where grading is essential.

**Information Problem**

Lack of a formal means of accessing market information, such as the price a basket of tomatoes is sold in the urban market, is a barrier preventing farmers from taking their produce to large urban markets. Due to the perishable nature of tomato, farmers sell at the local markets soon after harvest because of fear to take the risk and transport these tomatoes to the Douala food market to sell. This is also because, they do not have knowledge of where tomato may be sold at a higher price and probably where it is most needed. Poor access to market information led to lack of trust between farmers and wholesalers. Farmers belief that wholesalers intentionally underquotes the price of tomatoes in the urban market in order to pay them low prices (Magesa et al., 2014). Sometimes these farmers find out that was not the exact price a basket of tomato was being sold in the city markets. This has led to lack of trust. This lack of trust makes negotiations between farmers and wholesalers difficult.

Given this information symmetry, one objective of this study was to explore the role of extension field staff in tomato production and to explore the role that extension can play in linking farmers to markets, and bypass wholesalers in the value chain to increase tomato farmers income.
Extension as a Leverage to Enhance an Efficient Value Chain

Extension plays a crucial role in promoting agriculture and improving farmers livelihoods (Rivera, 2003). Smallholder farmers are known to play a vital role in providing food for a growing world’s population. They often face challenges that prevent them from obtaining their full potentials, especially in terms of better revenue for improved livelihoods. Making the value chain efficient is important as it can increase revenue for farmers.

Role of extension in addressing smallholder market challenges

One objective of this study was to analyze the role of extension in enhancing an efficient value chain. That is, how can extension help improve smallholder farmers’ income? Extension has as objective not only to educate farmers on new methods and techniques to boost production but also enhancing marketability of the final produce to improve farmer’s revenue. Examining the role of extension to enhance tomato marketing is vital. About 75 percent of the farmers interviewed indicated that local extension officers organize educative talks with farmers regards to tomato marketing.

![Figure 12: Role of extension to enhance farmers' marketing](source: Field survey, 2018)
As shown in figure 12, according to the farmers interviewed, extension field workers advise farmers to form farmers’ groups. This is because when farmers form groups, collective marketing could be enhanced, they could get a stronger bargaining power, transportation costs could be reduced, and farmers could enjoy economies of scale. Smallholder farmers can be able to collectively develop infrastructure such as storage facilities that would help reduce food loss which is an issue that could be investigated in subsequent research in this area (Kaganzi et al., 2009; Markelova et al., 2009). When farmers pull their products together for sale they benefit from higher income, since costs would be spread amongst many farmers. Moreover, there is need for extension to focus on combining collective action and establishing networking amongst value chain actors to enhance tomato marketing. When farmers form farmers’ groups and market their produce collectively, they can easily access markets to sell their produce and benefit from lower transaction costs (Hellin, Lundy, & Meijer, 2009).

When farmers form groups, extension could provide farmers with marketing information. Approximately 10 percent of the extension workers indicate that they do have contacts with some buyers in major city markets. They sometimes provide farmers with this linkage to enhance the sales of their produce. Farmers benefit more by selling their produce directly to retailers when they bypass wholesalers along the value chain.

Also, about 10 percent of extension workers educate farmers to plant on different schedules in order to harvest on separate time frame. This would reduce the inflow of tomato at one point in time in the markets. Since excess supply translates to fall in prices, spreading supply would keep prices high and more revenue would be benefited.
Farmer Access to Extension Farm Visits

Given the predominance of single women as extension officers in the study areas, we explored the relationship between farmers background factors (gender and marital status) and visits by extension to farmer. Table 5 shows the results of chi-square statistical test.

Visit of extension workers to farmers

*Table 5: Correlation results on visits of extension services to farmers*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Visits of extension field workers to farmers</th>
<th>P-Value ($\chi^2$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>66.7</td>
<td>33.3</td>
</tr>
<tr>
<td>Female</td>
<td>81.2</td>
<td>18.8</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>65.0</td>
<td>35.0</td>
</tr>
<tr>
<td>Single</td>
<td>90.9</td>
<td>9.1</td>
</tr>
</tbody>
</table>

Source: Field survey, (2018)

The results showed that men were more often visited by extension workers than female. About 33.3 percent of males were visited by extension compared to 18.8 percent female visit. Although this difference, the result was not statistically significant ($\chi^2 = 0.860$, df = 1, $p = 0.354$), this counterintuitive finding is interesting may be reflection of the local culture (see below). In terms of marital status, it was found that married people were often visited by extension workers than singles. Approximately, 35.0 percent of married people benefited from extension visits compared to 9.1 percent of singles. However, there was no statistically significant difference between marital status and visit by extension workers to farmers ($\chi^2 = 2.488$, df = 1, p-value = 0.115).

We can think of several reasons why more men in the study area have access to extension services than women farmers. In most African countries, including Cameroon, men are considered
as the household heads and women as caregivers (Mudege, Mdege, Abidin, & Bhatasara, 2017; Ragasa, Berhane, Tadesse, & Taffesse, 2013).

In addition, according to Ragasa et al., (2013), in their study on gender differences in accessing extension services, the results show that females were less likely to get extension visits and access to quality services compared to males. Different channels were used by farmers to access information, which includes; visits by extension agents, farmer’s access to radio, newspaper; bulletins with price information; and farmers’ participation in community meetings. They found that more males attended community meetings, have access to radio, access to bulletins to access price information than females.

Also, Mudege et al., (2017), in their article on gender relations and access to agricultural training through extension in accessing agricultural information and knowledge found that more male headed households were visited by extension agents than female headed households. This is because men were often considered as household heads while females are perceived as caregivers and helpers in their homes who were often seen as illiterate and ignorant. This perception by their husbands and extension workers militate the believe that women were not the best target for training and information dissemination by extension field agents. It was recommended that extension services should be more gender inclusive and address women needs.

Using Collective Marketing and Technology to Make the Value Chain Efficient

Collective action

Given the focus of extension advise to farmers to form group, we explored whether extension workers have been effective in encouraging farmers to form groups to enhance collective marketing of tomatoes after harvest? Making markets and value chain work more effective and
better for the poor would be accomplished when information about market prices, opportunities, and enhancements, including the formation of farmers groups, to provide smallholder farmers with a stronger bargaining power with buyers (Markelova et al., 2009; Shiferaw, Obare, & Muricho, 2008). Collective marketing is when different farmers pool together their farm produce to sell to enhance a strong bargaining power in order to get a better price. This could lead to increase revenue since transaction cost can be shared and better negotiations made with the wholesalers.

With more collaboration among farmers and elimination of wholesalers who are sometimes exploitative in the value chain would be vital. Collective marketing could be the answer to smallholder tomato farmers in Fako. When farmers form groups and collectively market their produce, transportation cost is reduced, and farmers can enjoy economies of scale. Formation of groups by smallholder tomato farmers would create an efficient channel for extension to provide farmers with market information. It also provides the basis for a more formal relationship with other value chain actors (Mckague, 2012). On this basis farmers were asked whether they belong to farmers groups.

**Table 6: Member of farmers’ groups**

<table>
<thead>
<tr>
<th>Values</th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>23</td>
<td>74.2</td>
</tr>
<tr>
<td>No</td>
<td>8</td>
<td>25.8</td>
</tr>
</tbody>
</table>


From table 6, we see that a greater number of smallholder farmers do not belong to farmers groups. This reduce the chance of farmers marketing their produce collectively. This also, reduces their bargaining power and limits their ability of economies of scale benefit.
Sources of market information

As regard to farmers sources of market information, it was relevant to find out whether farmers need price information to make marketing decisions. Farmers pointed out that they had no formal means of knowing the true prices of their produce in major city markets to help in deciding where to sell their products. They often rely on wholesale traders who take advantage of their unawareness to pay low prices. Most farmers see market information as a vital component relevant to assist farmers gain access to remunerative markets.

Based on this we investigated whether farmers need information in order to make marketing decisions. We asked farmers if they know the price a basket of tomato is sold in the city markets before packing their output for sale. A significant number of respondents obtain market information from their fellow friends and other farmers (see table 7). Approximately 19 percentage of respondents obtain market information from wholesalers with a few obtaining market information from retailers (Table 7). This information searching would either improve farmers bargaining power or provide alternative markets they can chose from to sell their products and obtain higher revenue.

Table 7: Source of market information

<table>
<thead>
<tr>
<th>Market Information</th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retailers</td>
<td>2</td>
<td>6.5</td>
</tr>
<tr>
<td>Wholesalers</td>
<td>6</td>
<td>19.4</td>
</tr>
<tr>
<td>Farmers</td>
<td>12</td>
<td>38.7</td>
</tr>
<tr>
<td>Friends</td>
<td>11</td>
<td>35.5</td>
</tr>
</tbody>
</table>


Based on places where the respondents sell their produce, table 8 shows that majority of the respondents (96.7 percent) sold their produce within Fako Division (Wotutu market and Buea market). The sale of tomato outside the study area to Douala food market is low. Douala food
market is the largest food market in Cameroon with a 42 miles travel distance from study area to market destination is (3.2 percent) as seen on table 8.

*Table 8: Market place for tomato*

<table>
<thead>
<tr>
<th>Market place</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wotutu market*</td>
<td>21</td>
<td>67.7</td>
</tr>
<tr>
<td>Buea market*</td>
<td>9</td>
<td>29</td>
</tr>
<tr>
<td>Douala food market</td>
<td>1</td>
<td>3.2</td>
</tr>
</tbody>
</table>

*These are local markets and are in the area.


Wotutu market and Buea market are markets found within Fako close to farms. Transporting a basket of tomato from the farm to the local markets cost approximately 200frs ($0.35). However, transporting a basket of tomato from the local markets to the Douala food market costs averagely 600frs ($1.04). This adds up to farmers transportation cost leading to price difference a basket of tomato is sold in the different markets. With most tomato farmers producing on a small scale and do not belong to farmers groups to benefit from collective marketing, transporting their produce to Douala market remain a challenge. This is because individual farmers must cover the cost of transportation alone, and other costs associated with taking their produce to Douala market. Farmers would often prefer to sell in markets close to farms where they incur low cost of transportation.

Majority of smallholder farmers do not belong to farmers groups (see table 6) and more than 73 percent of farmers still obtain market information from friends and other farmers (see table 7) is an indication that extension has not been effective in providing farmers with needed market information. This limits farmers from taking their produce to sell directly to retailers in the urban markets. Extension could provide tomato farmers in Fako with market information that pertains in urban markets to help link them to these markets.
Use of mobile phones to access market information

Mobile networks provide opportunity for smallholder farmers to gain access to market information to improve their bargaining power and transform their livelihoods. Owning mobile phones is increasingly getting popular even in the rural areas in Cameroon. Some farmers are already using mobile phones to send messages and make calls regarding marketing of their produce. Literature provide us with evidence of the use of mobile phones to access market information (Kaske et al., 2018; Ogbeide, Service, Ele, & State, 2015). In Fako, some tomato farmers are using mobile phone to access market information (see figure 12). All farmers surveyed indicated they own mobile phones. However, not all farmers indicate they use their mobile phones to access market information.

![Figure 13: Percentage of farmers using mobile phones to access market information](source: Field Survey, 2018)

The results indicate a significant number of farmers (about 74 percent) use mobile phones to access market information. Surprisingly some farmers who own mobile phones do not use it to obtain market information (approximately 26 percent). Possible explanation could be the cost of
purchasing mobile credit which is based on “call as you go” a slogan used by the Mobile Telephone Network (MTN) in Cameroon. Calls are expensive and some farmers would not want to incur more cost especially when the price a basket of tomato is sold plummet. Also, it may be resulting from internet cuts used as a means by the government to reduce the media propaganda that spur so much tension and hostility in the Anglophone regions due to the ongoing crisis (Al Jazeera, 2018). Using WhatsApp and Facebook is a more affordable means of communication.

Again, we explored the relationship of farmers’ background characteristics and the use of mobile phones to access market information.

**Table 9: Use of mobile phones to acquire market information**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Use of mobile phones for market information</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use of mobile phones for market information</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No (%)</td>
<td>Yes (%)</td>
<td>P-Value ($\chi^2$)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>26.7</td>
<td>73.3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>25.0</td>
<td>75.0</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>25.0</td>
<td>75.0</td>
</tr>
<tr>
<td></td>
<td>Single</td>
<td>27.3</td>
<td>72.7</td>
</tr>
</tbody>
</table>

Source: Field survey, (2018)

The results show no significant difference between both gender and marital status and the use of mobile phones in accessing market information. However, slightly more females (75.0 percent) use mobile phones to acquire market information than males (73.5 percent). The result is not statistically significant at 5 percent level of significance. Also, slightly more married people (75.0 percent) than singles (72.7 percent) use mobile phones to access market information. However, this result is also not statistically significant at the 5 percent level of significance.

Mobile phones are increasingly gaining attention as a fast, easy and convenient way to communicate. Presently, mobile phones are used in accessing market information, get in touch with traders in other markets where they can sell their produce for a reasonable price. In Cameroon,
use of mobile phones to access market information is at its infancy, although an important medium with mobile phone ownership is at its maximum even in rural areas. This might be based on the high price paid to purchase running credit for the phone.

This results are in line with Kaske, Mvena, & Sife (2018), in their study on the use of mobile phone to access agricultural information in Ethiopia. With majority farmer household heads using mobile phones to call for agricultural purposes or receive phone calls in the same light, it was concluded that mobile phone play an important role as a medium for market information delivery. It was recommended that the Ethiopian Ministry of Agriculture should develop a mobile-based system that could be used to disseminate agriculture information to rural farming households.

Ogbeide et al., (2015), in a study found that the use of mobile phones would enable smallholder farmers gain access to market information quicker and efficiently. Thus, saving travel time and transportation cost to distant markets. This also, made it easy to connect with other farmers and traders in a more effective manner, empower farmers negotiations with wholesalers, traders and transport providers, and makes it easier to link farmers products to distant markets and high-end agricultural value chain.

However, we see a contrary view in the study by Tadesse & Bahigwa (2015), who found a weak impact of mobile phones as a means of accessing market information. This is because, even though farmers use mobile phones in information searching, very few farmers use their phones to search for agricultural market information. This is due to the lack of relevant information that farmers can access through mobile phones.

Due to the challenges examined, some farmers have taken the lead to locally process tomato in order to add value and improve shelf life. But this has not been sustainable. They locally
boil these tomatoes, remove the peel and bottle. These farmers won a price award for adding value to tomato in the Limbe Arts and Cultural festival, but continuity was not sustainable. There is need to encourage such ventures, and farmers in other areas could emulate this practice. This is because adding value would reduce the volume sold in its fresh form, at the farm gate, and at a low price.

Therefore, farmers could use their mobile phones to access market information. Farmers could also, use their phones to arrange with retailers in urban markets for sale of their products without passing through the wholesalers. This could be done by using the services of the transporters who collects the produce from the farmer and deliver to the retailer after negotiations. Money can be paid using mobile money transfers that is increasingly becoming popular and money transactions could be seen immediately a transfer is done. Mobile phones are convenient way to facilitate business transaction and bypass wholesaler.

Due to challenges farmers face marketing their produce during bumper harvests, especially accessing urban markets to sell, some farmers have taken the lead and started processing tomato. This has not been sustainable. A female farmers’ group processed tomato and showcased in the Limbe Arts and Cultural Festival that won them a cash price (see below) and thereafter, they did not continue with this great idea.
Figure 14: Locally processed tomato

Source: Picture taken during field work

Figure 14 is a sample of tomato that was locally processed by a women tomato group in Wotutu. This was locally processed and bottled. They exhibited the processed tomato during the Limbe Arts and Cultural festival, which won them a cash price of 150,000 francs ($258). This idea should be encouraged, and extension could use this as an example to educate tomato farmers to add value to their produce. This would increase shelf life since tomato is a perishable product and more revenue could be generated.
CHAPTER 5: CONCLUSION AND RECOMMENDATION

Sub-Saharan African countries have a large number of smallholder farmers who produce food to ensure food security (AGRA, 2017). The majority of these farmers plant on smallholdings and are extremely poor (Coff, 2015). In Cameroon, as in all other SSA countries, smallholder farmers face many challenges in commercializing the food they produce, including access to urban markets and access to market information. Linking smallholder farmers to markets is vital since farmers could benefit from higher revenue for their livelihood sustenance.

The study examined vegetable value chain in Fako, Cameroon. Actors in the value chain were mapped in order to identify the actors and their activities along the value chain. According to the M4P framework, mapping actors in the value chain will not only help identify actors and the interdependency that exist between actors in the process, but also help identify challenges faced by the actors in the value chain (Ferris, Engoru, et al., 2014).

Actors in the value chain had some relationships. Farmers and transporters were found to make prior arrangements to transport farmers' produce from the farm to the market. These arrangements were made the day before harvest. The relationship established between farmers and wholesalers was based on credit facilitation. Some wholesalers finance tomato production for some farmers with agreement to provide the wholesaler with tomatoes after harvest. Wholesalers and transporters also have some relationships. The wholesalers hire the services of transporters to carry their produce from the farm to the market.

The study identified some challenges. Access to labor during harvest season was seen as a production problem. Both family and hired labor were used during production. During harvest
seasons the kids are in school and their services cannot be utilized. Also, due to low wages paid to harvesters and high rate of rural-urban migration, labor is scarce and difficult to find.

Poor road infrastructure and poor state of vehicles are constraints to tomato marketing. The roads are seasonal roads and narrow as you get into the farm. On this basis tricycles and motor bikes were predominantly used to transport tomato from the farm to the local markets. Poor state of vehicles which are unreliable were used to transport tomatoes from the local markets to urban markets. Poor transportation means caused damage to tomatoes leading to food loss.

Access to markets especially urban markets were barriers that hindered smallholder tomato farmers from taking their produce to the cities to sell. Wholesalers have formed associations and would not allow farmers to sell directly to retailers in urban markets. Farmers lack access to market information, they do not know the price a basket of tomatoes is sold in urban markets. Farmers would not take the risk to take their produce to city markets. They prefer to sell at the farm gate and at a low price.

Analyzing the role of extension to help link farmers to markets and bypass wholesalers is essential. This is because farmers can sell directly to retailers in urban markets and price paid by consumer could reflect as more revenue to farmers. Extension agents educate farmers to form groups. Forming groups would enhance collective marketing and improve smallholder farmers’ bargaining power and a reduction in transaction cost. On this basis, the following recommendations are made.

**Recommendations**

Based on the findings of this research, we offer the following recommendations to serve smallholder farmers better and help link them to markets for livelihood improvements. First, to
improve smallholder farmers access to high-end value markets, it is recommended that farmers should adopt crop diversification. According to Rahman, (2009), crop diversification is a desired strategy to increase agricultural growth. Tomato farmers should diversify their portfolio by producing crops such as maize that is non-perishable and can be preserved when dry and sold for more income. They could also, produce other vegetables, such as peppers, that can be stored for extended periods. Crop diversification is an important way to improve farmers income. Extension could educate tomato farmers of the importance of crop diversification.

Second, in addition to educating farmers to form farmers’ groups, extension workers can also educate farmers to adopt production strategies that follow separate planting periods. This would help to reduce the amount of tomatoes supplied at the local markets at a point in time. A planting calendar should be developed with about a two-week period separating planting dates assigned for the different groups, meaning farmers harvesting at separate times. Farmers harvesting at different times will reduce the chance of tomatoes flooding the local markets and also reduce the drastic loss farmers face in this area, for instance during the 2017 harvest period when tomatoes were sold in the local market for less than 1,000 francs (less than $1,72) a basket.

Third, the extension staff should also develop programs with local radio stations, newspapers, and bulletins to provide up-to-date market information, including current prices of farm products from around the country. This information would enable smallholder farmers to make informed decisions about where to sell their products. Extension could also help link farmers to retailers and help bypass wholesalers in the chain.

Fourth, mobile phone app technology should be developed and integrated with extension programs to increase awareness of existing market information to access better paying agricultural markets. Mobile phones can be used to short circuit information and remove actors such as
wholesalers from the value chain. They could communicate with retailers directly in urban markets. Farmers could collaborate with transporters to deliver to the retailers in major cities like Douala and money paid using mobile money transfer without the farmer going to the city.

Fifth, the local council should consider purchasing vehicles adapted to transport fresh tomatoes to reduce food loss, which is already the case with beef transportation in the Buea area. There the local council was provided a van by the Ministry of Livestock, Fisheries and Animal Industries in Cameroon that is used to transport meat from the slaughterhouse to the markets to ensure food safety (Cameroon-tribune.cm, 2016). In addition, the Fako Regional Office of Agriculture should provide to farmers disposal, storage facilities and equipment to enhance availability, quality and to reduce food loss. Delivering wholesome tomato product post-harvest practices should follow all cleanliness procedures. This upgrading would attract high-level buyers often willing to pay better prices based on top grades of tomatoes.

Sixth, the government should encourage investors to build a tomato processing firm in Fako, Cameroon to add value to fresh tomatoes by transforming them from their raw form to ketchups and canned pastes to improve shelf life.

Based on these recommendations it is hoped that extension services and local policies, will focus on helping to solve the constraints faced by smallholder farmers not only in Fako Division but in other parts of Cameroon where tomato is produced for commercialization.
REFERENCES


FAO. (2013). *THE FOOD SECURITY THROUGH COMMERCIALIZATION OF AGRICULTURE PROGRAMME IN THE CARIBBEAN REGION. Food and Agriculture*


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APPENDIX A: QUESTIONNAIRES

Producers

Code Number: ------------ Date of Interview: ------------
Name: -----------------
Name of Sub-Division: ------------
Name of Village: ------------

In this survey questionnaire, we would be asking sample questions about challenges faced by tomato producers, your relationship with transporters, and wholesalers. Your responses will be kept confidential. You may also skip questions. You are also free to stop answering the questionnaires at any given point in time. There is no penalty for discontinuity.

Section I

This section will ask questions on personal experience with farming

1) How long have you been involved in tomatoes farming?
   ☐ 1-2 years ☐ 3-4 years ☐ 5-6 years ☐ 7+ years

2) What is your farm size?
   ☐ 1-2 hectares ☐ 3-4 hectares ☐ 5-6 hectares ☐ 7+ hectares

3) Have you always farmed tomato?
   ☐ Yes ☐ No

4) Would you consider tomato as your main crop?
   ☐ Yes ☐ No

5) Which season is tomato grown in this area? ________________

6) Do you grow in all seasons listed above?
   ☐ Yes ☐ No

7) If “no”, why don’t you grow in all the seasons?
   ____________________________________________

8) Which season do you consider more profitable, and why?
   ____________________________________________

9) In the past 3 years, have you grown tomato every year?
   ☐ once ☐ Twice ☐ Every year
10) Have you been visited by an extension worker?
   ☐ Yes ☐ No

11) If yes, in the space of 3 years how many times have you had this visit? ___

12) What marketing information is provided by the extension worker? Describe

13) What other services are being provided by the extension worker? Specify

14) How do you finance your production?
   ☐ Personal savings ☐ Borrow

15) If “borrow”, where do you get this financial support from?
   ☐ Banks ☐ Cooperatives ☐ “Njangi” (meeting) houses ☐ Personal savings ☐ Others

16) Do you encounter any difficulties in getting loans? Explain

Section II
This section, we’ll ask questions based on harvesting

17) How do you harvest these tomatoes?
   ☐ Hired labor ☐ Community help ☐ Family Labor

18) Based on size of your farm, what is the average number of baskets of tomatoes harvested per week? ___

19) Does price per basket changes over time?
   ☐ Yes ☐ No

20) When do you experience low prices?
   ☐ Peak harvest season ☐ Low harvest season

21) What are some of the challenges faced during harvesting? Specify _____________

Section III
This section deals with questions with regards to sales/transportation

22) Do you sell your produce directly in the wotutu market?
   ☐ Yes ☐ No
23) If yes, what percentage of your produce is sold in Wotutu market ________
24) Do you sell your tomato directly to wholesalers?
   □ Yes □ No
25) If yes, what percentage is sold to wholesalers? ________
26) Where do wholesalers buy these tomatoes from?
   □ Farm □ market
27) Do you sell through cooperatives?
   □ Yes □ No
28) If yes, what percentage is sold through cooperatives? ________
29) Do you know the price a basket of tomato is sold in the city?
   □ Yes □ No
30) If yes, does that influence the price you sell in your community?
   □ Yes □ No
31) What challenges do you face taking your produce directly to the market? ______________

____________________________________________________________________
32) What is the cost of getting a basket of tomato from the farm to market? ________
33) How do you get these tomatoes to the market?
   □ Head load □ Motorbikes □ Public transport □ Private transport
34) When do you negotiate with the drivers?
   □ Before harvest □ After harvest
35) Where do you transport this tomato to?
   □ Wotutu market □ Buea central market □ Muea market □ Douala market □ Others
36) When do you negotiate transport price?
   □ Before transportation □ During transportation □ After delivery
37) Does transport fare increase when production increases?
   □ Yes □ No
38) Do you have any formal arrangements with drivers?
   □ Yes □ No
39) Who makes these arrangements?
   □ Men □ Women
40) What are the challenges of getting transportation? ______________
Section IV
This section we’ll ask questions on farmers relationship with wholesalers

41) To whom do you sell your produce?
☐ Wholesalers ☐ Retailers ☐ Through cooperatives

42) If you sell to wholesalers, do you have any formal arrangements with wholesalers?
☐ Yes ☐ No

43) If yes, please explain the nature of your agreement.
___________________________________________________________________

44) When do you make these arrangements with wholesalers?
☐ Before planting ☐ During harvesting ☐ After harvesting

45) Does this arrangement influence the price you sell these tomatoes?
☐ Yes ☐ No

46) Who determines the price?
☐ Farmers ☐ Wholesalers

47) Do you belong to a cooperative group?
☐ Yes ☐ No

48) Where do you get information on market price?
☐ Retailers ☐ Wholesalers ☐ Farmers ☐ Friends

49) Do you own mobile phones?
☐ Yes ☐ No

50) Do you use your mobile phone to search for market information?
☐ Yes ☐ No

Section V
Demography Information

53) Age: ☐ 19 and under ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60-69

54) What is your sex? ☐ Female ☐ Male

55) Marital status: ☐ Married ☐ Unmarried ☐ widow ☐ Divorced

56) Education level: ☐ No schooling ☐ Secondary/high school ☐ Degree and above

Thank you very much for your time.
Wholesalers

Code Number: ----------- Date of Interview: -----------

Name: ------------

Name of Sub-Division: ------------

Name of Village: ------------

In this survey questionnaire, I will be asking sample questions about your marketing, transportation activities, and challenges faced by wholesalers in tomato marketing, your relationship with transporters and producers. Your responses will be kept confidential. You may also skip questions. You are also free to stop answering the questionnaires at any given point in time. There is no penalty for discontinuity.

Section I

This section, questions are related to tomato marketing by wholesalers

1) Where do you buy tomatoes from?
   - ☐ Bokova ☐ Wotutu ☐ Muea

2) Who determines the price at which tomato is bought from the farm?
   - ☐ Farmers ☐ Wholesalers ☐ Transporters

3) What is the average cost of transporting a basket of tomatoes from buying point to sales point? _____

4) What means of transport do you use to carry your produce to the market?
   - ☐ Public transport ☐ Private transport

5) Where do you sell your tomato?
   - ☐ Buea central market ☐ Limbe market ☐ Muea market ☐ Douala food market ☐ Others

6) Do you provide information to farmers on consumer preference regarding specie?
   - ☐ Yes ☐ No

7) Do you know the price existing in the market before you buy from producers?
   - ☐ Yes ☐ No

8) Does this influence the price you pay for a basket of tomato you buy from the producer?
   - ☐ Yes ☐ No

9) What are the challenges faced in marketing tomato? Specify

___________________________________________________________________________________________
Section II

This section I would ask questions based on the relationship with farmers and transporters

10) Do you have any formal arrangement with farmers?
   ☐ Yes ☐ No

11) When do you make these arrangements?
    ☐ Before harvesting ☐ During harvesting ☐ After harvesting

12) Do you provide any form of support to farmers?
    ☐ Yes ☐ No

13) If yes, what kind of support do you provide? Specify
    ____________________________________________________________

14) How reliable is tomato supply based on this support provided?
    ☐ Very reliable ☐ Moderate ☐ unreliable

15) Do you provide farmers with the price at which a basket of tomato is sold in the city?
    ☐ Yes ☐ No

16) Does the price in the city influence the price at which you buy from farmers?
    ☐ Yes ☐ No

17) Do you buy whatever is available from farmers?
    ☐ Yes ☐ No

18) Do you have any formal arrangement with transporters?
    ☐ Yes ☐ No

19) How do you find these drivers?
    ☐ At agencies ☐ Using cell phones ☐ Personal driver

20) When do you negotiate the price?
    ☐ Before transportation ☐ During transportation ☐ After delivery

21) Does transport fare increase when production increases?
    ☐ Yes ☐ No

What are the challenges encountered purchasing tomato from farmers? Specify
   ____________________________________________________________

What are the transportation challenges encountered getting tomato to the market?
   ____________________________________________________________
Section III
Demography Information
8) Age: □ 19 and under □ 20-29 □ 30-39 □ 40-49 □ 50-59 □ 60-69 □ 70-79 □ 80+
9) Marital status: □ Married □ Unmarried □ widow □ Divorced
10) What is your sex? □ Female □ Male
11) Education level: □ No schooling □ Secondary/high school □ Degree and above

Thank you very much for your time.

Transporters
Code Number: ----------- Date of Interview: -----------
Name: ------------------
Name of Sub-Division: --------------
Name of Village: -------------------
In this survey questionnaire, I will be asking sample questions about tomato transportation and challenges face by transporters in distribution of tomato, transporters relationship with producers, and wholesalers. You may also skip questions. You are also free to stop answering the questionnaires at any given point in time. Your responses will be kept confidential. There is no penalty for discontinuity.

Section I
In this section questions are based on general transportation of tomato
1) What means of transportation do you use?
   □ Head load □ Bicycle □ Motorcycle □ Van/pickup/bus □ Others
2) Who owns the means of transportation used?
   □ Agency □ Privately owned □ Farmer □ Wholesaler
3) For how long have you been engaged in tomato transportation? ________________
4) Who make negotiations for this tomato to be transported?
☐ Farmers ☐ Wholesalers

5) How far is an average tomato farm to market that you provide transportation for? _________

6) Does the price charged per basket of tomatoes transported increases with season?
   ☐ Yes ☐ No

7) If yes, when does this increase take place?
   ☐ Peak season ☐ Off season

8) Does price increase when there is bad weather?
   ☐ Yes ☐ No

9) Where do you transport this tomato to?
   ☐ Buea market ☐ Wotutu market ☐ Muea market ☐ Limbe market ☐ Douala market

10) What is the state of farm to market road?
    ☐ Tarred ☐ Untarred but graded ☐ Untarred with potholes ☐ Foot paths

11) What are the challenges faced in transporting your produce to the market? Specify ______________________________

Section II

In this section, questions are based on the relationship with farmers and wholesalers

12) For whom do you offer your transportation services to?
    ☐ Farmer ☐ Wholesaler ☐ Personal

13) Do you have any standing arrangements with farmers?
    ☐ Yes ☐ No

14) How reliable are these arrangement with farmers?
    ☐ Very reliable ☐ Moderate ☐ Not reliable

15) Do you have any standing arrangements with wholesalers?
    ☐ Yes ☐ No

16) How reliable are these arrangements with wholesalers?
    ☐ Very reliable ☐ Moderate ☐ Not reliable

17) When do you make these arrangements?
    ☐ Before harvesting ☐ During harvesting ☐ After harvesting

18) Do you collect whatever amount of tomato needs to be transported?
☐ Yes ☐ No

19) Are your services hired on long term basis?
   ☐ Yes ☐ No

20) What is the average price at which you transport a basket of tomato to the market? ________

21) When do you negotiate the price?
   ☐ Before transportation ☐ During transportation ☐ After delivery

Section III
Demography Information

22) Age: ☐ 19 and under ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60-69 ☐ 70-79 ☐ 80+

23) What is your sex? ☐ Female ☐ Male

24) Marital status: ☐ Married ☐ Unmarried ☐ widow ☐ Divorced

25) Education level: ☐ No schooling ☐ Secondary/high school ☐ Degree and above

Thank you very much for your time.

Extension

Code Number: ----------- Date of Interview: -----------

Name: --------------

Name of Sub-Division: --------------

Name of Extension Post: --------------

In this survey questionnaire, we will be asking sample questions about tomato marketing and challenges face by extension service provider on information provision regarding tomato marketing. You are free to stop answering these questions at any given point in time. Your responses shall be kept confidential. There is no penalty for discontinuity.

Section I

1) Approximately how many tomato farmers do you work with in your zone? ____________

2) Are these farmers members of tomatoes farming groups?
   Yes, all are members of tomatoes farmers group
More than half are members
About half are members
Less than half are members
None of them are members

3) In the last 3 years how many tomato farmers group have been formed in your zone? _________

4) List these groups ______________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

5) Do you provide your services to individual farmers?
☐ Yes ☐ No

6) If “yes”, how effective are your services to individual farmers?
☐ Very effective ☐ Moderate ☐ Not effective

7) Are your services provided to farmers groups?
☐ Yes ☐ No

8) If “yes”, how effective are your services to farmers groups?
☐ Yes ☐ No

9) Comparatively, how effective are your services to individual farmers vs farmers groups? Explain
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

10) Do you regularly have information on weekly market price of tomato for the following markets?

<table>
<thead>
<tr>
<th>Markets</th>
<th>Weekly market information (Yes/No)</th>
<th>Do you provide farmers with information on the current market price (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buea central market</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limbe market</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Douala market</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muea market</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11) Do you organize educative talks with farmers on tomato marketing?
☐ Yes ☐ No

12) What other educative information regarding tomato farming do you provide to the farmers?
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
13) What other services do you provide the tomato farmers? Describe
______________________________________________________________________________
______________________________________________________________________________

14) What are the challenges faced rendering these services to farmers? Explain
______________________________________________________________________________
______________________________________________________________________________

15) What advisory role can you provide farmers to assist farmers boost tomato marketing? ________
______________________________________________________________________________

16) What challenges do you face in your efforts to provide marketing information to tomato farmers?
______________________________________________________________________________
______________________________________________________________________________

17) What other roles do you provide tomato farmers regarding the marketing of their produce?
______________________________________________________________________________
______________________________________________________________________________

Section II
Demography Information
10) Age: ☐ 19 and under ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60-69
11) What is your sex? ☐ Female ☐ Male
12) Marital status: ☐ Married ☐ Unmarried ☐ Widow ☐ Divorced
13) Education level: ☐ Secondary/high school ☐ Degree and above

Thank you very much for your time.
Focus Group Questions

Introduction: Establish friendly and engaging rapport with farmers.

Research introduction:
Looking into ways of linking farmers to market to improve your income from sales of your produce. Participation is completely voluntary, and all information will be kept confidential. There is no penalty for discontinuity. Your information will help for a master’s thesis and could shape agriculture programs by identifying the challenges faced by farmers in commercializing tomato.

1) What is your name, age, sex?
2) Is tomato the major source of income for your family?
3) How many seasons do you grow tomato?
4) Do you produce tomato in all seasons?
5) How do you finance your production?
6) Are there challenges getting loans to finance your production?
7) What challenges do you face during the harvest season?
8) Where do you sell this tomato?
   a) Nearby local markets
   b) Distant city markets
9) To whom do you sell your tomato?
10) Do you have any arrangements with wholesalers?
11) What means of transportation do you use to carry your produce from the farm to market?
12) Do you have any arrangements with the transporters?
13) What challenges do you encounter transporting your produce from farm to the market?
14) What are the challenges that hinder you from taking your produce after harvest to sell in the city market?
15) Are there other challenges you face in marketing your produce?
16) Are you often visited by extension workers? Why or why not?
17) What kind of market information does extension workers provide you with?
18) Are there other services that extension workers provide you with?
19) Are there other challenges you face that are not listed?
APPENDIX B: IRB APPROVAL

Institutional Review Board
Office for Responsible Research
Vice President for Research
2420 Lincoln Way, Suite 202
Ames, Iowa 50014
515 294-4566

Date: 05/14/2018
To: Namah-Ch Taku-Epse-Forchu
From: Office for Responsible Research
Title: Spatial distribution of tomato from farm gate to market and its effects on farmer’s profit
IRB ID: 18-211
Submission Type: Initial Submission
Exemption Date: 05/14/2018

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

2: Research involving use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observations of public behavior, unless (i) Information obtained is recorded in such a manner that human subjects can be identified, and (ii) Any disclosure of the human subjects’ responses outside the research could reasonably place the subject at risk of criminal or civil liability or be damaging to the subjects’ financial standing, employability, or reputation.

The determination of exemption means that:

- You do not need to submit an application for annual continuing review.
- You must carry out the research as described in the IRB application. Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the inclusion of participants from vulnerable populations, and/or any change that may increase the risk or discomfort to participants. The purpose of review is to determine if the project still meets the federal criteria for exemption.

In addition, changes to key personnel must receive prior approval.

Detailed information about requirements for submission of modifications can be found on our website. For modifications that require prior approval, an amendment to the most recent IRB application must be submitted in IRBManager. A determination of exemption or approval from the IRB must be granted before implementing the proposed changes.

Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

IRB 09/2018
Please note that you must submit all research involving human participants for review. Only the IRB or its designees may make the determination of exemption, even if you conduct a study in the future that is exactly like this study.

Please be aware that approval from other entities may also be needed. For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.

Please be advised that your research study may be subject to post-approval monitoring by Iowa State University’s Office for Responsible Research. In some cases, it may also be subject to formal audit or inspection by federal agencies and study sponsors.

Please don’t hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.