THE IMPACT OF FINANCIAL INCLUSION ON AGRICULTURAL DEVELOPMENT IN NGOKETUNJIA DIVISION, NORTH WEST CAMEROON

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DEDICATION

This work is dedicated to my wife and kids

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ABSTRACT

Agriculture remains the backbone of many developing countries, with increasing contribution to the gross domestic product. In Cameroon, more than 80% of the population is involved in agriculture, yet the sector is plagued by mounting challenges. With large expanses of very fertile land, Ngoketunjia Division would theoretically boast of food self-sufficiency and feed the rising population. On the contrary, these fertile lands co-exist with low agricultural productivity and yield. Therefore, this study investigates this dilemma and questions the role of financial inclusion in the productivity of agriculture in the Ngoketunjia Division. The main objective of this study therefore is to investigate into the contribution of financial inclusion on the productivity of agriculture in Ngoketunjia Division, North West region of Cameroon. In other to attain this objective, data was collected from 285 farmers in Ngoketunijia using structured questionnaire from a cross section of the farming population. The data was treated and analysed using structural equation modeling technique, and particularly the Partial Least Square Approach. Pre tests conducted such as the convergent validity, average variance extracted (AVE), cronbach's alpha and convergent validity all indicated that the instrument was valid and reliable. The data set was further analysed using SmartPLS3.0 version. In this process, we have demonstrated that there is the absence of financial inclusion in the region as mainstream financial institutions are largely absent, hence limiting access to resources. This makes the contribution of financial inclusion to agricultural productivity in the region below par. The main hypothesis that financial inclusion has a statistical significant effect on agricultural productivity was as a consequence rejected which further justify the fact that farmers are largely excluded from financial services in the region. We furthermore proved that education and training play a positive and significant role on the productivity of farmers in Ngoketunijia, irrespective of the variability of the weather condition. Post tests conducted such as the Variance Inflation Factor (VIF) indicates no issue of multicollinearity and hence

result validated with 99% confidence based on a probability value of 0.00, which implies that the overall conclusion is significant. It is recommended that measures should be put in place to ensure pragmatic education for farmers as well as ensure financial sector development for it to benefit the farming population. More youths should be encouraged and supported to adopt agriculture as a business, in line with the head of state's vision on second generation agriculture. It is concluded that agriculture remains the backborne of the economy and efforts to upgrade the performance of the sector should be intensified.

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CHAPTER ONE

INTRODUCTION

This chapter introduces the work within historical and geographical context. Specifically, the chapter focuses on background to the study where efforts is made to understand the dynamics leading to the problem, the main problem of the study, the specific research questions and hypotheses, as well as the significance of the study. Since the whole work is based on addressing this problem and determining a result, the statement of the problem and the goals are the high points of this chapter. For a better contextualization of the issue, the research offers an understanding of the situation around the world and in the region.

1.1 Background to the study

Agriculture has remained the foundation of many less developed countries despite the high level of industrialization and the benefits it brings to the population. It employs more than 80% of Africa's active workforce and it is inextricably linked to the continent's development. The situation in Cameroon is not much different. Having been described by many as an African in miniature, the vast majority of Cameroon depends largely on agriculture for the sustenance of livelihood. Agriculture has consistently and significantly contributed to the gross domestic product (GDP) of Cameroon (Noula, Linyong and Gwah, 2013). Agriculture alone accounted for 76.38 per cent of national GDP in 2017, up from about 68 per cent in 2016, per the Ministry of Agriculture and Rural Development (2019). Financial inclusion and agricultural growth are important, especially in rural regions. The rural masses depend largely on agriculture for survival; hence access to credit through formal or informal financial institutions is key to agricultural development as it represents the source of much-needed capital for investment. The Ngoketunjia Division in the North West Region of Cameroon has been described as an agricultural production basin due to its very fertile soil; yet, many households go without basic food items (Lambi et al., 2007).

Many financial institutions have sprung up in the region to serve the needs of the poorest residents, but many poor farmers lack access to the necessary financial resources to till the soil and, as a result, generate enough food to feed the country. In this context, it is relevant to understand the inter connectivity and impact of microfinance development, financial institutions' requirements to provide financing to farmers, agricultural productivity and farmers' position in the region. In this context, we will identify the major roadblocks that could shape agricultural development policies in Cameroon's North West Region in the future to increase food production.

Since high industrialization in most countries must be supplemented by agricultural production, the much-discussed industrialization and industrial development seem to have failed to lift the world out of poverty and misery. The West have concentrated on adding value to raw materials, and have paid less attention to the growth of agricultural production basins, which are mostly located in developing countries. As a result of this, the global income gap between developed and developing countries has widened. According to Handelman (1996), continuous reliance on different sectors of the economy, rather than restructuring, continues to stymie development in the majority of third-world countries.

The governments and populations of most Third World countries, particularly those of Sub-Sahara Africa, continue to depend largely on primary commodities for much needed revenue and for livelihoods. In Sub-Sahara Africa, primary commodities such as mineral extraction and agriculture jointly account for more than 70% of the gross domestic products, GDP, and remain a significant source of income and foreign exchange earnings to these countries. Unfortunately, Oluwatayo and Ayodeji (2016) report that Africa is home to the poorest of the poor and most vulnerable people across the globe, principally due to rising insecurity that makes large expanses of land unproductive.

The agricultural situation in Sub-Saharan Africa is frequently characterized as dire, requiring immediate policy action if food production is to keep pace with a growing population, famine is to be prevented, and poverty is to be reduced (Dewbre & Borot de Battisti, 2008). This is an unfortunate reality as human and natural resources are abundantly available to enhance production and productivity on the continent. According to Paul Biya, President of the Republic of Cameroon, as reported by Ball (2016), the country's growth is dependent on agricultural development. After this pronouncement, Paul Biya in 2016 launched the Second-Generation Agriculture project for the nation in which youths were encouraged to take farming as a business rather than as a means of subsistence (Ball, 2016).

Agriculture remains the economic backbone of Cameroon, recruiting more than 80% of the population and contributing significantly to the country's GDP. According to Abia et al., (2016), given that Cameroon is not a net food importer, agricultural production has enormous potential to help the country's over 23 million citizens and beyond. While the country's southern regions have maintained relative levels of food security in recent decades, political conflict and instability now threaten food production, especially in the country's north and south-west regions. Major plantations in these two regions are out of business while others are barely operating at 20% of their potential, with over 328 million USD (about 200 billion FCFA) required to revive them (The Post Newspaper, 2019). Many farmers, because of insecurity, have escaped the production basins of the region as food prices spiral gradually.

Poor governance and economic mismanagement in the early years of independence led to the collapse of the West Cameroon Produce and Marketing Board, an autonomous institution that promoted the development of agriculture in the then British Southern Cameroons. Lack of access to funds was widely blamed for the collapse of coffee production in Cameroon's Northwest Region, which led to the eviction of many subsistence farmers in the mid-1990s (Forbe, 2019). Though many blame the fall in production and the shutdown of the enterprise

on global economic instability, poor governance and economic mismanagement were at the centre of everything (Forbe, 2019).

Despite agriculture's importance to Cameroon's economy, Forbe (2019) noted that the country's efforts to boost local output and lift the rural population out of poverty have been hampered by a lack of access to finance for the sector. This notwithstanding, it must be mentioned that about 23% of the GDP of the country still comes from agriculture (Ball, 2016). According to Sarris (2016), money flows into agriculture appear to be woefully insufficient in comparison to current needs in many low-income and food-insecure countries.

Although agriculture is unquestionably the backbone of the economy, access to financing for its growth remains a challenge. Small-scale and individual farmers are the primary producers in the area, as they lack the financial capital to accelerate the agricultural sector's growth. They have remained largely excluded from the formal financial markets, and have almost entirely resorted to informal financial dealings such as "njangi groupings" to provide funds for items produced and distributed. Unfortunately, the conditions for accessing the source of financing remain unattainable for a majority of small-scale farmers. The financial market and its actors' requirements that limit access to finance are key to agricultural and overall development (Karlan and Morduch, 2010). Interest rates and credit conditions, especially collateral requirements, have been described as "out of reach" for farmers by researchers.

The lack of financial resources limits not only the procurement or production of critical capital equipment, but also the training of human capital necessary for the growth of this important sector of the economy. This restriction has further obliterated the youth's participation in third-generation agriculture (i.e., agriculture for profit), as Cameroon law currently prohibits them from owning land and imposes other systemic limitations. Although banks provide more large loans for agricultural growth than microfinance institutions,

farmers are unable to profit from bank loans due to a lack of collateral (Shkodra and Shkodra, 2018).

There are no significant manufacturing enterprises in Cameroon's Northwest Region, as the economy is largely based on agriculture. Apart from the Cameroon Tea Estate (CTE) and the Upper Noun Valley Development Authority (UNVDA), which are both prominent agricultural establishments with limited financial resources, all other types of agriculture are carried out by small businesses and individual farmers in this area. The Ndop plain in Ngoketunjia Division is a development basin suitable for rice, coffee, and other food and cash crops, but local farmers have been severely hampered in making effective use of the vast production basins due to a lack of financial and technical resources. Access to sources of financing is central to agricultural development and improvement in the livelihoods of local stakeholders in the Ngoketunjia Division, Northwest of Cameroon. Capital investment is necessary for the development of any venture in the short and long run. This research is driven by the set of issues existing in the region, such as land availability, the availability of human resources, the accessibility of sources of financing and poor food crop production. The research will contribute to the existing literature on finance and agricultural regional development. It will further provide information necessary for the redefinition of programmes for the enhancement of agriculture in the region. The research will further provide an operational framework for the understanding of the linkages between agricultural production and financial inclusion.

1.2 Statement of the Problem

One of the United Nations' Food and Agricultural Organization's visions is a hunger-free planet, which contributes to improved conditions of life in economically, socially, and environmentally sustainable ways for all people, particularly the poorest, through food and farming (FAO, 2017). Food scarcity is one of the defining issues of the new era now

unfolding (Brown, 1996), as sited by (Atkins and Bowler 2001). Esther Boserup in her population theory emphasized that, necessity is the mother of invention, which translates to the fact that once population increases, food production will also increase (Soby, 2017). Over the years, the demand for food and other basic services has risen with population growth. Vernon (2006) argued that in order to make appropriate policies for agricultural growth, it is necessary to break it down into components to achieve an understanding of the component elements and processes.

The necessity of having a food supply system that can feed the population sustainably has never been more relevant than now. A rising population as well as hunger is a cause for concern, especially as political and social conflicts continue to threaten global and world food supply networks. The number of challenges threatening local food production in Ngoketunjia continues to rise unabated. With large portions of fertile land and good weather conditions, the amount of food production continues to dwindle. In this thesis, we question why vast portions of very fertile land continue to exist with a lot of idle human resources in the face of dwindling agricultural output and the multiplicity of financial institutions. There is a high probability of food insecurity in the Ngoketunjia Division, especially within the present context of “the Anglophone crisis” in Cameroon that has hit the region very hard. This region was also chosen based on the fact that it is one of the national production basins, contributing significantly to the production of agricultural commodities for immediate consumption, such as rice and tomatoes, given the complete absence of any processing units. This argument is as compared to the other regions of the country which concentrate on the production of cash crops, such as cocoa in the Southwest, Centre and Littoral regions, and mining in the East Region, just to mention a few. The main problem of this research is to resolve and clarify the issue of financial inclusion and agricultural productivity in the Ngoketunjia Division. In order to clarify the theoretical and practical linkages between sources of finance, access to finance,

and agricultural productivity in the Ngoketunjia Division, this research responds to these specific questions:

1. What are the challenges faced by farmers in the Ngoketunjia Division?
2. To what extent does access to financial resources and the availability of microfinance institutions affect farmers' output (production) and agricultural development in the Ngoketunjia Division?
3. Does education and training in Ngoketunjia affect agricultural production?
4. How sustainable is agricultural production in Ngoketunjia?

In order to answer these questions and more, the following research objectives are specified:

1.3 Research Objectives

The main goal of this research is to assess the effect of financial inclusion, as measured by access to financial services, on the production volume of small-scale farmers in Cameroon's Ngoketunjia Division. Agricultural productivity, measured as the ration of input to output, is necessary to understand the return from agricultural investment in the study area.

Specifically, the study has the following sub-objectives:

1. To examine the challenges faced by farmers in the Ngoketunjia Division in their efforts to increase production,
2. Analyse the extent to which the availability of financial institutions and access to financial resources captured as financial inclusion affects farmers' output (production) and agricultural development in the Ngoketunjia Division,
3. Investigate the role of education and training in promoting agricultural productivity in the Ngoketunijia Division, and,
4. Examine the sustainability of agriculture in the region.

1.4 Research Hypotheses

Two main hypotheses are formulated in this study is based on literature review and theoretical foundation as follows:

H1: There is a statistical significant effect of financial inclusion on the productivity of agriculture in the Ngoketunjia Division

H2: Education and training have a significant influence on the productivity of agriculture in the Ngoketunjia Division.

1.5 Significance of the study

This research is of prime importance as it contributes to the attainment of higher qualifications and, by extension, builds the necessary capacity for further research in agriculture development in the long term. It is therefore very important to me as an individual and to the company for which I work, as well as to the national economy through effectively contributing to business goals and objectives.

Research of this nature would be critical in promoting agricultural development through contributing to policy shifts in the region. It provides valuable insights into the practice of agriculture and ex-rays the contemporary challenges it faces, as well as suggests policy recommendations for national institutions to take action.

This research result is critical in enhancing future research as it forms the basis for literature and contributes to knowledge.

Conclusion:

In this chapter, we have established that there is a multiplicity of financial institutions in Cameroon, but evidence of their existence is limited in rural areas. We have also established that vast land and abundant labour exist in rural areas, particularly in Ngoketunjia Division. We further highlight that financial exclusion is one of the main reasons why agricultural productivity is low in the region, raising serious questions about the connection between agricultural productivity and financial inclusion. Therefore, we established the main problem of the study is that, despite the development of the global financial system with emphasis on

financial inclusion, many farmers in the region remain excluded from mainstream financial services because of lack of access to financial institutions and collateral to benefit from the mainstream financial system.

CHAPTER TWO

REVIEW OF LITERATURE

The current and applicable literature in the areas of agricultural production and financial inclusion is reviewed in this chapter. Emphasis is placed on literature that links financial inclusion and/or exclusion on agricultural development particularly in rural areas. The chapter also dives into the examination of some policy issues, conceptual issues and other related literature necessary to enhance the understanding of the present study. It concludes by examining some mainstream financial inclusion models such as the Mckinnon and Show (1973) financial liberalization thesis as well as the Von Thunen land use model for agricultural development**.**

2.1 Empirical Literature

2.1.1Agricultural Development

Agriculture is essential for Africa's overall growth (Bellon et al., 2020). The fact that prospects for manufacturing and higher-productivity service creation in Sub-Saharan Africa are currently bleak supports this argument, rendering agricultural production a viable means of boosting economic growth (Bellon et al., 2020; Makina, 2017). This is due to increasing urban food demand, the ability to substitute imported food, the ability to add value through agricultural production, and the ability to export agricultural products (Chikalipah, 2017). The second point of contention is unemployment and poverty. In most sub-Saharan African countries, agriculture is a big industry, particularly in the case of farm supply chains. Even moderate growth would therefore generate many new jobs and boost incomes for many low-income people (Bellon et al., 2020; Olaniyi, 2016).

Recent research has in effect supported the long-standing view that agricultural production, at least in low-income countries, helps to reduce poverty rather than promotes growth in other

sectors (Chuhan-Pole & Ferreira, 2014; Christiaensen et al., 2011). Although Dorosh and Thurlow (2012)'s economic-wide models for Ethiopia and Uganda show that agricultural development results in more poverty reduction than urban growth. However, such data should not be taken too literally, according to Dercon and Gollin (2014). They clarified that, due to a lack of evidence, it is impossible to prove conclusively that agricultural production is the most successful approach to poverty reduction, but the lack of data is not the way we know: there are rational reasons to believe, and there is some evidence to support, that agricultural development will alleviate poverty. The problem is that we cannot ensure that this is true all over the place. Due to the diversity of circumstances, it would not be realistic to expect universal processes across Sub-Saharan Africa.

The traditional agricultural development account predicts an increase in agricultural specialization linked to increased participation in the market. The support of this mechanism has for decades, particularly during the Green Revolution, been a core objective of agricultural policies in developed countries. A different story called agricultural diversification based on the market envisages moving from monoculture to a wide range of crops to meet market demand at different times during the year, leading finally to a shift in resources from one crop to another wider mix of crops and/or animals to increase household earnings.

Rural people are well-known for their participation in both input and output markets, especially in Sub-Saharan Africa, as producers as well as consumers (Carletto, Corral, & Guelfi, 2017; Chamberlin & Jayne, 2013). As such, markets do not sufficiently reflect the circumstances of demand and supply, making it impossible to consider the well-being of small farmers. As a result, a lack of correct quantification of the wellbeing of such farmers is not conducive to sustainable agricultural production, since the business conditions of these

farmers are obviously disadvantaged. Rural farmers will also be discouraged from operating at the best pace in developed economies.

Since the 1980s, most African countries' agricultural development strategies have changed dramatically. Agricultural growth policies at the time included the government taking a leading role, which was mostly implemented through marketing boards for specific crops, which provided supplies, technical assistance to farmers, and then purchased output. The boards worked at exorbitantly high rates, punishing farmers with low price payments or racking up huge government debts (Mutambatsere and Barrett, 2008).

The macroeconomic policies of the 1970s were overvalued, fixed exchange rates, high inflation and high levels of public debt. As a result, farmers became weaker when farmers' prices started to decline if sustainable food imports were lowered by commercial crop producers (Krueger et al., 1991). The 1980's and 1990's helped proponents of structural reform and related reforms in most Sub-Saharan African States to realize that these policies also reduced farmers' benefits in times of poor agricultural growth (Berg, 1981).

While macroeconomic distortions were greatly reduced, the sales boards were privatized, abolished or their duties greatly reduced by the year 2000, and the tacit taxes charged by African farmers have been substantially reduced (Anderson & Masters, 2009). In addition, in the early 2000s, governments across the continent focused further on agriculture, as shown by the Maputo Declaration by the African Ministers of Agriculture in 2003. This sets a 6% annual agricultural output growth goal, which is supported by 10% of the government's budget for agriculture. Emerging technology advancements to increase production and supply are made by states, sponsors, and foundations (Diao et al., 2013). Where the government has historically led, the private sector is largely seen by most countries as a key player with government funding for private enterprise. Input subsidies instead of expenditure on roads

and studies have tended to be collected by farmers. Government agricultural spending has increased, but it has resulted in more agricultural investment than public goods for rural development, for example, subsidies (Angelucci et al., 2013).

The de facto crop variety maintained on the farm by farmers as a starting point to promote farm creativity has been largely overlooked by agricultural development policies. This is an environment in which more people are made aware of the different benefits that crop diversity can bring to the well-being of peasants. Substantial programs will help customers fulfill their priorities and desires. Since crop diversity is an important and important aspect of agriculture and livelihoods for smallholder farmers, it's important to include crop diversity in the production of well-being initiatives (Bellon, Gotor, & Caracciolo, 2015).

There is increasing data to support household dietary diversity in crop diversity (Bellon, Ntandou-Bouzitou, & Caracciolo, 2016; Dillon, McGee, & Gbemisola, 2015). Once more, the variety of crops is closely related to household use of high nutritional value plants of cultural importance (Hoffman & Mwithirwa-Gatobu 2016; Bellon et al., 2016). The impact of climate change is also mitigated by crop diversity (Douxchamps et al., 2016; Lin, 2011) and aids poverty alleviation (Michler & Josephson, 2017). The protection of farm diversity is historically related to risk coping strategies (Asfaw et al., 2019); but other benefits, particularly in the underperforming markets, are being more widely recognized. One of the benefits (Kawa, Clavijo-Michelangeli, & Clement, 2015) of maximizing crops in marginal rain-food areas in heterogeneous agroecological conditions is to generate a variety of products for a range of uses (Keleman, Hellin, & Flores, 2013), offer economic opportunity in a number of local markets (McCord et al., 2015), and reduce demand and climate instability risks.

The food mix has diversified from grain and tuber products to fruit and vegetables, vegetable oils, milk, beef and fish products, as much as a supply from farms in Sub-Saharan Africa is being sold progressively in urban areas. Consumers in cities are rapidly consuming processed food. Some supply chains are lengthening, connecting cities to farms farther out, through improved distribution, packing, and logistical management. Supermarkets and grocery store chains have been important retailers in many cities (Reardon et al., 2015; Tschirley et al., 2015). They do, however, present some challenges. Infrastructure, storage, and processing plants are all needed to facilitate the chain. Farmers need to constantly increase their output to meet manufacturers, buyers, and exporters' demands as well as to increase their production in supply chains.

2.1.2 Environment and Global Warming

It is becoming increasingly clear that agricultural production in Sub-Saharan Africa must be environmentally friendly and respond to climate change. Environmental threats include soil depletion and destruction, as well as the conversion of productive ecosystems like forests and wetlands to commercial use (UNEP, 2016). Global warming means that crops have to react to highly volatile precipitation, temperatures and tempests. Global warming could also be reduced as farm techniques that extract more carbon from trees and soil could be introduced.

2.1.3 Gender and Agricultural Development in Africa

The subject of gender in agriculture is different between countries. In Cameroon, many still see agriculture as a domain for the uneducated as well as for the female gender. In most rural areas of Cameroon, women are the bread winners of the family: tilling the soil, fetching firewood, nurturing the kids and providing for every household needs. This is a cultural problem which is evident in Ngoketunjia Division of the North west region of Cameroon. In agricultural matters gender inequalities are typically defined by unfair access to farm inputs (Killic et al., 2015; Kristjanson et al, 2017). Women also suffer from systematic inequality in

the access to domestic food baskets in particular in respect of agricultural land ownership (Palacious-Lopez & Lopez, 2015). Apart from their own work, most women have minimal access to farm inputs (Killic et al., 2018). According to some African countries, 41% of women farmers and only 15% of male farmers have registered not owning land for individual agriculture purposes (Peterman et al., 2011).

In African countries, there were significant gender differences in terms of development. (Farnworth et al., 2016; Palocio-Lopez et al., 2017). Female growers are poorly produced because they do not use farming instruments like soil, pesticides and extension resources enough (Mukasa & Salami, 2016; Jafry & Sulaiman, 2013; Uduji & Okolo-Obasi, 2018). Knowledge and market access were also impeding the production of women farmers (Doss, 2018; Collins, 2014; Sharaunga et al., 2015).

Women can play important and diverse roles in agriculture but, compared with men, have unequal access to development opportunities. It would be fine to satisfy these disparities for African women and agriculture. The extent to which the CSR practices of MOCs helped society flourish in this area is questionable. For example, scholars like Idemudia (2014), Tuodolo (2009) and others said it was neither comprehensive nor deeply rooted in the Niger Delta CSR mechanism.

Farmers may reject technological progress for a variety of reasons. One thing is that it is not enough to return to effective strategies. The cost of agricultural production and the price of exports are declining, while rural transportation costs are extremely expensive (Livingston et al, 2014). Another issue with current procedures is the possibility of occasional crop failures or diminishing returns. This may increase return volatility with increased medium returns. Costs may be prohibitive for farmers with low incomes and low investment. The shortage of cover exacerbates the problem that is compounded by high transaction rates on rural financial

markets (Poulton and al. 2006; Swiss, 2007; Wilhelm, 2006). As such, while farmers have access to technology to improve productivity and income, the rural market cannot keep farmers poor (Carter & Barrett, 2007). These technical barriers have been observed for a long time in rural Africa. In part, several breakthrough ideas are developed. For instance, infrastructure investments in certain areas have lowered travel costs (Donaldson et al., 2017); weather-indexed micro-insurance advances provide farmers with an enhanced risk reduction (Hazell et al., 2010); and so on. Input is made more accessible by agri-distributor network building initiatives (Belt et al, 2015) and land rights registers have increased soil safety in some countries (Belt et al, 2015).

2.1.4 Promoting Agricultural Development in Africa

If agriculture is to expand faster than the population, production of farm labor must be increased, leading to higher incomes for farmers and consumers and the release of jobs for business and services. As a growing number of African farmers feel that they cannot increase agricultural production to meet growing rural populations, increased production for growth and productivity will be needed (Chamberlin et al.,2014). As a result, farmers in sub-Saharan Africa received a great deal of attention recently, especially through the use of outside inputs on their farms, for intensifying their agriculture.

Since the addition of the Living Standard Measurement Surveys (LSMS 2009) by households of eight African nations to the Integrated Agricultural Survey (ISA), it was possible to analyze in depth the use of input on regional and national levels, as the results were largely restricted to village and district surveys (Sheahan & Barrett, 2014). Although there is little overall use of external inputs, in particular irrigation and mechanisms in the surveyed countries, Sheahan and Barrett (2014) are using the ISA-LSMs data in order to demonstrate a highly diverse use of plant, agroecological zones, and countries. For example, they discover that farmers do not appear to benefit from additional connections between improved crops,

fertilizer and crop protection, and that inputs are usually implemented individually. Their finding that most farmers are not troubled because of their input content, reinforces their long-standing discontent with the fact that contact with extension fertilization is barely related to local soil studies. You note that only a small percentage, perhaps less than 1 percent, of producers can use structured credit to purchase inputs.

Despite the growing rural population, a relatively new agricultural problem has arisen from the finding that most rural farmers now reside in small settlements of more than 200 kilometers per square kilometer in rural areas. Around 200 kilometers or more, the majority of rural farmers live in rural areas. Headey and Jayne (2014) report that farmers are growing their crops more frequently by decreasing dairy and crops, but typically do not use more fertilizers or irrigate the crops. Without the use of new technology, the return on jobs will decrease. They also state that no diversification has been witnessed in order to increase household incomes in populous areas. They found that families in those regions do not reduce their family size significantly, which is an important finding in agriculture research, possibly due to lack of access to successful family planning. Nin-Pratt (2015) finds that fertile countries are more likely to systematically follow paths of agricultural development, but they are not as closely associated with measures of intensification, such as fertilizer use. Farmers in rural Ghana's most populated areas typically don't increase farming, while more food crops like cassava can be grown for food. However, farm incomes are growing as the main solution to land scarcity. Most household incomes that seem to be a win now contain off-farm profits. Agricultural production in Ghana is increasingly commercialized, which leads to less-developed areas.

There is obviously economic efficiency in the work of significant technology such as machinery and herbicides in these regions; steps for intensifying, such as the use of fertilizer, were not applied in the same way. It may justify why the use of fertilizers in maize fields in

Ghana is so low compared with the economically optimal rate (Chapoto & Ragasa, 2013). The intensification of the population, agro-ecology and consumer demand is, on the other hand, not entirely featured. The relationship between holding size and yields per hectare has been reversed for a long time. That is not to say that small farms are not profitable alone; almost certainly, the reverse rate is due to a corporate weakness that allows smallholders, rather than working for more land or purchasing land, to contribute their labor to their own land (Collier & Dercon, 2014).

In contrast, big farms aren't a positive thing, obviously. Ali et al., (2016) find evidence of large farms spillover to small farms from newly established large farms in Ethiopia to neighboring smallholders. The proximity of large farms to smallholders should not be used to justify the elimination of roads and other government facilities that enable smaller farmers to invest and innovate. It seems the intensifying was patchy and incomplete. There are also long-standing concerns about why farmers are not using more advanced technologies.

These discussions start with the debate about the compatibility of state-of-the-art technologies with local farming and livestock crops and farmers. Although it took Africa longer than Asia to develop enhanced agricultural technologies, a lot was done by the 2010s with regard to useful improvements, partly because of the rainfed conditions that characterize African agriculture, crop diversity, and agricultural underinvestment. Improved varieties, fertilizer and greater water preservation are significantly higher than those usually collected (Nin-Pratt, 2015).

2.1.5 Intensification of Agricultural Development in Africa

Many views have been advanced in relation to the intensification or modernization of agriculture with the view of improving yield. While some believe that improving output can be achieved through agricultural intensification, others believe that it is the expansion of farm

sizes that will do the magic. A lot of success as well as failed stories can be told of efforts by both the private and the public sector to modernize agriculture, such as the operation green revolution in Cameroon in the early 1990s (Jackson, 2009). Specialization and intensification as a way of growing agricultural productivity has long been the subject of prevailing discourses on agricultural growth and modernization (Jackson, 2009). However, some researchers are now questioning whether this model promotes agriculture that is both sustainable and resilient (see for example, Ashkenazy et al., 2017; Knickel et al., 2017). In this section, we examine the rationales for agricultural growth models that promote the pursuit of economies of scale and scope.

Economies of size and reach are one of the most successful ways to accelerate agricultural production in Africa (Ashkenazy et al., 2017; Knickel et al., 2017). Economies of scale are when the overall cost per processing unit decreases as farm productivity increases (Duffy, 2009; Knickel et al., 2017). It is for this reason that large farms are able to produce at a lower cost per unit than small farms (Ashkenazy et al., 2017; Chavas, 2008). Economies of scale are intrinsically and predominantly related to capital-intensive technological development: the ongoing adoption of technological advances improves production and labor efficiency while lowering input costs per unit of output, as farmers are able to spread more output over the same fixed input level.

A farm specialization pattern is also linked to increased productivity, but this is possibly due to the lower difficulty produced by this strategy. Because new technologies are often expensive and can only be used profitably by scaling up, they are also driving large-scale and specialized operations. Farmers' decisions about the size of their operations, level of production, and degree of specialization are heavily influenced by local input and output prices. Economies of scope, or 'integrative economies,' are described by Panzar and Willig (1981) as a situation in which the cost of providing sharable input services to two or more

product lines is less than the total cost of providing these services for each product line separately. As a result, diversification can be used to lower total production costs associated with different output processes (Teece, 1980). Economies of scale exist in agriculture, where the combined processing of multiple outputs increases efficiency and lowers overall production costs (Chavas & Kim, 2007).

2.1.6Agricultural policies and initiatives

Changes are mostly gradual instead of transformative in both sets of ideals. Leaders and elites should take incremental strides in the right direction, which can pave the path for social change, if done effectively. The more recent studies of agricultural policy shows that political economies are more constructive than those seen in the past. However, they do not include clear, broadly accessible lessons. The interplay of ideas, leadership, and the ways people and organizations pursue influence in politics remains dynamic, deeply rooted in local culture and circumstances.

The distinction between policies and investments, such as public works funding in rural areas, that have proven to be working, and those that many policymakers like grants, has led to a great deal of study (Booth et al. 2014; Henley and van Donge 2012; Poulton 2012).

Despite the fact that these studies are rich with insights into specific policy decisions, they do not reach a general conclusion. However, two themes appear fairly obviously. One is the struggle in low-income countries with limited state capacity to control the state and economy, where governments are prone to extracting revenue from economic activity in order to bribe political supporters. Many supporters want their benefits in the short term, with easily visible pay-offs, because they don’t think the state can use such resources for long-term sustainable spending. As a result, fertilizer subsidies are much more politically desirable for agriculture than spending on farm research or even rural highways.

Overall, agriculture policies and practitioners need to align their focus on cost of production, sustainability and economic performance with 'post-production' positions, including control of biodiversity, climate change mitigation, causation, and maintenance of high quality of life in stable rural areas.

2.1.7Agricultural Development and Financial Inclusion

Various governments and university scholars have made considerable efforts to better understand the dynamic relationships between agricultural production and access to financing in developed countries, with the aim of directing and reforming state policies. Obamuyi (2009) discovered that in Nigeria, the cost of funding (mostly interest rates), liberalization, and industrial transformation all had a significant effect on agricultural expansion and, as a result, economic growth. Global financial flows, according to Mishkin (2006), are a key driver of domestic financial market expansion. Capital market liberalization continues to usher in wider and more liquid debt markets, which farmers may use to increase their productivity. Financial inclusion is represented as supplying the armed, who would be unable to access a wide range of financial services (e.g., loans, investments, deposits, insurance). Financial inclusion is critical in the fight against hunger and poverty (Evans & Lawanson, 2017). To achieve broad-based economic growth that can lift low-income households' incomes, financial inclusion is needed along the agricultural value chain. Diversification of the economy away from agriculture is also critical for development. Rural households can satisfy consumption and social demands (such as food, hygiene, school fees, and funeral expenses) without diverting funds from investment opportunities by having access to financial resources (including deposits and other non-credit products) at the household level (Chaddad et al., 2005; Adeola & Evans, 2019). Owing to the essence of crop and animal maturation, as well as seasonal fishing restrictions, agricultural value chains have seasonal financial needs.

Value chain companies such as input dealers, buyers, manufacturers, and processors usually need substantial working capital in order to manufacture and meet (distant) markets for inputs, obtain crops for onward distribution or manufacturing, and manage shipping and other service costs. Players in the supply chain engage in a zero-sum game with little or no financial risk, in which investments and improvements at one level (such as development) can only be made at the cost of investments and improvements at another level (such as processing). Certain value-chain companies (buyers and sellers of inputs, for example) provide manufacturers or traders with advance payments or in-kind loans, reducing the liquidity available for their own investment and production. As a consequence, supplying liquidity to certain businesses could have a favorable impact on producers. Similarly, giving farmers direct financial access would free up much-needed funds for consumers to spend on developing their businesses or entering new markets.

The ability to grasp how money works and how to plan, save, and spend it wisely is referred to as financial literacy (Atakora, 2013). The willingness to make well-informed and prudent financial choices is referred to as financial literacy. Since it empowers people to make their own financial choices, financial literacy is also a prerequisite for financial access. Financial literacy is projected to increase, resulting in greater financial inclusion. Wafula (2017) examined the impact of financial literacy on financial inclusion among small-scale farmers in Trans Nzoia County, finding a close connection between financial literacy (savings habits, debt management, and savings practices) and financial inclusion. Access to financial services influences their availability, according to Camara et al. (2015), and is important for financial inclusion.

Chaddad, Cook, and Heckelei (2005) analyze the role of financial restrictions in US agricultural cooperatives using the cooperative capital constraint hypothesis and a panel data econometric study of agricultural cooperative investment activity. The findings suggest that

the availability of internal funds has influenced agricultural cooperative capital spending significantly. The results also show that expenditure sensitivity to cash flow is linked to cooperative structural characteristics. Direct agricultural finance has a positive impact on immediate agricultural production in India, according to Das, Senapati, and John (2009), while indirect agricultural credit has a significant positive impact on agricultural output that is delayed by a year. Agricultural finance, according to Das et al. (2009), is a vital component of agricultural production. Institutional credit, on the other hand, had no substantial effect on agricultural growth in India during the post-reform period, according to Izhar and Tariq (2009).

Non-bank financial institutions' credit has a major effect on manufacturing/agriculture GDP in Nigeria, according to Acha (2012). The distribution of the Farm Credit Guarantee Scheme Fund and the Government Fund to agriculture has a major positive effect on agricultural development, according to Obilor (2013). In contrast to manufacturing, commercial and merchant banks have been sluggish in supporting agriculture. According to Toby and Peterside (2014), Between 1981 and 2010, the average bank loan to agriculture was 9 percent to 10%, while manufacturing loans were 32 percent to 37 percent.

Toby and Peterside (2014) discovered a weak relationship between commercial banks giving out credit and agriculture's GDP contribution, but a good connection between merchant banks giving out credit and agriculture's GDP contribution. In conclusion, several studies back up the idea that financial inclusion is critical for achieving broad-based economic development through the agricultural value chain, which will help low-income households, increase their income. The effect of financial inclusion on agriculture, on the other hand, is also debatable. Several major similar topics are yet to be thoroughly researched in the literature.

According to He and Sun (2012), financial reform that favors the weakest of the poor has a direct effect on China's successful growth. The effect is largely due to credit reallocation through markets, rather than changes in savings and investment costs, according to the results.

Despite the generally accepted importance of finance to agricultural development, Dhrifi (2014) pointed out that, although the financial environment in the majority of African countries cannot benefit agriculture, the presence of a high-quality financial institution will help improve agricultural productivity. The findings showed that if African countries have a certain number of high-quality institutions, they would benefit from financial growth. According to Wang and Guangwen (2020), farmers' use of digital financial services decreases their vulnerability. However, such results are dependent largely on farmers' ability to cope with risk.

According to Olaniyi (2017), the use of financial services has significant short- and long-term impacts on agriculture, meaning that expanding financial inclusion is critical for long-term agricultural development in rural areas. On the other hand, access to financing was found to have a marginal impact on agricultural production. While providing funding to rural farmers has many benefits, it is more important to consider how the money is invested in rural areas and how it impacts rural results.

According to Xuluo *et coll*., (2019), monetary policy has a short-term favorable influence on variables of financial inclusion, with the reverse effect of economic fundamentals, which means that a positive monetary policy would encourage the growth in the short term of financial inclusion, while gradual economic changes will make it more difficult.

Chaddad, Cook, and Heckelei (2005) examined the effect of financial restrictions on US agricultural cooperatives, finding that the availability of internal funds has a significant

influence on agricultural cooperative capital expenditures. According to Das, Senapati, and John (2009), direct agriculture credit has a huge positive impact on agriculture development in India. Agriculture credit is a crucial component of financial inclusion, (Das et al.2009).

Obilor (2013) found that the Farm Loan Guarantee Scheme Fund and government funding for agriculture have a strong positive impact on agricultural productivity, while Acha (2012) found that non-bank financial institution credit has a major impact on manufacturing/agricultural GDP. Toby and Peterside (2014) found a substantial adverse relationship between commercial bank loans and agricultural GDP contribution, in contrast to Obilor (2014) but a significant positive association between commercial bank loans and agricultural GDP contributions (2013).

Following the G20 community of nations' acceptance of financial inclusion as an essential growth tool at their annual 2009 meeting, it has remained a hot topic on many countries' policy agendas. As a result of its commitment to national growth, the World Bank announced that at least 50 countries around the world were completely committed to achieving financial inclusion for everyone by the end of 2013. Financial entry, according to Cull, Ehrbeck, and Holle (2014), increases local economic development and thus population livelihood. This means that many cooperative economic operators will have to work below capacity or will struggle to expand their projects if they do not have access to affordable funding. Financial exclusion and hunger are closely related, according to the International Fund for Agricultural Development and the World Bank (2015). According to them, 73% of people around the world who are vulnerable have no access to financial resources. According to Gomathy (2015), banks have a responsibility to make banking facilities accessible to the general public through financial inclusion. He claims that the government should urge banks to pursue financial inclusion through financial aid, advertisements, and awareness drives, among other items, if global growth is to be achieved. There is mounting evidence that sufficient financial

services benefit customers, particularly women and the economically disadvantage individuals, according to Demirguc-Kunt, Klapper, and Singer (2017). Since the bulk of those involved in agriculture are women and seniors, all of whom are economically vulnerable, this methodological observation is important for this research. Connecting these underserved communities to the traditional financial system may be vital to the region's agricultural growth.

The Onoja survey (2017) shows that the links between agricultural credit and farm productivity are solid and important, but in advanced economies the relationship is positive but minor. This, he said, concerns developing countries' level of industrialization. Growing agricultural production, he believes, should be focused on creating an incentive system that directs more credit to agricultural investment. Similarly, Olaniyi (2017) stated that supplying rural farmers with access to funding may have a range of benefits, asking stakeholders to consider how the money is used in rural areas and how it impacts rural results.

While the importance of financial inclusion is widely recognized, an assessment is required for the degree of financial integration on the basis of loan flows for small borrowers in India according to Lakshmi and Visalakshmi (2013). It is necessary to bear in mind that financial inclusion will not result in increased agricultural production without increased capability. Langwenya (2019) identified a statistical significant association between South Africa's use of financial services and agricultural development that confirmed the hypothesis that agriculture production is linked to financial integration.

The rise of cell phones, according to Andrianaivo and Kangni (2011), has consolidated the impact of financial inclusion on economic development, especially in countries where mobile financial services are commonly used. Mobile financial systems have taken banking to rural areas for the good of the general population in recent years. According to Garg and Agarwal

(2014), Indian banks had to follow a financial inclusion strategy in order to stimulate rural growth in the economy, particularly because India continues to have one of the world's largest unbanked populations. Many Asian countries, according to Rillo (2014), are considering financial inclusion as part of their sustainable and pro-poor development policy. The relative importance of financial inclusion to growth in general prompted the World Bank to set an ambitious target of universal financial access by 2020, according to Demirguc-Kunt, Klapper, and Singer (2017). Bridging the financial inclusion and gender divide in smallholder agriculture by tailored interventions like digital financial inclusion and gender responsive agricultural finance innovations, according to Olayinka, Adegbite, and Machethea (2020), has the ability to reposition Nigeria in terms of meeting sustainable development goals and other sustainable outcomes. Despite the fact that women are overwhelmingly engaged in agriculture, they seem to be mostly absent from society's finance market (Njimanted, 2017).

Financial inclusion in Ethiopia is still low, as many people depend on the informal financial system to get by. According to Mengistu (2018), 62 percent of Ethiopians reported saving money in the previous year, but only 26 percent did so formally at financial institutions, while 38 percent did so with strangers or in an informal saving club.

Financial inclusion was found to be influenced by education, wages, and gender inequality, according to Kalsoom, Chaudhary, and Aribah (2016). The findings indicate that a lack of funds and the completion of necessary formalities are significant barriers to accessing financial services, especially in rural areas. In the absence of schooling, interventions to include the vulnerable in the financial system will be ineffective in lifting them out of poverty. On the road to achieving the Sustainable Development Goals, access to finance serves as a catalyst for access to other productive resources, and mobile technologies have proved to be effective in promoting access to finance (World Bank, 2016). Banks will reach

out to the neediest people by working with the government and providing low-cost financial services (Sangeetha & Kapi, 2018).

According the Food and Agricultural Organization (2014), Agriculture growth is needed to alleviate rural poverty, and this growth can be achieved by financial inclusion. However, smallholders' lack of access to credit is a major cause of slow investment in agriculture and rural growth. The tide can be turn around through financial inclusive policy.

According to Onaolapo (2015), extended bank branch networks and loans to small businesses had a major effect on poverty reduction in Nigeria, but only a marginal impact on national economic growth and financial intermediation. As a result, having access to financial services and resources, especially in rural areas, greatly helps efforts to combat poverty through food production. Financial inclusion, according to Ajinaja and Odeyale (2017), could have a positive significant impact on the development of small businesses in Nigeria if the effort to include everyone succeeds. Financial sector development with financial inclusion as a goal has been seen as a mechanism for economic growth and poverty reduction (Madalitso, 2014). Despite the optimism around inclusive financial service delivery, Miller (2019) believes that the links between digital financial inclusion, poverty reduction, and food security are largely hypothesized, since no significant and robust evidence has yet been developed. Financial inclusion in the Nigerian agriculture market, according to Michael (2016), is a mechanism for achieving the sustainable development agenda. Institutionalizing financial services in rural areas, he said, could help advance the global agenda of sustainable development. According to Nchuchuwe and Adejuwon (2012), in order to improve agricultural production, the government must follow an integrated rural development policy, which is a multidimensional strategy for improving the quality of life of rural residents, with proper financial inclusion being one way to achieve this.

According to Fuentes (2018), although increased access to financial capital boosts labor productivity, the fact that women aren't included in the process means they get little support for entrepreneurship, asset accumulation, and wealth formation. As a result, one way to ensure digital financial inclusion and poverty reduction is to take advantage of the rapid growth of cell phone use in general and supporting women's access to mobile phones in particular. According to the International Labour Office's policy brief (n.d.), while rural citizens have the greatest need for financial services, rural communities remain the largest untapped market for financial services, and ensuring their financial inclusion will unlock rural areas' considerable economic potential.

The traditional channels of financial service delivery continue to play a vital role in access to finances and poverty alleviation (Tuesta et al., 2015). The study also stated that due to a lack of education, women are largely excluded from the financial system. They believe that being a woman with a source of income is important in increasing the likelihood of financial inclusion. According to Guilherme (2016), 28% of the world's population gets access to financial services through the post office, and hence strategies to enhance financial inclusivity should not ignore the postal sector as it seems to be available in every rural setup where banks have no financial gains installing.

According to Okoroafor, Adeniji, and Awe (2018), internet connectivity has critical implications for financial inclusion due to transaction costs. Via the expansion of financial services to a greater number of people living in rural areas without the exhaustive use of the internet, financial inclusion would be quite teeny and extension that may have been removed from the formal financial services in the region. According to Okoroafor, Adeniji, and Awe, financial inclusion and economic development in Nigeria are positively linked (2016).

Being poor and not getting access to financial resources are inextricably linked (De Klerk, Fraser and Fullerton, 2013). As a result, overcoming poverty is critical for achieving financial equality, which has far-reaching implications for growth and development. According to Kawimbe (2020), mobile financial networks have been an important platform for promoting financial inclusion of previously unbanked citizens in East Africa. The lending interest rate proxy for farmers' access to finance had a significant positive impact on agriculture in Ghana, according to Wonder, Jiang, and Siaw (2019). As a result, the government can ensure that the lending interest rates of both financial and non-financial institutions supporting the agriculture sector are flexible, enabling farmers to access capital for expansion without difficulty. According to Tankha (2015), the regional rural bank (RRB) was developed in India in order to grow the rural economies with credit and other facilities for developing agriculture, trade, commerce, industry, other productive activities in rural areas, particularly small and marginalized farmers, agricultural workers, craftsmen and small businessmen. This is as a result of the practical implications of micro credit to small scale operators who do not have access to financial services. Unfortunately, Guichandu (2015) noted that few micro finance institutions lend to finance agriculture activities even if they are working in rural areas.

It is necessary to trigger development in rural communities through financial inclusion. According to Mancho and Lambi (2020), there is no reason why the wetlands of Ndop remain untapped while poverty aggravates. The available wetland potentials for crop cultivation are enormous in favour of strategies to reduce poverty. But as Shu (2020) noted, investment in wetlands has to be carefully evaluated as climatic variation continue to hamper rural food production in Santa, Bamenda.

2.1.8 The Concept of Financial Inclusion

Financial inclusion has been seen as a driver of growth in most economies. It has therefore taken center-stage in discourses and discussions in developing and emerging economies. This is not surprising because a financially inclusive economy facilitates successful investments and payments systems. In simple terms, financial inclusiveness ensures that businesses flourish as expected. The potential of businesses to serve a wide range of customer and supplier expectations are fulfilled in a strong financially inclusive environment. On the micro level, individuals are able to save their funds for future investment in a financial inclusive environment. More importantly, financial inclusion has a multiplier effect on segments of the economy; contributing to far reaching economic gains for individuals, firms and governments (Koku, 2015). In the same vein, a financially excluded population could experience huge income inequality (Ravallion, 2014). This poses the question that if financial inclusion is that important, why hasn't it been mainstream in most jurisdictions? In other words, what factors determines financial inclusion?

Financial inclusion is also seen as the mechanism by which economic players maintain the accessibility, affordability and use of the financial system (Sarma, 2008). Financial inclusion means the distribution to residents of an economy who are usually excluded of affordable financial goods and services through the formal financial system (Thorat, 2007). Financial inclusion is described by Triki and Faye (2013) as all measures which make organized financial services accessible to all sub-groups of a nation's population. The word "financial inclusion" is described differently by different scholars, but the common denominator, according to the World Bank's 2014 Global Financial Development Report, financial inclusion is the percentage of a population that utilizes financial services. Indeed, according to Naceur et al. (2015), this concept is useful for both analytical and theoretical research. As a result, financial regulators' primary goal will be to ensure that a large percentage of a

population had access to financial resources. In a variety of financial literatures, financial inclusion has taken center stage. Researchers have been interested in understanding how it is measured, which factors affect it, and how it affects other segments of the economy. For instance, access to credit has been strongly linked to economic development and thus countries where access is low grow slowly (Bhattacharaya & Wolde, 2010; Love & Martinez Peria, 2012). Again, policy related issues are important to financial inclusion. In a related study, Aga and Martinez Peria (2014) identified that remittance to sub-Saharan Africa causes recipients to open bank accounts.

Individuals and companies with access to dependable financial goods and resources such as purchases, transfers, savings, credit, and insurance are referred to as financial inclusion (Evans, 2016; Sarma, 2012). The three types of technology-based financial services models in Africa are Bank-focused models, bank-driven models and non-banked models. Banking modeling uses cost-efficient, non-traditional supply networks to connect with customers. The networks that are used are ATMs, internet banking, and mobile phones. Customers can get a wide variety of financial services from bank-led models through retail agents or cell phones. Equity Bank developed a network of banking agents, including lotteries, pharmacies, postal agencies and gas stations, to meet the unbanked people in Kenya. In non-bank models, the bank's work is restricted to security properties, while the telecommunication provider administers the account. Telecom operators are managing agreements such as 'orange money' in Mali, Senegal, Cameroon and Niger. Non-bank-led initiatives are capable of reaching those excluded from the conventional financial sector.

Measuring Financial Inclusion

Measuring financial inclusion is a difficulty, as access can be separated from the use of financial resources (CGAP, 2009). Despite their availability, individuals may opt not to use financial services (voluntary exclusion), thereby limiting the use of access. As a consequence,

in calculating the actual usability of financial resources, voluntary exclusion should preferably be taken into account. It is difficult to differentiate between access and use of financial resources since data on access is limited.

The study by Chai et al. (2019) indicates that the two terms are not segregated and that usage is known as a proxy access measure. However, the high provision of structured financial resources in terms of usability for Camara et al. (2014) does not actually mean that the system is inclusive. Improving financial inclusion can be accomplished by calculating access to financial resources. Financial inclusion can be best understood based on the type of financial intermediary and its degree of formality (Chidzero et al., 2006). The World Bank (2008) proposes to measure access according to the financial products used, considering the value of the informal sector in developed countries. This measure is not universal, however. This leads to numerous metrics being used to capture financial inclusion. For instance, as part of the work on financial inclusion in India to better capture the phenomena, Sarma (2008) created a composite index. Using aggregate supply statistics, the measure of inclusive finance is mainly discussed by the usage and access to structured financial services (Honohan, 2008; Sarma, 2012).

However, two methods to evaluating access to a financial institution are distinguished in the literature. The first is to use information owned by (supply) service providers (Cull & Scott, 2010; Sarma, 2012; World-Bank, 2009). The second is to explicitly survey households on their usage (demand). On the conversation on the financial inclusion determinants, the literature differentiates the determinants of financial inclusion into three large groups. The first is at the meso level and the macroeconomic level. At this level of discussion, the condition between demand and supply of financial services is examined. The interaction between clients and financial intermediaries is influenced by the financial system and the legal, political, regulatory and economic context (Helms, 2006). This class of determinants

aligns with the systematic risks proposed by Beck and De la Torre (2005). Again, the geographic location of branches and service points affects the ease with which clients can access financial resources (Beck et al., 2009).

Moreover, limited or too costly transit systems restrict the travel of persons to financial organizations. This indicates that in developed nations, the position of services is determined by physical facilities (Beck & De la Torre, 2005**;** CGAP, 2010). Thus, with business competition, service providers are encouraged to innovate in order to grow their market share by creating new ways of serving consumers and addressing the shortage of physical infrastructure. The second category concerns customers. Voluntary exclusion is distinct from compulsory exclusion. Voluntary exclusion applies to a condition where people have, but do not use or access financial services.

First, some people will assume that they have no use of the financial products being offered them (Kempson, 2000; Claessens, 2006). Other scholars (Chidzero et al., 2006; Beck & Demirgüç-Kunt, 2008) mention that, because they are still using the financial services of a member of their society or friend, certain persons do not seek to use the financial system themselves (indirect access). Religious or cultural factors, such as language, also explain a portion of voluntary exclusion (Beck et al., 2013). This, regardless of literacy, induces systemic exclusion. Unlike voluntary exclusion, involuntary exclusion means that people actually do not have access to financial services so they will not be liable for the prices and characteristics of the services as well as the specifications of the providers. Typically, customers complain that financial services are too costly (World-Bank, 2009). They also bemoaned that they lack the required collateral to secure the needed financial credit.

The third category concerns the providers of the financial services. Financial exclusion can also be demonstrated by restricted availability of financial services. On the basis of projected

earnings, financial organizations assign credit (Bigsten et al., 2003). Bad clients often have no meaningful promise to honor their financial obligations. They will usually borrow funds with inaccurate information about their potential earnings and would eventually default on their obligation. Furthermore, insufficient data on individuals' credit histories could pose an added risk. Therefore, this associated information asymmetry limits the willingness of financial institutions to operate in the credit space (Cull & Scott, 2010). Due to uncertainties regarding household-specific conditions (illness, jobs, death) and the environment (natural disaster, national economic crisis), the danger of delivering financial services to poorer individuals is greater (Matin et al., 2002).

2.1.9 Financial Inclusion and Economic Growth

Financial inclusion has been identified as a source of growth in many regions of the world. This reflects the reason why many agricultural actors including the government have designed series of measures to achieve the aim of financial inclusion in many parts of the world. Theoretically, the linkage between inclusive finance and growth is well established (Adomako et al., 2016: Osei-Assibey, 2013). The researchers identified that financial inclusion improves overall firm growth and profitability (Adomako et al., 2016; Osei-Assibey, 2013). Also, Carbó et al. (2005) argued that financial exclusion should be strongly tackled by both developing and developed economies due to its negative impact on growth. The study however was done in Europe. On a broader study, Honohan (2008) explored the differences in household access to financial products in 160 economies. The study discovered that high income inequality correlated with low access to financial services and vice versa. Not surprisingly, Kempson (2000) had in an earlier study discovered a similar trend. Last but not least, Johnson and Kwak (2012) investigated the subject of financial access and exclusion from a survey conducted in the year 2006 in both Uganda and Kenya. They discovered that education, income and employment strongly determined access to financial services.

However, the study by Johnson and Kwak (2012) deviated from the popular narration and indicated that the location of an individual (either rural or urban) has no bearing on access to formal financial services.

The financial sector represents a crucial structure in any economy. Due to globalization and deregulation, financial systems across the world are increasingly becoming integrated. Subsequently, researchers have been interested in understanding the interplay among these financial systems (Mirdala, 2011). The financial sector has developed tremendously over the years. The financial sector, which was formerly being reserved for household savings, is now the conduit of more complex business transactions. Early researchers such as Goldsmith (1969) and McKinnon (1973) recommended more profound functions of the financial sector. Subsequently, the role of financial system in fostering economic development has been the subject of many researchers (Adeoye, 2015; Adeoye & Saibu, 2014; Demetriades & Andrianova, 2004). These studies have tended to uncover the relationship between a well-functioning financial system and a vibrant economic system (Abu-Bader & Abu-Qarn, 2008; Goodhart, 2004; Mirdala, 2011).

The goal of financial systems in contemporary times has been on how to balance gains and risks. It has caused the formulation of global, national and regional reforms aimed at ensuring a robust system. Financial regulators are being mindful of market competition, deregulation and promotion of usage. Successful financial inclusion has been attributed to economic development and reduction of poverty (Adeoye & Saibu, 2014; Adeoye & Sangosanya, 2015). The ways in which financial inclusion contributes to economic development are varied. The financial system contributes to mobilization of savings, allocation of resources, facilitation of payments systems, and access to finance; the attributes of financial inclusion (Zhuang et al., 2009).

Financial innovation is viewed as a complete process which considers the promotion, advancement and the selection of new ways of instituting reforms, measures or innovative ideas with the aim of enhancing the financial architecture (Khraisha & Arthur, 2018). Financial innovation improves the frequency and extent to which a population uses financial services. Besides, with the improvement in financial innovation, the populace who had hitherto being denied the opportunity inherent in financial inclusion is now able to participate fully. Financial innovation has essentially changed the way financial services are served across the globe and thus has been one of the driving forces of economic transformation. Therefore, financial innovation has been the core of government and regional policies.

Financial innovation increases the productivity of the financial system by encouraging the growth of the credit market, promoting monetary policy operations and the dissemination process of monetary policy. There is no question that in the growth of the financial economy, financial developments are important. Facilitating financial intermediation is the key function of creativity in the financial industry. Innovation in the banking industry plays a variety of other roles in the economy. The fundamentally imperfect financial markets are full of developments in the financial industry, to respond to agency issues as well as intelligence anomalies, to minimize trade, search and marketing costs, to tackle tax and regulatory challenges, to respond to increasing globalization and threats, to fight technical disruptions (Tufano, 2003).

Financial innovation, they claim, does not inherently stimulate economic activity because it increases uncertainties in the financial system (Holland, 2014). Ho (2006) analyzed the effects that financial progress has had on delivery structures for monetary policy. He noted that the advent of electronic payment systems could replace demand deposits and other liquid deposits, thus undermining the proper functioning of the transmission mechanism of monetary policy. This is partly attributed to the worsening of the correlation between the shift

in bank demand deposits and the shift in the operations of the real economy. For the time between 1980 and 2013, Bara and Mudzingiri (2016) examined the relation between financial innovation and the economic development of Zimbabwe. Using Autoregressive Distributed Lag bound trials and Granger causality checks, the data was analyzed. The study showed that there was a favorable association between financial innovation and economic development that differed depending on the metrics used to quantify and calculate financial innovation.

An analysis of financial innovation and inclusion was undertaken by Yawe and Prabhu (2015). The analysis included a range of financial advancement fields, including deposits, payments, banking programs for the vulnerable and financial literacy. Study findings show that financial inclusion should reach beyond the conventional banking industry. They acknowledged that, while it is not under their authority, telecom providers have launched mobile financial services. This has added to competition between them and financial institutions. They recommended that an administrative structure comprising of regulators of financial services and telecommunications providers should be appropriate to broaden financial inclusion without inherently sacrificing policies to tackle contemporary global concerns such as money laundering. The focus of this study was on financial innovation and how it applies to the financial needs of those who are financially excluded in different categories; deposits, investments, banking programs for the excluded poor, financial literacy and consumer security.

An inclusive financial system should be comprehensive enough to engage both formal and non-formal banking participants. The relevant financial innovations initiatives implemented in Cameroon include the following: online banking, mobile banking, Automated Teller Machines, agency banking and credit card payments. These innovations have resulted in increased opportunities, resulting in efficiency, growth and development. Financial inclusion has been made more prominent, even in remote areas through mobile money and agency

banking. However, a significant proportion of the rural communities are financially excluded all together. The financial sector ought to innovate so as to capture myriad of the population. Financial innovation entails creating and marketing new financial services, markets and technology to the population (Tufano, 2003). The innovation could also entail enhancing the capabilities of financial systems and improving already known systems so as to solve pertinent financial problems as well as increase access (Misati et al., 2010).

On the micro level, some researchers have identified that financial inclusion benefits individuals by reducing inequality and poverty traps (Aghion & Bolton, 1997; Beck, Demirguc-Kunt & Levine, 2010). Additionally, the availability and operationalizability of savings products increase consumption, women empowerment and investment (Ashraf, Karlan & Yin, 2010; Dupas & Jonathan, 2013). However, individuals may decide to exclude themselves from enjoying financial products, even when these products are available (de Koker & Jentzsch, 2011). The reasons for non-usage could be structural, religious or cultural (Beck, Demirgüç-Kunt & Honohan, 2009). Others even do not trust the financial system, may not be able to afford the products or the products may not have been designed appropriately. The other class of individuals is the self-withdrawn. These individuals used to use financial products but withdrew totally due to varied reasons. Some of these reasons include loss of trust and investment, unfavorable credit records, costs and difficulties in using products (Ellison, Whyley & Forster, 2010).

Thus, policies should also be geared towards encouraging people to use these products. Literature also draws the difference between financial access and usage. The financial excluded could be persuaded to open accounts but these accounts may not be used and would eventually become inactive. Thus, due to this phenomenon, financial access does not translate into usage (Platt et al., 2011). Access without usage could also contribute to costs to financial institutions. Such a case negatively affects the profitability of these institutions, serving as a

disincentive for further expansion. Hence, policies should be geared towards providing incentives for usage.

Determinants of financial inclusion

The degree of financial inclusion is usually determined by multiple factors, but most important and widely talked about in literature include: usage, barriers and access to financial services. The fact that someone owns a bank account which allows him to save and borrow money, use insurance services or use payment services implies that the person is financially inclusive. Though there exist commonalities in definition, the determinants of financial inclusion vary widely across geographical and cultural space. In a comprehensive study, Sarma and Pais (2011) identified that income, internet and literary significantly affect financial inclusion. Thus, nations with low GDP per capital, low internet connectivity and literary rates are mostly financially excluded. Therefore, there exist a high correlation between income and financial inclusion. Fungáová & Weill (2015) agreed that in China, higher education and wages correlated with financial inclusion. Tuesta et al. (2015) have found that in Argentina, wages and education play a role in financial inclusion. Furthermore, Chithra and Selvam (2013) discovered that in India, revenue, schooling, and access to credit all encourage the use of structured accounts. Camara, Pea, and Tuesta (2014) noted that literacy and a high degree of income are both variables that contribute to high financial inclusion.

The empirical studies related to the causes of financial inclusion are varied. Socioeconomic, regional, demographic and financial influences are the subject of debates. Education, employment, wages, and wealth ownership form the socio-economic factors affecting financial inclusion (Demirgüç-Kunt & Klapper, 2013). With respect to work and education, getting a career raises the chance of accessing financial resources (Johnson & Kwak, 2012).

Similarly, the odds of financial inclusion are increased with education (Demirgüç-Kunt & Klapper, 2013). In comparison, in developing countries, Nino-Zarazua and Copestake (2008) and Tuesta et al. (2015) find little impact between the level of education and the level of financial inclusion. This outcome was confirmed by De Soto (2000), who discovered that the degree of employment and literacy did not impact financial inclusion. The majority of observational research finds it to be strongly associated with the bank levels in terms of revenue (Demirguc-Kunt et al., 2017; Beck et al., 2009). In comparison, wealth ownership such as mobile phones, vehicles, radio and television increases the likelihood of financial inclusion (Honohan & King, 2012; Johnson & Nino-Zarazua, 2011; Mago & Chitokwindo, 2014; Asfaw, 2015).

Arora (2012) discovered that there is a connection between education and financial access once more. Desai (2012) realized that growing literacy in the Sub-Saharan African region would greatly boost financial inclusion. He advised that that government and regulators should institute policies aimed at increasing literary across the region as an indirect way to improve financial inclusion. He further advised that non-government agencies should support the efforts of the government in this drive towards financial inclusion. More importantly, there should be the conscious effort to emphasize financial inclusion in national and strategic policies to other to spur the interests of the citizenry since financial inclusion is crucial for national development.

Allen et al. (2014) advocated that incorporating local languages into banking would improve financial inclusion in the Sub-Sahara region. Again, financial institutions should be proactive in imbibing relevant local practices so as to encourage the rural folks to enjoy banking. Such a move will increase financial inclusion in the region. As a proof to their suggestion, Allen et al. (2014) examined the success story of the Equity Bank of Kenya in championing local language in banking. As predicted, Equity Bank of Kenya gained substantial profit by

implementing this ground-breaking advice. Therefore, Allen et al. (2014) advised that other banks within or outside Kenya should attempt to implement similar measures in their jurisdiction. On a global stage, Ozili (2018) saw that digital finance positively affected financial inclusion in developed and developing economies. On another note, Lumsden (2018) noted that instituting reliable financial frameworks can increase financial inclusion and improve financial outcomes, especially in developed and developing economies.

Income has been identified earlier as increasing the chances of financial inclusion. Financial inclusion also has an effect on increasing income. Accordingly, Swamy (2014) found out that financial inclusion increases income and according to the study the income was more profound among females than males. However, though the impact of financial inclusion on income was realized by Nanziri (2016), he was not convinced by the study that the impact was much profound on one gender in South Africa. In another study, Ahamed (2016) revealed that increasing financial inclusiveness is associated with low tax evasion. The link between financial inclusiveness and broad-based development occurs indirectly through reduction in information asymmetry and lowering of transaction cost.

Furthermore, Allen et al. (2014) in their study showed that in Africa, population density is a more significant driver of financial inclusion than in the rest of the world. In understanding the financial inclusion among 15 African countries, Olaniyi (2016) identified that adult education level, Islamic banking presence, GDP per capita and internet access were highly significant in determining financial inclusion. Factors such as deposit interest rates, population, and inflation, on the other hand, did not seem to have a substantial impact on financial inclusion. The study's results could help economic blocs across Africa, but they may fall short of resolving country-specific issues. Furthermore, they discovered that having access to mobile banking greatly improves financial inclusion.

The literature on financial inclusion also examines the effect of Islamic banking on overall financial inclusion in Muslim communities (Demirguc-Kunt, Klapper & Randall, 2014; Naceur, Barajas, & Massara, 2015). Naceur et al. (2015) realized that there exists huge gap between financial access and financial usage in the Muslim communities studied. Again, the authors identified that the link between access to credit and financial inclusion is weak. This view may not be hard to understand since the emphasis of Islamic banking is not on access to credit (Naceur, Barajas & Massara, 2015). Also, Demirguc-Kunt, Klapper, and Randall (2014) realized that the effect of Islamic banking on financial inclusion is not different between Muslims and non-Muslims.

Financial inclusion is affected by three variables, according to Kabakova and Plaksenkov (2018): demographic, technological, and economic variables. Social networks, according to Chai et al. (2019), boost the likelihood of the households taking part in the informal financial market, increase the size and proportion of informal financial transactions to the overall household assets. Similar findings have been recorded in Africa, but no proof exists. Zimbabwe's economically deprived people have adopted mobile banking, according to Mago and Chitokwindo (2014), because it is available, fast, and secure. Furthermore, Ouma et al. (2017) discovered that low-income households in Sub-Saharan Africa use mobile banking to increase their savings.

It is however noteworthy to consider how agency banking has drastically improved rural banking. According to Nato (2011), the financial sector has been extremely transformed, owing to financial innovation. The innovations have been experienced in the following spheres: financial innovations, product innovations, and process innovations, technological innovations, and circumventive innovations. He noticed that process innovation tends to increase efficiency in tasks while institutional innovation relates to changes in regulatory and administrative systems. Product innovation targets the markets whiles technological

innovations take advantage of technological development. Circumventive innovations emerge to bypass regulatory and administrative controls, in an effort to achieve certain objectives.

In a related work, Lumsden (2018) indicated that financial innovation seeks to drive the world's financial system to be more robust and efficient. Financial innovation also tends to build strong financial frameworks that are capable of supporting credit, encouraging monetary policy and transmission.

2.1.10 Factors inhibiting financial inclusion

One of the major factors inhibiting financial inclusion is high transaction costs. Empirical evidence suggests that the cost benefits analysis of small transactions is not favorable for the provider of financial services (Moore & Craigwell, 2003; Natamba et al., 2013). Moreover, financial institutions incur comparatively high costs in providing services to the poor (Bag, 2013). Therefore, most financial institutions in South Saharan Africa are located in densely populated urban areas. Moreover, the continent is sparsely populated and thus the cost involved in providing financial services can be high, especially in rural communities (Collins, 2014). Again, the fixed costs in operating branches in the widely distance population does not augur well for profit maximization. The result of this situation is the concentration of branch networks in the towns. Additionally, much of the bank services are tailor-made for medium to high income earners (Beck & Munzele, 2012). However, there exists proportionately high number of low-income earners in Sub-Sahara Africa, thereby causing high financial exclusion in the region. Another major contributor to the high transaction costs has to do with the cost of managing rural financial institutions. It has been realized that the cost of such interventions is very high (Brown et al., 2005), exacerbating the plight of low-income earners.

Poor infrastructure is another major contributor inhibiting financial inclusion on the African continent. Financial expansion thrives on the provision of telecommunication facilities,

proper road networks, and security services among others. Unfortunately, such essential services are inadequate on the continent. The argument for proper infrastructure is that it spurs economic activity, thereby increasing the probability for users to engage in financial services. Additionally, increased economic activity has been linked to reduction in poverty (Kessides, 2012). Conversely, the poor nature of infrastructure in Sub-Sahara Africa has contributed to slow economic growth on the continent (Kessides, 2012).

A key part of financial inclusion is safe access to financial goods. Infrastructure deficiency, such as transportation for a financial institution, network coverage for mobile banking, and even internet penetration for online banking is often referred to as obstacles to active financial inclusion. An empirical research on the determinants of financial inclusion in India was conducted by Chithra and Selvam (2013). They noticed that the physical infrastructure for networking and communication are closely related to financial inclusion levels. Johnson and Kwak (2012) investigated whether financial innovation was ideal for the economy. They noticed that a great deal of discussion had taken place about financial innovations, but the social significance remained uncertain. Innovation is one of the commanding factors that determines and forms human society, and innovation has been responsible for raising living conditions for Americans. They noted that it was important to more carefully examine the traditional logic that financial innovation is always successful.

Also, high banking charges has been cited as one of the reasons for high levels of financial exclusion on the continent. A World Bank (2013) survey reported that more than 80 percent of the respondents submitted that lack of funds was the explanation why a structured bank account was not operated. The high bank charges may be manifested in withdrawal limit charge, Commission on Turnover, service charges and monthly maintenance charges (Akudugu, 2013; Tchouassi, 2012). On the supply side, the bank charges are important to the banks because it accounts to more than 20 percent of bank’s revenue in Sub-Sahara Africa

(Beck & Munzele, 2012). Moreover, financial institutions demand that users hold minimum account balance, of which most users are either not financial stable to do. Fosu (2013) found out that minimum balances account for more than 20 per cent of gross national income per capita in most African countries. Again, many respondents revealed that they lacked the required documentations to open a bank account (Akudugu, 2013; Hendricks & Chidiac, 2011).

Naceur et al. (2015) has recognized that two major factors impede on financial inclusion in Africa. The two types are structural characteristics and policy issues. Policies include the impact of the macroeconomic environment, financial systems, institutional arrangements and banking regulations. The structural characteristics are time-invariant and include level of income, population density and size and the level of formality of markets. As recognized earlier, low financial inclusion has contributed to poor economic performance on the continent. Therefore, improvement in the delivery of financial services would significantly increase the state of living of the poor and vulnerable (Dupas & Jonathan, 2013). That notwithstanding, policies should be geared towards making financial systems accessible and inclusive. For such a system contributes to high degree of patronage. These policies could spur favorable conditions that lead individuals to create financial assets, make more income and sustain the macroeconomy (Chibba, 2009).

The continent is also riddled with high illiteracy rate, therefore inhibiting adequate financial inclusion. This is because it is difficult for individuals with high illiteracy to appreciate the need and the full potential of financial inclusion. Literacy has both direct and indirect route to financial inclusion. The direct route suggests that individuals would be able to read and write and thus be more involved in making sound financial decisions, since most of these financial products are conveniently made in the official languages of English or French, aside the local languages. Also, the indirect route suggests that there is empirical evidence that connects

literacy to high probability of earnings. In this regard, literate individuals are best positioned to common high purchasing power and thus are more ready to engage in financial services (Hendricks & Chidiac, 2011; Robinson, 2014). Actually, empirical studies support this assertion (Acemoglu et al., 2014; Hanushek, 2013). However, studies by Akudugu (2013) and Sarma (2012) reveal that social exclusion enforces financial exclusion.

2.1.11 Problems of Providing Financial Inclusion in low-income earners

The narrative on financial inclusion is not always rosy. There exist some challenges or threats which causes economies to reconsider the manner and form of inclusion to engage in at every point in time (Bellon et al., 2020). In this regard, there have been firm regulations in some instances to reduce or eliminate the impacts of these challenges. Most central banks in countries are primarily tasked to ensure that the financial systems are protected from some of these dangers. Based on the above, countries are cautioned to balance the economic gains being promised by financial inclusion and the potential dangers associated with it (Barajas, 2016; Naceur et al., 2015).

The proportion of unbanked individuals can potentially be as high as 90%, particularly in non-developed economies. Not surprisingly, Africa holds the highest number of unbanked adults (Mehrothra & Yetman, 2015). Specifically, according to the World Global report from 2014, roughly three-quarters of qualifying people in Sub-Saharan Africa do not have a formal bank account. The degree of financial inclusion, on the other hand, varies greatly from country to country. Kenya, Angola, Mozambique, and Morocco, for example, have an average of 40% of their adult population with a formal bank account. Mauritius and South Africa, once again, have more than half of their adult population banked. On the continent, these two countries have the largest percentage of banked adults. In addition, only about 10% of the adult population in fourteen African countries is banked.

Again, Dev (2006) studied the problems associated with providing financial services to vulnerable groups including poor farmers and non-farmers in India. He identified that microfinance institutions and cooperatives farmers' societies were significant in promoting financial inclusion in India. Additionally, he discovered that the role of government and the central bank in deregulation were crucial factors that promote financial inclusion.

The studies of Honohan (2004) and Navajas et al. (2000) indicate that for people with low incomes, the use of financial services is still very low, although the latter has a negative effect on financial inclusion. Zins and Weill (2016), however, discovered a negative link between profits, formal and informal saving. Individuals live in remote areas have fewer access to financial institutions in terms of regional determinants. Morvant-Roux and Servet (2007), Johnson and Nino-Zarazua (2011) and Honohan and King (2012) find that urban banking penetration is higher than rural banking penetration.

Nevertheless, bank exclusion is an individual choice and has no connection with the place of residence (Leyshon & Thrift, 1995). Since the groups suffering from such marginalization are often those with more difficulties accessing banking services. This raises their insecurity in economic and social terms. According to estimates from the OECD (2006), the growth rate of household debt depends on the amount of their income and is not based on regional areas. In relation to demographic conditions, men use more financial services than women (Honohan & King, 2012; Johnson & Nino-Zarazua, 2011) because the woman will rather prefer to borrow from a relative. In this way, Demirgüç-Kunt and Klapper (2013) in their paper found a negative relationship between the use of a formal account and feminine gender. On the other hand, Demirgüç-Kunt and Klapper (2013) revealed a connection between genders and financial inclusion. This finding is in line with Pitt and Khandker's (1998) argument that women's access to financial services increases financial participation by reducing poverty and promoting children's education.

Nevertheless, En et al. (2012) found no substantial association between gender and account ownership. Moreover, Fungácová and Weill (2015) observed the same outcome in China. In terms of age, the older the individual, the more likely the person will be financially included (Johnson & Nino-Zarazua, 2011, Johnson & Kwak, 2012). But, as seen by the works of Honohan and King (2012), the odds of getting an account are starting to decline at a certain age (over 45). Similarly, they state that people between 18 and 24 years of age are excluded from financial services. The research on microfinance institutions in Eastern Europe and Central Asia by Caudill et al. (2009) shows a negative and significant association between the age of these institutions and the degree of their cost of production. As revealed by the findings of Johnson and Kwak (2012) this outcome is specifically linked to people over 45 years old.

Knowledge-related financial causes, as well as financial habits, have divisive consequences. The lack of financial literacy creates distrusts in financial institutions and financial services (Morvant-Roux & Servet, 2007; Beck & Demirgüç-Kunt, 2008). This reflects the detrimental role played by financial literacy's non-mastery in the field of financial inclusion. Those with financial expertise, on the other hand, are not averse to the use of financial resources. More financial services are used by people who have learnt to invest, control their funds and quantify interest (Nino-Zarazua & Copestake, 2008). Moreover, financial habits increase the likelihood for individuals to use more financial services. Individuals who have developed habits are able to be disciplined in their expenditure (Nino-Zarazua & Copestake, 2008). They add that a person who knows the return of his savings (interest) is more likely to use financial services (Nino-Zarazua & Copestake, 2008). In comparison, Chidzero et al. (2006) and En et al. (2012) learn that, since a family member is still using it, there are people with knowledge and financial practices who do not use these financial resources. This has a negative effect on the extent of access and use of financial resources, thus limiting financial

inclusion. Religion and client culture, amid financial literacy, limit access to financial resources (En et al., 2012).

2.1.12 Mobile Money & Financial Inclusion

Electronic banking was popularized in African following the introduction of mobile money, starting in East Africa. Evidence suggests that because of wide use of mobile phone even in rural areas, many individuals now have access to somewhat financial accounts with the telecom service providers. There are lots of financial transactions done through mobile money in Cameroon today. This has actually led to improvement in financial sector deepening (Asongu & Nwachukwu, 2016). For instance, there are more daily mobile money accounts and transactions than formal bank transactions. Mobile banking has been one of the crucial financial inclusion measures on the continent. In this section, the impact of mobile penetration on financial inclusions in Africa is discussed. First, Asongu (2015) indicated that mobile penetration tends to reduce income inequality. On a related note, Asongu and Nwachukwu (2016) realized that mobile penetration improves on the overall economic development in Sub-Saharan Africa. They further indicated that government could accelerate the penetration so as to improve inclusive growth over the continent. Again, Beuermann et al. (2012) indicated that increasing mobile coverage enhanced household consumption per capita which has a way of reducing absolute poverty. They argue that mobile phones serve as sources of vital information for its users, thereby reducing access to quality information on market and price.

Also, Donovan (2012) evaluated the advantages and benefits of mobile banking, as a form of financial inclusion in developing economies. He found out that mobile money is immune to some of the challenges of formal financial institutions and thus even offered convenience to the users. The usage of mobile money was prevalent in places where formal banking systems have not even penetrated. Johnson and Kwak (2012) looked at the key determinants of

financial exclusion in Kenya from 2006 to 2009 in a related report. They discovered that in Kenya, the root causes of mobile money exclusion were age and education.

In the same vein, Ghosh (2016) indicated that the advent of mobile phones increased economic prosperity in India. The study realized that mobile phones enhance literary and increases financial inclusion. A study on Sri Lankan mushroom farmers on the use of mobile phone and mobile banking indicated that farmers could now have better financial knowledge and thus could make financial decisions. Again, the usage of mobile phones was linked to higher income, a factor that has been linked to financial inclusion earlier in this literature (Wijeratne & De Silva, 2014). Again, Suri and Jack (2016) found out that M-PESA had significant long-run effects on both poverty and household consumption. An interesting revelation from the findings was that households headed by females had the greatest impact. In an earlier study, Bailard (2009) analyzed the impact of mobile penetration on corruption and concluded that there exists a negative correlation between these two indicators in Africa. Information sharing in this regard have been seen as the catalyst to reduce corruption.

According to Roller and Waverman (2001); Sridhar and Sridhar (2004) and Lee et al. (2000), ICT production, especially cell phone penetration, has an impact on economic growth (2009). Mobile money has a larger effect in low-income countries than in well performing countries, according to Roller and Waverman (2001) and Waverman et al. (2005). Financial inclusion, according to Andrianaivo and Kangni (2011), is responsible for a greater portion of this effect. Regulations can also help to promote financial inclusion. India's financial inclusion has risen as a result of regulations such as the required routing of wages through banks and post offices (Chakraborty & Mukerji, 2017). McHenry et al. (2017) have discovered a close connection between internet use and household bank accounts. Similarly, Siddik et al. (2017) showed how e-banking helped Bangladeshi banks perform well. Lenka and Barik (2018) discovered a strong and hopeful partnership between financial inclusion and the advancement

in mobile phone technologies and internet connectivity in Sub-Saharan African countries. They also discovered a one-way causal link between expanded financial involvement and the growth of smartphone and internet networks.

The increased use of internet-enabled phones has also provided those in the African area with access to the internet. The continent is at the forefront of the mobile money trend, with over 56 agreements in place (Lenka & Barik, 2018). Kenya's M-Pesa and South Africa's Wizzit are two examples. Mpesa has over 27,000 agents in Kenya who process over 30 million transactions a day. By 2013, more than 150 million people in Africa were using mobile devices to access the internet, with over 60% of them using 2G devices (Friedline, 2017). In comparison to a global average of over 30%, this results in a gross penetration rate of just 17% of the total population. MTN 2G and 3G networks were used by 87 percent and 49 percent of the Nigerian population, respectively, in 2013. In the first quarter of 2014, Safaricom in Kenya had 91 percent and 67 percent 2G and 3G coverage in Kenya, respectively. The increased usage of internet-enabled phones on the continent has sparked a lot of debate and enthusiasm about how it would affect financial inclusion. The enormous potential of internet penetration and mobile banking in financial inclusion has been highlighted by governments, the media, and numerous studies on Africa (Friedline, 2017, Lenka & Barik, 2018).

With the progress made so far, it is important to consider that a large portion of the African population could be without adequate internet connectivity. Africa is also a long way from understanding the true potential of the internet. Though cell phones are the most widely used internet technology in Africa their use and reliability lag behind that of developed economies.

Furthermore, while internet connectivity and mobile money seem to be a fast route to financial inclusion on the continent, a range of roadblocks exists, including strict rules, restricted interoperability, a lack of eligible agents, and low levels of digital and financial

literacy and wages. Despite the fact that mobile broadband has a larger potential for extending financial access, Africa has a lower coverage of high-speed mobile broadband networks. Another big challenge is lawmakers' inability to find the best balance between technology promotion and enforcement enactment.

The usage of mobile phones has been linked to information sharing; Sreekumar (2011) indicated that cooperation among fishers was enhanced tremendously by the use of mobile phones. As technology progresses, financial inclusion becomes broadly accessible. Ojong (2016) identified that mobile phones enhance the business in the remittance space. These remittances can be channeled into savings and investment and thus increases the lot of those involved.

There also exist the negative effects of mobile technology. Srivastava (2005) has realized that the mobile phone is more as a social net which connect individuals. This also means that hackers can have access to private information of others. The mobile phone serves as a tool for distraction; potentially reducing the time that individual would have on their hand to do productive work (Srivastava, 2005). Fraudsters have resorted to using mobile communication to obtain vital information from their prey. The frauds on mobile money have been seen as an important threat to financial inclusion. Mobile bank operators and regulators ought to be vigilant to reduce the level of frauds being perpetuated by these fraudsters so as to increase the level of customer trust.

2.2 Theoretical Literature

This section reviews relevant theories in the area of agricultural development and financial inclusion and growth. This review is to give us an insight into the evolution of global and academic production system, and to provide a theoretical link necessary for an embracing study of this nature. In this respect, theories necessary to give the insight such as financial inclusion and technological acceptance model, the agent theory, endogenous growth theory,

Arrow's model of agricultural development, the Romer mode, the Von Thunen land use theory of agricultural production as well as the financial liberalization thesis are examined.

2.2.1 Financial Inclusion Theories

The number of the unbanked in the days of cruse technology was huge. Technology and particularly mobile technology has increased the percentage of the banked population considerably in less developed countries. In east Africa for example, large proportion of the population have access to finance through the mobile technology. It is therefore difficult to talk financial inclusion today in Africa without talking technological change. Financial inclusion can be accomplished by leveraging on appropriate technology. In fact, the Technology Acceptance Model has been used to explain how people accept and use technology (Wingo et al., 2017). The model claims that a person's desire to use technology is influenced by a variety of factors. Additionally, the model considers the manner in which technology is used and when it is used. A variety of variables, as per the model, affect a customer's judgment about how and when to use emerging technologies. On the other hand, the principle of idea diffusion explains how, when, and how rapidly new ideas and technologies achieve traction and diffuse (or spread) within a culture or social structure (Aizstrauta et al., 2015; Dearing and Cox, 2018). According to these viewpoints, internet and mobile media use has grown in a variety of contexts, as appropriate levels of ICT affect the depth and reach of business activities, economic development, working standards, and access to social transition considerations such as health care, education, and good governance (Meso & Duncan, 2000). Financial inclusion is described as the availability of formal financial services at a fair cost to a wide variety of poor and low-income people (De Koker & Jentzsch, 2011; Evans, 2017; Mahendra, 2006).

Financial inclusion would have multiplier impact on the economy as a result of higher net income for rural households, further savings, and a more stable deposit base for financial

service providers. Financial inclusion would enable a larger number of people to participate in the global financial market, broadening the reach and effectiveness of monetary policy (Evans, 2016). Marshall, 2004; Sarma, 2008; Hannig & Jansen, 2010; Ardic, Heimann & Mylenko, 2011; Demirguc-Kunt & Klapper, 2013; Allen et al., 2016); and the effect on poverty reduction, income inequality, and development (Marshall, 2004; Sarma, 2008; Hannig & Jansen, 2010; Ardic, Heimann & Mylenko, 2011; (Thorat, 2006; Sarma & Pais, 2011; Sarma, 2016).

The available cross-country data emphasizes the benefits of financial depth rather than financial inclusion (King and Levine, 1993; Khan and Semlali, 2000; Asongu, 2015; Valickova et al., 2015). Analyses of the macroeconomic effects of mobile phones in developed countries abound in the literature. The micro-economic impact of cell phones on SMEs as Chowdhury (2006) and Donner (2006) have both written about this subject (2006). Jensen (2007) discovered the beneficial effects of mobile telephony, showing that exchanging information reduces business volatility and improves fisherman responsiveness. Individuals will have to consider a modern way of doing things before they could use the technology to its full potential. There has been a plethora of studies that have investigated the factors that make individuals accept particular technologies (Chen & Tan, 2004; Wang, Wu & Wang, 2009). Most of these studies have evolved from sociology, economics, information system, psychology, and their likes. Some researchers such as Venkatesh et al (2003) studied behavior theories by resorting to ideas from these disciplines. In fact, the researchers used eight of these theories in explaining the manner and way in which new technology is adopted.

Financial inclusion also involves users adapting to new forms of financial technology. In this light, the literature tends to provide understanding of the various theories that concerns the reasons why one would either accept or reject technology, especially related to finance (Sharma & Mishra, 2014; Surendran, 2012). The aim of these theories and models is to

provide a construct that convey information on the reasons behind technology acceptance (or rejection), the manner in which the technology is being deployed and how users may use these technologies (Sharma & Mishra, 2014). Therefore, the relevance of these theories predominantly depends on the decisions of individuals. Expressed in another way, these theories are manifested when the individual, provided with varied options, tend to choose and behave in a particular way based on a number of factors. These variables that inform individuals have been extensively analyzed by many researchers (Parijat, & Bagga, 2014; Sharma & Mishra, 2014). It should also be recognized early in this section that apart from variables that contribute to individual decision makings, there could also be moderators of these variables. Thus, the variable in itself may be enforced and even influenced by other factors (Samaradiwakara & Gunawardena, 2014). That notwithstanding, there still exist certain gaps that ought to be explained by literature, especially when findings obtained from one geographical area is being proposed to other places (Samaradiwakara & Gunawardena, 2014; Surendran, 2012). Additionally, differences in period of time could cause changes in how factors affect individual decisions. As expected, human behavior is not static and thus application of such knowledge would be generally suited to the particular situation.

Accordingly, the purpose of this section of the theoretical review is to provide the context within which technology acceptance theories can explain the concept of financial inclusion. These theories would be analyzed extensively and the relevant portions would enrich the other parts of the research. Additionally, the literature would identify certain limitations to these theories; recognizing instances and conditions where researchers should be cautious in basing their findings on these theories.

2.2.2 Financial Inclusion Theory

Financial inclusion is the process of mainstream institutional actors offering suitable financial goods and services at a reasonable cost to all parts of society, including disadvantaged

communities such as poorer sections and low-income groups, in an equitable and open manner. All ‘bankable’ individuals and businesses have access to credit, all insurable individuals and businesses have access to premiums, and all have access to savings and payment systems.

According to financial inclusion theory, financial inclusion activities and initiatives should be directed on the most vulnerable parts of society, such as the poor, young people, mothers, and the elderly, who are disproportionately affected by economic inequality and crises. It makes sense to get poor people into the mainstream banking market because they are especially impacted by financial bubbles and economic recessions. One method to do this is via government-to-person (G2P) social cash transfers into the official accounts of disadvantaged individuals. Making G2P social cash payments to the poor, young people, women, and the elderly enables other poor, young people, women, and the elderly to gain access to the formal financial system and open a formal account in order to receive social cash transfers, thereby increasing the rate of financial inclusion for marginalized groups. Furthermore, since disadvantaged people in society are offered social cash transfers and other services to achieve financial equality, they may feel as if they are being rewarded for the current wealth inequalities, helping them to keep up with the rest of society. The implication of the theory is that it considers such members of the community as vulnerable, meaning that attempts to increase financial inclusion should be focused on them.

The vulnerable groups’ financial inclusion theory has certain merits. To continue, the philosophy focuses on vulnerable groups and aims to get them into the structured finance system in order to solve the issue of financial exclusion. Second, under this principle, recognizing the community’s financially vulnerable participants is easy. The degree of deprivation, income status, ethnicity, age, and other demographic factors can all be used to classify the population’s most vulnerable members. Third, achieving financial inclusion for

only the most disadvantaged members of the population could be more cost-effective than achieving financial inclusion for the whole population.

The vulnerable group hypothesis is not without faults. To begin with, the principle does not give financial equality for all members of society a high priority. Second, it overlooks non-vulnerable people who are not included in the structured financial system. Individuals that are not insecure need access to the structured financial system as well! Finally, it presumes that women are the most insecure group, meaning that men are not. In western cultures, where men and women struggle for equal opportunity, marking women as inferior classes to the exclusion of men may have unexpected financial and social consequences. It could lead to men's social mistrust of women. Finally, focusing on poor people for financial inclusion would exacerbate socioeconomic inequalities by favouring vulnerable people over others in social policy, as well as income inequality where vulnerable people have more access to financial resources than others. Financial inclusion outcomes are accomplished through current sub-systems (whether economic, social, or financial systems) on which financial inclusion is based, and therefore greater financial inclusion will have beneficial implications for the systems on which it is based. A major improvement in a sub-system (one component of the system) could have a big effect on the projected financial inclusion outcomes. Imposing regulations on economic agents and financial service providers, for example, may balance their priorities with those of users of basic financial services, allowing economic agents and service providers to force users to use basic financial services. However, a large system-wide overhaul – such as replacing the current national financial inclusion program with an entirely new programme – would not necessarily mean a transition in internal sub-systems, since a sub-system change would be done at the sub-system level. According to the hypothesis, financial inclusion will boost the efficiency and effectiveness of the sub-systems

it relies on, and the efficiency and effectiveness of the sub-systems would decide whether a financial inclusion strategy succeeds or fails.

According to systems theory, the ultimate benefactors of financial inclusion are a country's existing subsystems (economic, financial, and social).

The notion of financial inclusion offers a number of advantages. To begin, systems theory acknowledges the critical role of a country's existing economic, financial, and social systems or processes in promoting financial inclusion. Second, in contrast to other proposals that take a micro approach to financial inclusion, it takes a macro approach. Finally, systems theory of financial inclusion discusses how the interrelationships within the subsystems that financial inclusion relies on have an impact on the outcomes of financial inclusion.

Despite the relevance of the financial inclusion theory, there are some flaws inherent in it. To begin with, the current structures are a representation of their surroundings. Current programs do not work properly in some settings, and as a result, the predicted financial inclusion results may not be realized. Second, the processes theory of financial inclusion overlooks the role of external influences on financial inclusion results; rather, it concentrates on the effect of the system and subsystems on financial inclusion outcomes. Finally, systems theory of financial inclusion argues that the outcomes of financial inclusion are intimately connected to the systems upon which they are built. The relevance of the vulnerable group theory to this study is far-reaching and would help situate the research in its expected context. First, the farmers under study can be classified as a vulnerable group and thus the theory applies to them. Based on the theory, they are vulnerable due to a number of reasons which include income level, literary and place of residence. There exists an income classification of people which can distinguish between the poor and the rich. As established above, poverty can be a determinant for exclusion. Moreover, the income level of the farmers is low. This means their command

over money can be low and thus limited to the basic things of life. Therefore, these farmers may be financially excluded, when there is actual or perceived realization that financial inclusion can be costly. The costly nature of formal financial inclusion is realized through maintaining minimum account balances, paying commission on transactions, monthly service charges and other fees related to managing a formal bank account (Anarfo, Abor & Osei, 2019). In fact, fees and commissions account for substantial income of financial institutions in Sub-Saharan Africa. Thus, on the supply side, financial institutions would be eager to increase their revenue in this space. One possible remedy to this impasse is for financial institutions to specialize their offerings to the poor and create specific offerings for them. However, it has been realized that specialized products to the poor is not cost-effective particularly in Sub-Saharan Africa. This is realized by the proliferation of most financial institutions in urban areas.

Also, the vulnerable group theory can be used to classify individuals along literacy lines. Farming in most of Africa has been ascribed to ethnic settlements. Hence, rural farmers mostly emerge because of their family lines and not necessarily because of schooling in farming. The tendency of this phenomenon is that the motivation to acquire some form of literacy in other to farm is non-existent (Anarfo, Abor & Osei, 2019). Hence, the rural farmer is likely to have low literary rates. The vulnerable group theory ascribes low literary to vulnerability and thus the literary of the farmers here fits into the theory.

Again, the farmers can be classified as vulnerable due to the location of their residence. The rural community is generally denoted as a vulnerable group because it usually lacks the required infrastructure. Financial inclusion can be strengthened when there is a required social and economic amenity (Anarfo, Abor & Osei, 2019). First, technology such as internet speed and connectivity support the financial inclusion agenda. This kind of technology is likely to be found in the urban other than the rural community in Africa. Additionally,

increasing infrastructure is associated with social and economic development (Eldomiaty, Hammam & El Bakry, 2020). The associated development therefore motivates a great deal of people to settle at where these amenities are, thus, increasing economic activities and income levels. The economic limitation of rural communities imposes a cost restriction on financial institutions (Eldomiaty, Hammam & El Bakry, 2020). However, microfinance and micro credit institutions usually require comparatively low cost of capital in investment to set up and thus are available in these rural communities. However, the cost of obtaining loan facilities, a form of financial inclusion, in these institutions is costly when compared to the mainstream financial institutions, thus, exacerbating the plights of the rural farmers.

The study does not distinguish vulnerabilities based on gender. This means that the treatment on a female is same as that on a male, preventing any form of gender discrimination. I believe this situation is desirable since the study does not inherently assume that the male rural farmer is different than the female rural farmer.

Notwithstanding the above, financial inclusion now includes other convenient forms that can be patronized by the rural farmers. In fact, mobile banking has been growing tremendously and has been seen as the future of financial inclusion on the continent.

2.2.3 Agent Theory

This theory arose from Arrow's pioneering work in 1974, and it clarifies the conflict of interest that can emerge from a principal-agent contract due to the agents' secret characteristics, motives, and behavior, which the principal cannot know with certainty. The principal is individual, organization, or institution that hires another to act on their behalf, whereas the agent is the person, organization, or institution that is hired to perform the task in question (in this case, loan recipients). This principle is particularly important in this study

because access to credit might not be accompanied by a willingness to repay the loan, leaving the borrower with no way of knowing whether or not the loan will be repaid.

The entire analysis is based on the following assumptions: first, all parties (lender and borrower) have rational behavior and expectations and interact on the basis of well-established principles such as freedom of contract and private property; second, the agent's actions and the results of his activities have external effects on the principal's profit and loss; and third, the agent's actions and the results of his activities have external effects on the principal's profit and loss. Because of the agent's discretionary freedom, there is a lot of ambiguity (since the principal cannot rely on any motivation like loyalty or conscientiousness). The principal's uncertainty increases as the ability to monitor the agent's behavior (that is, the information asymmetry) decreases; fourth, there is divergence of interests, which means the agent acts opportunistically to maximize her own anticipated benefit rather than acting in accordance with the principal's objectives. Secret attributes (the principal is unaware of the agent's abilities and skills), unknown motives (the agent has objectives and desires that the principal is unaware of), and concealed acts (the principal is unable to completely monitor the agent's actions) are the three forms of opportunistic activity.

However, it is important to note that information asymmetry associated with the agency theory inhibits the smooth flow of financial inclusion. On the part of the principal (the financial institutions), the agent (the rural farmers) bears the greatest risk due to lack of information about the realities on the field. The riskiness may stem from inadequate documentation of farm operations, poor identity system, instable residential status of the agent, seasonal changes and lack of suitable collateral. Thus, there is the fear that the rural farmer will default. That notwithstanding, microfinance institutions are more likely to advance credit facilities to rural farmers in Africa (Belek & Jean Marie, 2020). Furthermore,

these microfinance institutions provide credit at a high cost. In reality, according to a study by Belek and Jean Marie (2020), rural farmers who receive financial assistance from microfinance institutions have a technical efficiency of 0.68% lower than non-beneficiaries, who have a technical efficiency of 0.72%. The high cost of financial services deters some rural farmers from using them, limiting financial inclusion.

This theory is based on the following facets:

Adverse Selection

As a result of the above, the principal cannot completely assess the agent's quality as shown by his productivity, abilities, education (hidden characteristics), and plans if he chooses to maximize his own benefit by consuming surpluses, fudging, and collecting useful information (hidden intentions). This creates quality volatility, implying that the principal is willing to pay a price that is greater than the agent's true market value. Instead, a price limit raises the risk that the "high-value" agents may not apply. According to Akerlof (1970), adverse selection leads to partial business loss when the principals bid the average offer, which is too low for the high-quality candidates. As a result, only low-quality businesses will provide their services, despite the fact that the minimum price that high-quality agents are willing to negotiate is less than the principal's average ability to pay.

One of the three key ways to reduce the risk of selecting an underperforming partner is to get it checked by independent authorities.

If market intelligence agencies or other independent organisations collect knowledge about building firms' track records, outsourcers' uncertainty may be significantly reduced. Ratings and scores for construction companies are only helpful if they are collected independently and subsequent evaluations are performed using the same method. As a result, adverse selection will be greatly minimized.

Screening and Self-Selection: It is costly for a principal to properly evaluate the quality of a service provided on his or her own. As a result, a screening procedure such as unbundling, which involves breaking down the job into small enough parts for contractors to bid as lone contractors for each part, will be needed. The agent's success is evaluated, and the deal can be renewed if necessary. The key benefits of this mechanism can only be realized if the performance quality can be measured, particularly if the output is unaffected by unknown exogenous factors. Furthermore, recruiting a new agent to obtain the requisite expertise is less costly than sticking with the first agent that has proved to be of low quality. However, due to the risk of recruiting a low-quality agent in the next round, caution should be exercised.

The principle of self-selection is more complex. In addition, the less knowledgeable group suggests a pricing scheme that forces prospective agents to share honest information about their efficiency, reducing the principal's risk. If the evaluation of the provided service is favourable, for example, the price charged in the first phase would be below market prices, rising to market levels in subsequent phases. However, there are some limits to this impact: Only if the output quality is specifically and solely dictated by the quality of their jobs and if the quality can be properly measured using detailed and contractually agreed-upon criteria, can agents commit to such a system. Otherwise, such a mechanism would put high-quality agents in jeopardy.

Signaling: Spence (1973) proposed this method to prevent adverse selection, which is based on the premise that the agent selects a behavior that signals the private information. Although the principal does not know the true characteristics, indices (information and data such as track records, economic condition, number of workers, and number of pieces of equipment) and signals may help to reduce confusion (guaranties given by the agent, special qualifications, certificates). As opposed to a pooling equilibrium, in which all types of agents

are compensated equally, the optimum condition of a separating equilibrium is obtained, in which different types of agents receive different prices and market efficiency increases.

However, Certifications only help to reduce information asymmetries if the signalling costs are higher for lower-quality agents. Similarly, they can only be used as indicators if there is a strong connection between the certificate level and the standard of the service provided. Other indicators of the agent's efficiency include promises to lower the price if the result does not meet agreed-upon standards; and the need to perform free corrective maintenance because only high-quality companies can consider such contracts.

The theory of adverse selection has implications for this study in that bankers will misjudge the activities of farmers and assist the risky farmer rather than the right one. Furthermore, due to the low quality of information given by rural farmers, the banker may not be able to confidently check the information provided by the farmers. In reality, Anyanwu (2010) discovered that farmers in Cameroon face challenges such as a lack of financial resources, insufficient data, difficult macroeconomic conditions, and strict documentation. As a result, the bank would most likely charge a high interest rate to compensate for the increased risk.

Moral Hazard

The principal will monitor the activities of the agent under positive knowledge costs after selecting a contractor and signing a contract (hidden action). Moral danger arises when the principal can completely control the acts while having little capacity to adequately assess them. The underlying issue is the agent's knowledge advantage about the quantity and consistency of input and output (hidden information). All of this allows the agent to take advantage of his budgetary independence to optimize his profit role (through fringe benefits, decreased effort, and unnecessarily large budgets), resulting in inefficiencies as the

principal's payoffs decline faster than the agent's. The following steps may be taken to regulate or mitigate moral hazard.

Monitoring: Monitoring includes all means of monitoring by which the principal aims to decrease his knowledge disadvantage. The principal's behavior in trying to manage the effort spent by the agent, can lead to incurring some monitoring costs. Some principals keep track of how many hours the construction crew works. However, this does not account for efficiency because some workers might be at work but not employed. Alternatively, penalties may be described in cases where the principal considers opportunistic conduct. Due to the difficulty of identifying such a behavior, this is often not true. Thus, the challenge here is to know which criteria have the strongest influence and impact on the quality of the service delivered and if the costs of monitoring these indicators does not exceed their value. Fundamentally, supervision necessitates the principal's thorough knowledge of construction activities in general and the specific projects in question.

Restrictions and Contractual Agreements: The principal in this case fails to calculate the agent's feedback and instead formulates rules that restrict the agent's options. Coding standards, method definitions, and project management principles are all examples of this. However, since compliance with these statements must be monitored, this can come at a cost.

Incentive-compatibility Contracts

Due to the inability for the principal to quantify the agent's input, other mechanisms are required to ensure that the output meets the principal's requirements. The best way to balance priorities in order to reduce moral hazard is to implement an incentive scheme that harmonizes principal and agent objectives. This means that the agent's compensation should be proportional to the principal's benefit.

As a result, it is best for the agent to behave in the principal's best interests and adhere to the contract's incentives. In practice, this is accomplished by contingent bonuses, such as a predetermined bonus if the quality of the delivered service exceeds a certain threshold. At this point, the challenge is to come up with a metric or indicator for the project's efficiency. As a result, we'd like to demonstrate how to use those metrics and their associated issues to figure out the pitfalls and challenges of reward schemes.

Strengthen Loyalty: Since values like loyalty, honesty, and friendship are criteria in the agent's utility mechanism that are maximized, the stronger the emotional bond between the agent and the principal, the less opportunistic behavior will occur. As a result, the primary goal is to create an emotional pressure that prevents the agent from exploiting opportunities for opportunistic behavior. This demonstrates the importance of close coordination and frequent communication between the two parties in averting potentially volatile situations.

Verification by Independent Authorities: This is important in this case because observed opportunistic behavior has a significant negative impact on the credibility. Exploiting discretionary flexibility when a contractor's credibility is made public is not ideal because it reduces the likelihood of potential ventures.

The preceding account primarily addressed circumstances that arise before and during a project. However, it is possible that the principal knows that the agent is maximizing his own benefit rather than the principal's objectives, or that this was the case in the previous project. Furthermore, in some situations, it could be more cost-effective for the principal to retain the agent because of irreversible expenditures (sunk costs) that make hiring a new contractor

more expensive than retaining this one. This situation should have been prepared ahead of time by the agent.

Hold-up can be seen in our sphere of application when one contractor sells tools or embezzles financial resources that should have been used to complete the principal's work. The most common cause of a hold-up is the agent's tacit awareness (due to missing documentation) or exclusive skills. Consider a situation in which certain project owners seek the services of external developers they feel are the most qualified to master the project's specifics as well as the system on which the project will be implemented. Some researchers have suggested the following mechanisms to prevent such reliance on an expert or competent agent:

Dependence on the principal develops as the agent changes, resulting in cost that are high enough to allow the current contractor to raise rates above market value. This implies that the principal should focus on using common tools, processes, and software in order to ensure the involvement of a large number of other developers who understand and can manage the framework. This claim casts doubt on the importance of a thorough and accurate technical documentation that the principal may demand from each contractor. Coding standards and other guidelines are also essential for ensuring code maintainability and, as a result, preventing delays caused by the construction company that designed the system.

More than one external company should participate if ground-breaking ventures are outsourced or if such innovations are used for the first time. Since there are no internal competencies, there will be no reliance on a single supplier, ensuring that only a competitive price will be paid in the future.

By implication, due to the challenge of moral hazard and the cost of monitoring and supervision, banks mostly substitute the heighten risks by seeking for collateral. However, the tendency for rural farmers to have the required collateral for funding is low and even

limited to those who possess properties deemed fit for collateral (Jian, 2020). Due to the lack of collateral, some rural farmers will be financially disadvantaged.

2.2.4 Financial literacy theory

According to the financial literacy theory, financial inclusion should be accomplished through education that raises people's financial literacy (Ozili, 2020). According to this theory, financial inclusion programs and activities aimed at increasing the populace's financial literacy will enhance their willingness to engage in the formal financial sector.

The philosophy of financial literacy has several virtues. Financial literacy may educate individuals on the financial goods and services available to them. They will be willing to engage in formal financial transactions via the acquisition of a bank account, once they become aware of available financial products and services that may help them enhance their standard of living. (Ramachandran, 2011) Secondly, improving financial literacy allows people to access more advantages offered by the formal financial sector. Financial literacy may help people achieve self-sufficiency and financial stability by helping them in differentiating between needs and desires, developing and maintaining a budget, training them to save in order to pay bills on time, and preparing for retirement (Okello Candiya Bongomin et al., 2020). Thirdly, governments with limited public resources or tax revenue to support financial inclusion programs would pick financial literacy as a method for financial inclusion since it does not need a significant amount of public money to educate the people about financial services usage. Several objections have been levelled against the financial literacy idea. To begin, it focuses on "willingness", not "capacity", to participate in the official financial system. While financial literacy education may improve people's desire to engage in the formal financial sector, it does not necessarily enhance their "capacity" to participate, where "capacity" is defined as the possession of money capable of completing

one or more transactions (Ozili, 2020). Regardless of the disadvantages of this theory, financial literacy have been identified as a contributing factor to financial inclusion in agriculture (Akoto, 2015.; Fowowe, 2020; Kailanya,2012). According to Akoto, (2015) there is a correlation between financial literacy and financial inclusion of cocoa farmers in Ghana. This makes this theory relevant for this study.

2.2.5 Endogenous Growth Theory

This theory embraces the fact that according to Solow- Swan's neoclassical growth theory, economic growth and progress, which is the endpoint of economic welfare, are mainly the product of endogenous rather than exogenous influences. It holds that economic growth is envisaged with significant contributions of investment in human capital, innovation, financial inclusiveness, and knowledge. This theory is therefore of utmost importance in this dissertation because much concentration will be on the endogenous factors that favour financial inclusion and agricultural development especially in rural areas. Uzawa (1965) and Sidrauski (1967) are some major contributors to this endogenous growth models. Further contributions to this growth theory were also seen in the works of Romer (1986), Lucas (1988), and Rebelo (1991), among other economists, which focuses on long-term investments in human resources that have a positive economic impact and minimize the declining return on capital accumulation (Chand et al., 2015).

According to the theory therefore, economic welfare and thus development is achieved based on positive externalities such as subsidies for research and development and spill-over effects of a knowledge-based economy.

In their 1998 theory of endogenous development, Philippe Aghion and Peter Howitt focus on changes and innovation, arguing that the enormous increase in material well-being that has occurred in industrialized economies since the industrial revolution has been characterized by

change and innovation. Shift and creativity, rather than anything else, are responsible for modern-day affluence. It has changed how people live their lives in addition to generating money (Aghion & Howitt, 1998). As a result, economic growth means a two-way interaction between technology and economic life: technological innovation changes the very economic processes that generate it; therefore, the aim of endogenous growth theory is to gain a better understanding of the relationship between technology and different fundamental features of economies and culture.

According to the World Bank, poor people in many rural areas still rely on wood and other biomass fuels for the majority of their household and income-generating activities (Kaygusuz, 2010). Children and women in rural areas are the most impacted by a shortage of clean modern energy, spending endless hours searching for firewood and doing their homework under a kerosene-powered lamp, which emits harmful smoke that are harmful to the respiratory organs. Decentralized renewable energy plants help to solve energy access issues in rural areas while also achieving the objective of environmental protection, given the challenges of linking remote communities to the national grid (Chijioke, 2016). To allow more decentralized renewable technology to effectively serve rural communities, a robust infrastructure must be developed.

With a range of challenges associated with off-grid electrification in rural areas, financial inclusion for the poor will unlock these opportunities and build a viable environment for investment to flow in, which contributes significantly to the sustainable development target. True, the government has developed a clear and comprehensive policy framework that offers significant potential and opportunities for the private sector to contribute to closing the energy poverty gap in rural areas. Microfinance programs are an important way for developing country governments to emphasize decentralized renewable energy in their energy mix while also offsetting the cost of renewable energy delivery. Microfinance is a

method of offering small loans at low interest rates to people who want to start those kinds of businesses (Snow, 2005).

Providing modern energy to the underprivileged citizens in our rural communities necessitates a multi-pronged approach. Since Rwanda's geographical landscape is more mountainous, as it is known as the "country of a thousand hills," electrifying its population by connecting them to the national grid is virtually impossible in the short term due to the large sums of money required. Off-grid technology, on the other hand, relieves the utility of the burden because it is a sophisticated technology that can be easily controlled, and thus contributes significantly to reducing energy lost during transmission, as mentioned in the country's energy policy (2015). Either through the use of a decentralized system with a mini grid that distributes power to end consumers, or through the use of a stand-alone system.

As rural electrification is one of the highest priorities on agendas, the idea of affordable, efficient, renewable, and modern energy, as described in Sustainable Development Goal number seven, must be clearly understood. In most cases, short cuts are taken by taking the simple route and distributing small solar home systems to poor families, but this does not solve the root problem. These families get the bare minimum from this unreliable power because they can only afford a small number of lights that aren't being used productively. This is not sustainable in the sense that modern energy can play a central role in poverty reduction and produce some income for households, which can be used to increase their living standards, and if there are any malfunctions or defects, the owners can replace or repair them. The relationship between modern energy and financial inclusion for underprivileged communities should be at the forefront of debates, as one has a significant impact on the other. Policy interventions are needed, which obviously necessitates a drastic change in funding priorities (Bhattacharyya, 2013), Empowering the poor by providing them with resources to meet their social needs and improve their living conditions would improve the

business climate and, as a result, the problem of energy insecurity will be addressed. People know their needs better than anyone else, so financially supporting them will give them the freedom to choose the best and most sustainable system. Stimulating local social enterprises and involving them in modern energy solutions on a local level would have a huge effect on the long-term diffusion of modern energy.

2.2.6 Public good theory of Financial Inclusion

Providing formal financial services to the entire community should be regarded a public good benefiting all members of the population, according to the public good theory of financial inclusion (Ozili, 2020). This Theory states that, any farmer can obtain financial services without experiencing hardship. This covers farmers' usage of mobile money for financial services. A government may even issue a lump-sum cash deposit into each citizen's bank account and demand only that individuals have a formal account in order to access the free deposits (Ozili, 2020). This means that farmers who are unable to meet their fundamental necessities on a local level would have an opportunity to achieve economic empowerment.

However, this idea has a number of drawbacks. To begin, focusing only on financial inclusion as a public good obscure the underlying reasons of financial exclusion. Second, by framing financial inclusion as a public good that needs public funding, it is feasible to reallocate funds from other important public programs to sponsor financial inclusion efforts. This theory is critical for the study since it implies that financial inclusion benefits everyone regardless of their status or income level (Ozili, 2020). This means that both wealthy and impoverished farmers will gain from financial inclusion. Second, creating financial inclusion as a public good would need public finance rather than private equity, as investors demand a premium on private equity, which is prohibitively expensive when private funds are used to accomplish financial inclusion goals. Finally, because it is a public good, it enables the government to take on the duty of promoting financial inclusion.

2.2.7 Collaborative intervention Theory to financial inclusion

Financial inclusion, according to collaborative intervention theory, should be accomplished collectively by numerous stakeholders. According to the notion, integrating the excluded people into formal financial institutions will require collaboration among various stakeholders (Ozili, 2020). This theory is not without merit. For one thing, it promotes a multi-stakeholder approach to financial means. This theory, brings together different parties to help farmers be financially inclusive. Partners such as private investors, non-governmental organisations and the government. Second, collaborating stakeholders have a sense of accomplishment as a result of their important contribution to a public initiative. The collaborative intervention theory is not without its flaws. To begin, determining the ideal number of collaborators required to advance a financial inclusion agenda is challenging. Second, some participants may deactivate, leaving the duty to a few remaining active collaborators. Thirdly, a greater number of collaborators do not necessarily imply a greater likelihood of achieving financial inclusion. This implies that although there may be enough collaborators, with the aim of achieving financial inclusion, their effort might not be enough (Fowowe, 2020).

This theory helps the researcher understand the diverse stakeholders that can be involved in assess the effect of financial inclusion on agriculture.

2.3 The Financial Liberalisation Thesis

One of the key requirements for agricultural development in less developed countries is capital. While many rural farmers lack adequate collateral to benefit from the mainstream financial sector, governments should do all it takes to permit the farmers have access of the much-needed financial capital. The main focus of the interest rate liberalisation hypothesis

developed by Ronald McKinnon and Edward Shaw in 1973 is the fight against financial repression, thereby allowing individuals the much-needed access to the financial capital base. Financial repression, according to the theory, is detrimental to long-term economic growth because it decreases the amount of money or savings available for investment, thus limiting production growth. In contrast to the Keynesian model and Tobin, McKinnon (1973) and Shaw (1973) advocated for interest rate liberalization and the elimination of other forms of financial repression (1965).

The financial liberalization thesis is critical for this research because it helps to relieve financial constraints in most developed countries by enabling market forces to decide real interest rates, which can have a positive impact on production expansion, especially as interest rates rise toward their competitive market equilibrium position. Artificial interest rate caps, according to this tradition, limit savings, capital accumulation, and prevent productive resource allocation. Furthermore, according to this theory, financial repression can lead to dualism, in which some investors (farmers), especially in rural areas, are fully shut out of the financial market.

McKinnon (1973) and Shaw (1973) found the state of ideal information in advancing the financial liberalization theory, which means that all applicable information is equally accessible to all business agents. In reality, information asymmetries occur between capital providers and capital seekers in almost all financial markets. Second, the capitalist assumption that people and businesses should write and execute complex financial contracts at any cost has been strongly criticized (Gertler and Rose, 1994).

The thesis' arrangement requires financial intermediaries, savers, and borrowers since loans to the private sector are financed by the private sector's internal debt. Since loans to the private sector are funded by the private sector's internal debt, it's known as an inside money

model (Fry, 1995). The real rate has remained below its equilibrium level since the nominal interest rate has been set. The actual interest rate is a positive function of saving, but it is a negative function of savings. Savings decline as inflation rises or the fixed nominal interest rate declines, restricting access to much-needed financial capital for investment. Another argument supports the inflation effect: if land ownership were used to hedge inflation, a drop in the real interest rate will stimulate land demand as deposits become less appealing. People are transferring their savings from bank deposits to land ownership, which causes land prices to increase higher than the general price index. As a consequence of the induced wealth effect, demand rises and spending falls.

If there is financial repression in the form of a nominal interest rate set below the market-clearing value, two scenarios are conceivable. If only the deposit rate is set, there would be a large difference between lending and deposit rates. Credit distribution is dependent on acquisition costs, potential default rates, collateral quality, political influence, reputation, loan size, and covert advantages to loan officers, rather than expected investment performance. The average investment productivity is decreased because loans with lower interest rates become sustainable after the loan rate cap has been set at a relatively low level.

Entrepreneurs that did not apply for credit prior to the cap being set to join the market, triggering adverse selection. Banks' risk-taking behavior suffers as a result of the lack of a risk premium. Another source of distortion is credit distribution, which is prone to some randomness. The policy recommendation of McKinnon and Shaw is to remove structural limits on nominal interest rates and reduce inflation. About the fact that McKinnon and Shaw reach similar conclusions, they take different analytical approaches.

McKinnon's model is based on the assumptions that all economic units are limited to self-financing and that spending is highly indivisible. He does not distinguish between savers

(households) and investors (firms) (investors). An individual must first acquire cash reserves or other financial assets in order to invest later. As a result, cash reserves and financial properties balance each other in time. Since borrowers cannot borrow to finance investments, McKinnon's model is sometimes referred to as an outside money model.

Complementarity is unnecessary in Shaw's model because borrowers are not constrained to self-financing. He proposes an explicit inside money solution in which financial intermediaries keep savings investments going by increasing actual returns to savers and thereby increasing their lending capacity. Simultaneously, risk diversification, lending economies of scale, increased operating performance; lower knowledge costs for savers and borrowers, and liquidity preference accommodation minimize real costs for investors.

McKinnon's complementarity principle and Shaw's debt-intermediation perspective do not have to be mutually incompatible because investment can be financed both internally and externally. McKinnon's research focuses on developed countries, while Shaw's research focuses on advanced economies with complex financial systems. In addition to encouraging long-term expansion, financial liberalization decreases the contractionary effect of monetary stability programs (Kapur, 1976).

The Neo-structuralist School emerged in response to mixed encounters with financial liberalization programs, and it opposed financial policy from a macroeconomic perspective. Taylor (1983) and van Wijnbergen (1982; 1983) made two important remarks, one of which is special to developing economies. According to their models, unorganized capital markets are crucial in determining whether financial liberalization will stimulate growth or not. If the actual deposit interest rate increases, the presence of reserve conditions would cause reserves to transfer from the unorganized to the structured lending market, reducing financial intermediation. In the unorganized, money market reserve requirements do not apply. The

size of the credit supply contraction is determined by the extent to which reserves are substituted out of inflation hedges or the unorganized economy (Mathieson, 1980).

The second point is that higher interest rates will cause cost-push inflation, which will cause effective demand to fall. Even if financial intermediation does not shrink, the second argument remains real, as an increased tendency to save may weaken effective demand even further. On the other hand, Neostructuralist models presume that unorganized money markets are dynamic, which may or may not be true. Another flaw in these models is that they focus on total credit and investment volume rather than investment performance (Fry, 1989). A rise in credit costs can help with the above.

Credit sector disequilibria can be exacerbated by causes other than government intervention, according to Stiglitz and Weiss (1981). The authors demonstrate that the cost of credit has an effect on the essence of a transaction, preventing the market from clearing. The outcome is the result of a combination of an adverse selection effect and an incentive effect. High and market-clearing interest rates will entice poor borrowers or allow them to pursue riskier investment opportunities. Borrowers are also more likely to default on their loans as a result. As a result, banks would be wary of increasing interest rates above their market-clearing level. As a consequence, there could be credit rationing, with only massive loans being offered. There's also the chance of excess supply equilibriums. The microeconomic vulnerabilities in the free credit market are to blame for these poor outcomes.

In and of itself, adverse selection can be a challenge. Mankiw (1986) discusses the topic of the financial crisis in this context. He demonstrates how even small increases in the interest rate can have a significant impact on the riskiness of a group of creditors. The credit market would fail if the pool of loan borrowers is too risky to provide the banks with the required return. Furthermore, conservative monetary policy has the power to do more than merely

steer the economy around the marginal productivity capital schedule. In the worst-case situation, that might result in a global crash.

Among the theoretical criticisms of the financial liberalization thesis, it provides a solid foundation for investment finance, especially in third-world countries. Small-scale farmers in developing countries will continue to face high yields due to a lack of access to funding without legalization and easing access to much-needed financial services. As a result, the model is important in showing how the poorest of the poor will gain access to resources for investment.

According to Boateng et al. (2017), access to cash opens up opportunities for households to venture into other livelihood activities within a community and also use part to maintain their traditional livelihood

2.3.1 The Von Thunen Theory of Agricultural Development

In order to understand the value of land and its use or production in the Ngoketunjia Division, we shall use Von Thunen's land model. This model of land use is very popular in the understanding of agricultural development around a city despite its demonstrable shortcomings (Artkins, 1987). From time immemorial, farmers have desired to get maximum output from the minimum input of resources through the process of optimization (Blaikie, 1971). The basic idea about the model is that, farms and due to urbanization, is increasingly becoming small, pushing farm lands to the peripheries of the cities. According to Von Thunen's position model, if environmental factors remain stable, the farm commodity with the largest profit margin would outbid all other goods for land use. In this study, we discuss financial inclusion and agricultural productivity. Perishable products are good around the center of the city as it reduces the risk of damage and lending to farmers as a demonstration of inclusiveness in financial services is sometimes determined by the ability of the farm to meet this location property as it minimizes risk. Thus, the relevance of this model in this

study is to situate farming operations within the context of fast evolving cities, linking it to access to financial services.

According to Rossenberg (2019), this model came to light 1826 when the farmer, Johann Heinrich Von Thunen (1783–1850) published a book titled “The Isolated State”. This model is particularly important because it explains the way land is used for different purposes around a community. Agricultural development models generally attempt to explain the forces in society and the economy that lead to agricultural change through improved production (European Commission, 2018). According to Guthierez (2015), it explains why proximity to market is important when choosing crops for commercial farming.

Von Thünen was interested in the natural laws that regulate rural land use, according to Morton and Bryan (1996), that is, the best way for farmers of various products to place their farms within an Isolated State in order to maximize benefit. The central district was expected to be mostly used for high-rent uses such as apartment towers, department stores, and other retailers, financial services, hotels, and theaters (McDonagh, 1997). Land use, at the most basic sense, defines how people communicate with the land, regardless of the use, with the end goal of maximizing returns (Clerk, 2002).

The basic requirement for using this model is that environmental conditions around the city center are the same and that if citizens have the right to arrange the landscape around their cities as they see fit, they would naturally set up their economies by growing and selling vegetables, cattle, wood, and produce in that order (Udemezue and Osegbue, 2018). This also implies that the concentric farming trend will be stable, and if environmental conditions remain constant, some crops will have a locational comparative edge over all others. In other words, a crop that performs well near a city will continue to perform well, and farmers will see no need to improve. Agricultural growth, they argue, is a subset of rural development, especially in poor countries where industrialization is a distant hope. Agriculture’s growth

and production, according to Esther Boserup, is a normal reaction to population growth and is not inherently dependent on productivity.

The city, according to the model, is centrally situated within an “Isolated State” that is self-sufficient and free of external influences. Although this situation is no longer valid due to the high degree of globalization, the fact that Ngoketunjia, the study area, remains poorly connected to the rest of the world due to extremely bad roads, partially addresses it. Covering the about 45km distance linking the Ngoketunjia with Bamenda, the regional headquarters of the North West Region by road is not cumbersome and challenging. However, being a rural settlement largely occupied by locals, the town can supply a majority of its basic needs. Ngoketunjia Division is further surrounded by an unoccupied wilderness as the model suggests. From Ndop Central sub-division, there is a vast portion of wilderness from Baba 1 to Bamunka, From Bamessing to Balikumbat, and from Babessi to Bangolan, with only spartial linear settlement with very low population density (Sunjo, 2018). This implies that some of the conditions underlined by Von Thunen are still very evident in Ngoketunijia.

As the name of the division suggests, Ndop plain is really levelled, making mechanisation very possible with sufficient water bodies to ease irrigation than can allow for continuous production year out. Being a plain or low-lying undulating terrain, all the deposit of nutrients from runoff and periodic floods gets settled in the land, making it very fertile for agriculture. The soil quality and climate are consistent throughout (Bradford and Kent, 1977) and very convenient for the growth of variety of agricultural products. Principal food crops grown by farmers in Ngoketunjia include: palms, banana, rice, plantain, cocoyam, beans, just to mention these few, while coffee which was the principal cash and export crop is almost extinct since the late 1990s following the collapse of the coffee cooperative as a result of economic mismanagement (Gintar, Forbe, Mokwando, and Kidze, 2018).

With these conditions in place, the model summarizes that agricultural practices that yields the greatest profit to the farmers will compete for land use in a concentric pattern. According to the model, perishable commodities such as vegetable and dairy products will be produced or cultivated close to the city centre to reduce the cost of transportation, while non-perishable commodities will compete for the outer space. According to Turrentine and Pemberton (n.d), the framework can be presented in a simplified equation as follows:

$R= (p-c) - YFm$

Where R denotes land rent, Y denotes yield per unit of land, c denotes production expenses per unit of commodity, p denotes selling price per unit of commodity, F denotes freight cost (per farm unit, per mile), and m denotes distance to market.

The above equation implies that rent which determines land use is a function of the total production cost. Where the value of rent is zero, no agricultural activity will take place as farmers essentially wants to maximize profit and this again was a function of distance internalized in the production expense parameter (c). The shorter the distance between the farm and the market, the higher the value of rent, ceteris paribus (Achille, Jaza and Adamowski (2012). This condition was essential as transportation network in the days of Von Thunen was not well developed, having to rely on oxcarts for the shipment of goods from the farm to the market which had severe consequences on speed and delivery compared to what we have today. However, this consideration cannot be completely ruled out in this framework because presently in Ngoketunjia division, a significant portion of crops get bad in the field because of lack of transportation means. The area is characterized by seasonal roads which are sometimes not passable, making perishable goods to get bad before reaching the market (Lambi, 2013).

Based on the above presentation, it can be summarized that the conditions outlined in the framework of Von Thunen are quite relevant within the context of Ngoketunjia Division

where the locality is more or less isolated from the rest of the country because of extremely bad roads connecting the two major neighbouring centres of Kumbo and Bamenda. In fact, as the model presupposes, there is vast wilderness of unoccupied land in Ngoketunjia. Apart from isolated linear settlements, over 60% of the land that surrounds the locality is unused, and this justifies why land disputes has not been an issue for the past 2 decades (Sunjo, 2018).

Apart from profitability determining the competition for value in production, the model failed to recognize that certain environment does not give room for much competition in land use. For example, a swampy region is only suitable for the cultivation of rice under normal conditions and hence such commodities have no direct competitors, except the land is drained for the production of other crops. Furthermore, despite the fact that Ngoketunjia is flat as Germany where the model was developed, it has been constantly modified to fit different landscapes of different cities without major difficulties.

Though Hart (1980) argued that no model can adequately explain the behavior of farmers in land use decision making, the Von Thonen hypothesis gives a reasonable basis for certain observed agricultural behavior especially in urban cities. It must be recognized that the agricultural circumstances surrounding each city would be influenced not only by its own particular food and cash crop requirements but also by its scale and buying power (Turrentine and Pemberton, n.d). While many have questioned Von Thunen's claim that a ring-like land use trend does not exist, Zinyama (1989) and Chisholm (1979) discovered signs of concentric land use in certain parts of the world under some socioeconomic circumstances.

Literature gap: Many studies have been conducted on Agricultural growth and financial inclusion while the findings have been mixed and varied across countries and regions, no comprehensive research has been carried out in Cameroon, especially in the Ngokentunjia Division, where this study is based. The role of financial inclusion in agricultural

development in Cameroon has not been analysed up to now. Thus, there is a need to study the relationship between agricultural development and financial inclusion in Cameroon, and precisely in Ngoketunjia division.

We have analysed many theories in this work linking agriculture and financial inclusion. The general trend is that financial inclusion is expected to stimulate growth in real output and contributes to development. However, in the absence of a localized study for Ngoketunijia as a particular region, and Cameroon as a whole means those policies cannot be imported given that there are always differences in national and or regional characteristics. This implies that the gap continues to exist, necessitating a study of this nature to help develop and guide a policy framework.

In this chapter, we have established that there is a strong theoretical link between financial inclusion and agricultural development with varied evidences around the world. We further established that such conclusion was not uniform around the world as there were spotted evidences of mix conclusions. However, Mckinnon and Show in their financial liberalization thesis established that there is financial deepening which culminates in better productivity for farmers. The concentric land use model and the Von Thunen paradigm established clear evidence of zone pattern of land use in semi urban environment, with consequences on the productivity and marketability of perishable commodities in the area. Development theories such as Romer model have also demonstrated that basic inputs are necessary for any meaningful output. The conclusion of this chapter therefore is that there is convergence of evidence of both theoretical and empirical linkages between financial inclusion and agriculture development.

CHAPTER THREE

METHODOLOGY

This chapter discusses the fundamental techniques and processes for resolving the issue described in Chapter 1 and accomplishing the associated goals. In this light, this section will attempt to describe the design necessary for the investigation of the problem, the procedures for collecting data as evidence for the solution of the problem, the sampling procedures, the technique of analysis, and other methodological issues pertinent to a scientific investigation of this nature. Both a conceptual and empirical model have been emphasized with theoretical backing in order to demonstrate causation between the study's major components. This section will also detail the equipment used to gather data.

3.1: Research Design

This study used a survey design to collect data with the purpose of reviewing and resolving the research problem. The thesis assessed requirements, evaluate demand, and analyze impacts, which is why this study used a survey research design (Salant and Dillman 1994). To continue, survey analysis was used to statistically categorize particular aspects of a population by analyzing the connections between variables. Second, the data for survey is gathered directly from the respondents. Finally, data collection makes use of a representative sample of the population to provide data that can be extrapolated to the whole population (Glasow, 2005). Surveys are adaptable in terms of their design and the amount of variables that can be analyzed, and they are easily generalizable. They take minimal time and money to create and maintain.

To get a deeper understanding of the issues raised in this research, questionnaires will be developed and sent to area farmers. The data will be analyzed using an analytical model

created by Mckinnon and Shaw (1973) in their financial liberalisation studies, as well as the Cobb-Douglas (1973) development equation, which treats output as a function of inputs.

3.2 Instrument and Method of Data Collection

The data for this study was gathered using a questionnaire and interview guide that was created to ensure accuracy among the various respondents. An extensive interview was conducted with five members of the agricultural cooperative movement, the umbrella association for farmers' cooperative in Ngoketunjia with the main purpose of reconciling previous facts with results obtained using questionnaire. Interview guide and telephone discussion were the two main research instruments used to collect the data necessary for the resolution of the research problem raised in chapter one. The interview took place in the month of November, 2020, with majority done on Sundays based on farmers and field agent availability and convenience. The data was collected directed from the farmers or respondents because of the convenience strategy adopted. However, only limited cases of respondents requested to fill the questionnaire and returned later. This maximized the response outcome, estimated at about 95%. In other words, out of the 285 participants sampled for this study, only about 10% of them opted to fill questionnaire themselves. This reflects the level of illiteracy that is characteristic of a majority of the farmers in the region. Many preferred to be assisted for the filling of the questionnaires by the field assistants.

3.3 Sampling and Sampling Procedures

Data was collected from 285 respondents selected randomly from among the farming population in Ngoketunjia Division, North West Region of Cameroon. The questionnaire response rate was estimated at about 95% given that out of 300 sent out, 285 successfully returned them. This high response rate was due to the role of the field assistants in the data collection process as they ensured that farmers responded on the spot. The random sampling technique was used in the study because a greater proportion of the participants were farmers

and hence the chances of selecting non-relevant entity as sample was quite low .Participants were selected randomly from amongst the population. This was further assured by the fact that the field agents involved in the data collection process were inhabitants of the area of interest and hence knew many of the farmers.

3.4 Determination of the Sample Size

In determining the sample size for this study, two important criteria were used. In the first instance, given that area is largely agrarian and inhabited by farmers; any participant was relevant for the study, making the sampling according to Donner and Eliasziw (1987) scientifically reasonable. In the second instance, given that the exact population (numbers of people living in Ngoketunjia) is unknown, the determination was based on the Mensah and Castro (2014) approach in estimating sample size. Sample size for unknown population can be determined based on the following formulation:

$$n = \mathrm{Z}.\mathrm{Z}\frac{(P)(1-P)}{C}/1.28$$

Where Z = the standard normal distribution, set at 95% confidence, (Z = 1.96),

P = the percentage of participation or picking a response fixed at 50%, (P = 0.50),

C = the confidence interval of ±5%, (C = 0.05)

In the social sciences, the most common confidence intervals are 90%, 95% and 99%. To minimize errors, we opted for a mid-position interval for this study given that no sample can be perfect. Since we are determining the sample size before the actual administration of the survey, Smith (2014) notes that the safe decision is to use P = 0.5, the most forgiving number that guarantees a large enough sample size. Substituting the values of the parameters into the above function gives a sample size of (n = 384.16/1.28= 300), approximately 300 participants to make the survey both statistically and scientifically valid (Milton, 1986). Thus, the sample

size for this thesis was reasonably fixed at 300 participants selected from across the population.

Gusti (2015) went on to say that the research methodology used in this study (structural equation modeling) necessitates at least 100 tests. This ensures that the sample size specified above complies with the technical requirements of the data processing methodology used, ensuring the accuracy of the results. Given that the population living in the area was homogenous in characteristics, it became indifferent from where the study samples were drawn. The conditions of life, the necessity and the approaches to meeting basic livelihood needs of these populations were basically the same. While a larger sample can yield more accurate results, Smith (2014) opined that excessive responses can be pricey.

3.5 Validity and Reliability of Research Instruments

The research instrument (interview guides) and questionnaire were developed and approved by the supervisor and a proposal panel officially composed for the purpose of evaluation before implementation was done in the field. In this way, the final instrument met the criteria for validity and reliability (Glasow, 2005). To ensure applicability and ease of administration, a pilot interview and administration of questionnaire was conducted with at 5 farmers (for interview) and 15 others (for questionnaire) and adjustments made in consultation with the technical team and statistician before the full implementation was done. Trust worthiness, which is the ability of the research to reflect the reality and ideas of the participants, was therefore ensured in this research.

3.6 Model specification

The basic analytical model of this research is derived from the linear production function that output or productivity in the agricultural sector is a function of resource input, in this case labour and capital. Labour is captured within the concept of education and training of the farmers while capital is captured through access to finance. We also understand that in

developing countries, the weather condition plays a critical role in the determination of total output and by extension, farm productivity.

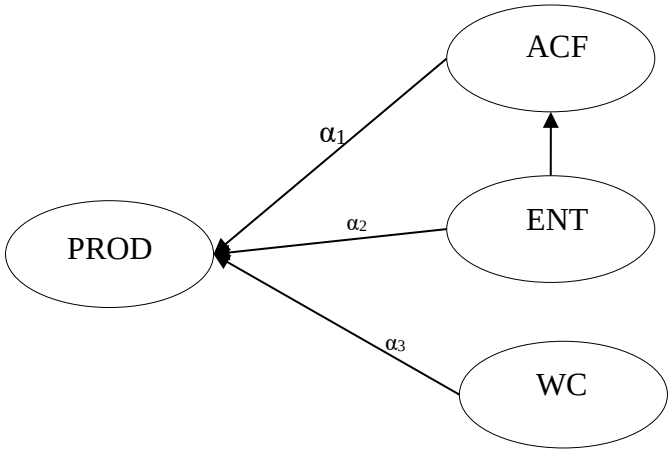

Figure 3.1: Hypothesized Conceptual Model

Source: Conceived by author, 2020

Based on this theoretical and conceptual underpinning, a conceptual model 3.1 is established, depicting access to finance, education and training as well as weather condition as determinants of agricultural productivity in the context of this research. α_1, α_2 and α_1 are the coefficient of the exogenous constructs.

From the conceptual model 3.1, an empirical model is hereby established as follows in linear form that lends itself to statistical evaluation:

$PROD_i = \alpha_0 + \alpha_1 ACF_i + \alpha_2 ENT_i + \alpha_3 WC_i + \lambda_i$……3.1

Where PRODi is agricultural productivity,

ACF_i equals access to finance as a source of capital, being proxy for financial inclusion,

ENT_i equals education and training, while

WC_i represent that concept to capture weather conditions in the farming area.

λ_i is the error term

α_0 is the constant term while α_1 to α_3 are the coefficients to be estimated

From the conceptual diagram, we observe that education has both a direct and indirect effect on the dependent construct of the model. While education and training increases chances of access to sources of finance with consequences on productivity, it also directly affects farm yield through the application of new technology.

Thus, the indirect effect specification is as follows:

$PROD_i = \alpha_4 + \alpha_1\ \alpha_2 ACF_i ENT_i + \alpha 3WC_i + \lambda_i$…… *(3.2)*

$\alpha_1\alpha_2$ measures the indirect effect

3.7: Methods of data analysis

In addressing the first and the third objectives of this study, we employed the descriptive and inferential statistical tools such as percentages, tables and charts to present and analyse the findings obtained with the use of questionnaires. Specifically, measures of central tendency and variability will be used to report the findings of these two objectives. Although descriptive statistics aid in the development of trends and the valuation of raw data, inferential statistics aid in the determination of whether an observed difference between groups is reliable or merely coincidental (Salkind, 2011). Inferential statistics enables social scientists to switch from sample to population by inferring population parameters from data on sample statistics (Greene, 2003; Salkind, 2011).

To answer objective two, we use the partial least squares approach to structural equation modeling. Two sets of linear equations functionally describe the inner and outer versions of partial least square path models. The inner model specifies the relationship between unobserved or latent variables (constructs), while the outer model specifies the relationship between a latent variable and its observable or manifest variables. The assumption in path analysis is that all variables are accurately calculated. In comparison to SEM, path analysis

has a more versatile collection of assumptions. The non-normality of data distribution is one of the advantages of this approach. To put it another way, data with non-normality can be used with this process. Furthermore, because the recognition issues have been resolved, indicators (items) with less than three for each construct could be used. It can capture both formative and reflective indicators with ease. Formative indicators are observable variables that are used to forecast a construct, while reflexive indicators are the constructs' observed manifestations. It also implies that the error terms have no reference to one another.

In addition, this method of data analysis can contain a larger number of indicator variables even higher than 500 indicators. It is more robust and relaxed modelling approach (Afthanorhan, 2013). It is well known for its accurate measurement of goodness of fit indices (Gronemus et al., 2010; Cunningham et al., 2006).

3.8: Derivation of the Technique of Data Analysis

The method of data analysis chosen for this study is based on the assumption that there is non-normality of the variables (constructs) and that they follow a standard normal distribution in which the mean value of the disturbance term is assumed to be zero, that is, $E(\varepsilon) = 0$. Also, the method assumes that there is no autocorrelation between the error terms of the different models statistically expressed as $Cov(\varepsilon_i \varepsilon_j) = 0$. This assumption permits us to control for endogeneity due to error sources. In this context, the variance of the disturbance term is assumed to be constant. The implication of a constant variance in a study of this nature is that: $Var(\varepsilon_i / x_i) = \sigma^2$ .....(3.3)

Another important characteristic of the method is the assumption that the covariance between the disturbance term and the exogenous variables is zero.

$Cov(\varepsilon_i, x_i) = \sigma^2$ .....(3.4)

In this perspective, the covariance matrix of the observed variable is a function of the set of parameters. With a correctly specified model and known parameters, we have

$$\sum = \sum \theta \quad \text{.....(3.5)}$$

In this study, there are four constructs and each construct will be measured using a set of question items on the questionnaire. For instance, agricultural productivity (APi) is one of the constructs which is measured using X1, X2, X3 and X4 as shown in the measurement diagram below, where the Xs are question items on the questionnaire that capture the construct. The observed or manifest variables are presented in a rectangle while the latent variable is represented in the big circle. The e1, e2, e3 and e4 are the measurement errors.

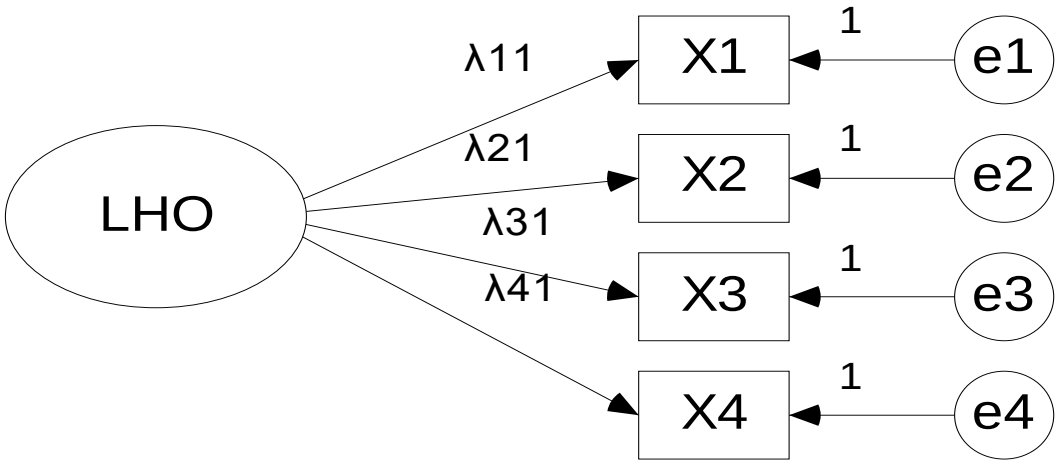

Figure 5.2: Conceptual Agricultural Productivity Measurement Diagramme

Source: Developed by author, 2020

In adopting this technique of analysis, we solved for the following system of equations using the PLS-SEM package:

$$\begin{aligned} X_1 &= \lambda_{11} LHO_i + \varepsilon_1 \\ X_2 &= \lambda_{21} LHO_i + \varepsilon_2 \\ X_3 &= \lambda_{31} LHO_i + \varepsilon_3 \\ X_4 &= \lambda_{41} LHO_i + \varepsilon_4 \end{aligned} \quad \text{.....(3.6)}$$

For all the n^{th} items that were used as manifestation of the latent construct LHO, we have;

$$X_1 = \lambda_{11} LHO_i + \varepsilon_1$$
$$X_2 = \lambda_{21} LHO_i + \varepsilon_2$$
$$X_3 = \lambda_{31} LHO_i + \varepsilon_3$$
$$X_4 = \lambda_{41} LHO_i + \varepsilon_4$$
.
.
.
$$X_n = \lambda_{n1} LHO_i + \varepsilon_n \quad \text{.....(3.7)}$$

The above systems of equation are the general form applicable to the measurement of all the latent constructs in this study.

In matrix notation, we have:

$X = \Omega LHO + \varepsilon$, Ω represents the estimated parameters

Cov(X) = $\sum = \sum XX^1 = E(XX^1)$ .....(3.8)

$XX^1 = \Omega_x \phi \Omega_x^{\ 1} + \theta_\sigma =$ Communality component and the unique variance component. Communality is the explained variance while the unique component is the unexplained variance.

The above methodology was used based on the covariance-based factor technique to address specific research objective two.

Discourse and Content Analysis

In addition to the partial least square approach to structural equation modeling (PLS-SEM) and the descriptive and inferential statistical tools employed in this study, we further made use of both the discourse and content analysis techniques to analyze the interview questions addressing specifically objective one which focus on challenges faced by farmers in

Ngoketunjia Division. The qualitative interview is seldom considered as a tool in discourse theoretical studies, but rather as analytical evidence (Cruickshank, 2012). Discourse analysis and analytical induction according to Hoyos and Barnes (2014) are important in making judgments out of interview in primary research studies. Woods (2011) indicates that as an analytical method, discourse analysis is based on two central ideas:

1. That language has historical and social significance that must be properly positioned. Communication is an effective means of gathering data at a specific point in time and within a specific community or population, and
2. Discourse research remains firmly fixed within social, cultural, political, and historical realms, rather than disengaging from or reducing the impact of meaning, as is usual in typically modernist science approaches.

Woods (2011) further noted that interview is a strong tool for collecting and analysing research information because it is a conversation with a purpose. Direct questioning or talking to individuals will yield a wealth of relevant knowledge about other people's experiences. This method of qualitative data processing was supplemented by a content-based inductive approach (Berger & Luckmann, 1966).

To ensure the authenticity and reliability of the interviews, we followed Alshenqeeti's (2014) guidelines, which included conducting pilot interviews, refraining from asking leading questions, taking notes during the interview process, and allowing interviewees to summarize and explain their points. As a consequence, the outcome is accurate and true (Woods, 2011). This approach is significant because it does not focus on the individual as the primary unit of study, instead attempting to identify cultural patterns in participants' accounts in order to analyze the phenomenon at a global scale (Talja, n.d). The focus of the study is on the contents of interview responses, which say something about phenomena or processes occurring in participants' inner or outer realities (Alasuutari, 1995). Since the participants'

inner feelings needed to be incorporated into the overall research process, this technique was required.

Content analysis, on the other hand, is a tool for explaining and quantifying phenomena that is systematic and objective (Krippendorff, 1980). It is important, according to him, for making replicable and accurate inferences from data to their context in order to provide information, new insights, a representation of evidence, and a realistic guide to action. Despite Morgan's (1993) claim that content analysis does not lend itself to statistical analysis, it was important in this study to understand and reflect the population's true value and beliefs. It helped us to examine the content of the interviews in terms of the messages' meanings, contexts, and intentions (Prasad, n.d). Since most closed-ended questionnaires are well-structured and do not allow participants to shade more light in their answers, interviews are the most effective way of revealing the inner realities of community members.

3.9 Testing for Relevance and Validity of Measurement Instruments

The technique of data analysis requires that certain properties of the various constructs should be tested before effectively using them in this study. Within this context, there are some pre and post-tests that were indispensable for a study of this nature. These tests include: multicollinearity, convergent validity, assessment of Average Variance Extracted (AVE), and Variance Inflation Factor (VIF), Q^2 statistics, f^2 statistics, amongst others were necessary to ensure the validity and reliability of the instruments used in the study.

The correlation matrix structure between the constructs was used to evaluate the issue of multi-collinearity in this analysis. Variables should normally be unrelated to one another. A high correlation value is undesirable because it can trigger problems in regression analysis when fitted. When the predictor variables have a perfect or exact relationship, it is difficult to come up with accurate estimates of their individual coefficients, according to Joshi (2012). In

other words, incorrect assumptions about the relationship between the outcome variable and the predictor variables would be drawn. This is because multi-collinearity inflates parameter estimates' variances, resulting in a lack of statistical significance for individual predictor variables, even though the overall model is meaningful. The variance inflation factor (VIF), which defines correlation between the different independent variables and the intensity of that correlation, was computed using SmartPLS3.0 version to test for multi-collinearity in this analysis.

In this chapter, we have shown that the survey design is the most suitable for gathering data in a view to solving the research problem raised in chapter one. This involves the use of questionnaire and interview. We further showed that a sample of 285 established statistically based on the Mensah and Castro (2014) approach was representative enough for the region. These participants have been demonstrated is selected randomly from amongst the farming population. Both descriptive and inferential statistics is necessary for analysing the first objective of the study while the partial least square approach to structural equation modelling is used to address the other objectives. The discuss and content analytics methodology was also incorporated to add value to verbal interview in the study. We have also demonstrated that both pre and post-tests such as the VIF test, Cronbach, multicollinearity t-test and probability values are necessary to validate the results.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS

This chapter presents and discusses the main results of the study. It opens up with an analysis of the demographic information collected from the participants in the study. The various objectives specified in chapter one will be addressed in this chapter in the order in which they appear. In this respect, the chapter will open up technically with an analysis of the challenges faced by farmers in the region, before examination of the effects of financial inclusion on the development of agriculture in the region. The pre-tests necessary for the validation of the data will be presented, the main results of the finding presented and discussed and the post tests used to validate the findings. The hypotheses stated in chapter one will also be tested in this chapter.

4.0: Analysis of demographic information

The individual characteristics are as important in research as the variables included in a scientific investigation. Limited evidence suggests that the behavior of variables is directly connected to the behavior of the population or sample that generate the variable. In this regard, some demographic characteristics of the population is analyzed to understand their interconnectivity with the cross-sectional data used in this study. Questionnaires were administered to 300 farmers as the study unit randomly selected. A total of 285 farmers completed and returned their questionnaires after continuous follow up and support from the field assistants used in this research.

Table 4.0a: Response Rate of Questionnaires

Number of Questionnaires	Total Number	Percentage
Questionnaires distributed	300	100%
Questionnaires returned	285	95%
Questionnaires unanswered	15	5%

Source: Computed by Author (2021)

Table 4.0a indicates that out of a total of 300 questionnaires given out to the sampled farmers in Ngokejunjia Division, a total of 95% (285) were returned while just 5% (15) of them were not return. Colin (2005) concluded that data obtained from questionnaires with a response rate of more than 75% is accurate and can be used for further study. The high success rate reported was due to the field assistants maintaining direct contact during the research process.

Frequency counts were performed on the data collected via the questionnaire. To put it another way, the highest degree of occurrence was calculated by adding the subjects' answers to each question (the number of times that a particular response occurs). Despite the fact that personal knowledge was not integral to the study, it was used to contextualize the findings and formulate specific suggestions. These responses to the questions are quantified and then shown in percentage form on tables.

4.0.1 Age distribution of the Respondents

Table 4.0b shows the age groups of the people who took part in our survey. This is important in understanding the activity rate of the farmers and in shaping policies for future agriculture in the region. The number of respondents per the different age brackets is presented as follows:

Table 4.0b: Age distribution of Respondents

		Frequency	Percentage
Valid	0-17years	15	5.3
	18-35years	35	12.3
	36-59years	180	63.2
	60+years	55	19.3
	Total	285	100.0

Source: Computed by author using excel 10.0 (2021)

The age of the farmers selected at random ranged from 16 to 65 years. Majority of the farmers (63.2%) fall within the age bracket of 36 to 59 years, followed by farmers of ages from 60 and above (19.3%). The least on the scale were farmers within the 0 to 17 age bracket, with a proportion of 5.3% of the total sampled of 285 farmers considered. It is evident that more than 60% were of ages above 30 years. This implies that a majority of the farmers were youthful population, making sustainability of agriculture very possible in the region. However, the act that the proportion of old persons (60 years and above) was significant also raises concern over long term activity and the ability to meet food self-sufficiency. It was also exciting to find out that children as young as 16 years were taking to the farms. However, these young respondents inherited already developed farm lands from late parents. According to Fai (2017) the youth make up 60% of Cameroon's population, and they are the ones who will keep the agricultural sector thriving. This also means that the majority of the respondents were adults, not children, and therefore their opinions could be trusted.

4.0.2 Gender distribution of the Respondents

The gender status of respondents had to be indicated. Male and female are the two genders. Table 4.0c presents the distribution of the sampled population according to sex.

Table 4.0c: Gender distribution of Respondents

		Frequency	Percentage
Valid	Male	195	68.4
	Female	90	31.6
	Total	285	100.0

Source: Computed by author using excel 10.0 (2021)

Table 4.0c indicates that out of the total 285 respondents selected for this investigation, 195 (68.4%) were males while 90 (31.6%) were females. More males were involved in the study than female. While this may mean that males were seen to be more interested in agriculture, the second dynamics is that the community is inhabited by a significant proportion of Moslems who prefer their wives to stay back and carter for the children. Also, some women were reported to deliberately refuse taking part in the survey as a sign of respect for the male folks. However, and despite the situation, Petroli (2003) reported that majority (89.3%) of farmers in Ngoketunjia Division who are registered in the Ndop Farmers' Association Zone (NFAZ) were males. Agricultural activities require a lot of physical energy and males are more likely to be involved than females.

4.0.3 Marital Status

The condition of being unmarried, married, widowed, or divorced is referred to as marital status. Farmers' status in this regard is important, especially in rural areas, because family labor is one of the most important factors determining agricultural productivity and output in many parts of the world. Large families have been discovered to have the required manpower for soil tilling (Fai, 2017). The distribution of farmers in this regard is seen in Table 4.0d.

Table 4.0d Marital Status

		Frequency	Percentage
Valid	Single	50	17.5
	Married	170	59.6
	Widowed	50	17.5
	Divorced	15	5.3
	Total	285	100.0

Source: Computed by author using excel 10.0 (2021)

As can be seen in Table 4.0d, out of the 285 farmers registered in this study, 50 (17.5%) were single; 170 (59.6%) were married, 50 (17.5%) Just 15 (5.3 percent) said they were divorced after being widowed. The majority (nearly half) of the respondents (59.6%) are married, according to these statistics. As illustrated above, this revelation has significant implications on the supply of local labour to power the farming process in the region. Adam (2015) in examining the impact of financial inclusion on agricultural growth observed that while family labour is important, males are mostly involved because of the high energy requirement.

4.0.4 Academic Qualification

Table 4.0e presents the educational qualification of the farmers as captured using the structured questionnaire. Out of the 285 effective respondents, 180 (63.2%), had no formal education, 60 (21.1%), 10 (3.5%), 15 (5.3%), 15 (5.3%) and 5 (1.8%) are holders of first school leaving certificate (FSLC) which is the basic primary education certification in Cameroon obtained after 6 years of primary/elementary studies, General Certificate of Education (GCE) Ordinary Level, GCE Advanced Level, representing junior secondary and senior secondary graduation certificates in Cameroon, respectively obtained after five years and 2 years of secondary education, Bachelor Degree, Master Degree and above respectively, which represent certifications from higher education or the university system also obtained after three years, two years and respectively. This implies that majority of the farmers in the region are uneducated through the formal system of education. This is a challenge especially

within the context of rapidly changing technology and most especially for the sustainability of agriculture in the long term.

Table 4.0e: Level of education of the farmers

		Frequency	Percentage
Valid	No formal Education	180	63.2
	FSLC	60	21.1
	GCE A/L	10	3.5
	GCE O/L	15	5.3
	Bachelor Degree	15	5.3
	Master Degree and Above	5	1.8
	Total	285	100.0

Source: Computed by author using excel 10.0 (2021)

However, despite the high numbers of reported farmers with no formal education, it was equally interesting to observe that few educated individuals did recognize the relevance of agriculture and engage in it. Ngoketunjia Division is one of the unexploited production basins in Cameroon with huge agricultural potential. The area can only be fully exploited if farmers become educated so as to see the take advantage of the opportunities provided by the natural environment.

4.0.5 Main Occupation of the Respondents

Tough the main occupation of a majority of the farmers (71.9%) was farming, their practices were not business accommodating. This implies the absence of the concept of second generation agriculture which is actually agriculture as a business. Many of the farmers in the region practice subsistent agriculture with only excesses (if any) taken to the market for sale. For agriculture to give better return, it must be considered as a business, and innovative

business models put in place to optimize its value. However, as Table 4.0f indicates, income from agriculture was complimented by income from other sources such as small businesses (petit trading).

Table 4.0f: Main occupation of respondents

		Frequency	Percentage
Valid	Farming	205	71.9
	Small Business	50	17.5
	Teacher/Nurse/Doctor	10	3.5
	Other (Specify)	20	7.0
	Total	285	100.0

Source: Computed by author using excel 10.0 (2021)

Very few proportions of the sample involved in this study (3.5%) had main occupation outside farming such as teachers, nurses and other white-collar job operators. A reasonable fraction of the population (17.5%) was reported to be engaged in the running of small businesses, while about 7% were reportedly engaged in other activities such as documentation and motorcycle riding to supplement farm income.

4.0.6 Longevity in Economic Activity

The following results are discussed in order to comprehend the number of years that the respondents have worked in the field of agriculture. Table 4.0g shows the number of years respondents in the study region have been around.

Table 4.0g: Years of Experience in Economic activity

	Category	Frequency	Percentage
Valid	0-5years	48	16.8
	5-10years	17	6.0
	11-20years	175	61.4
	21+years	45	15.8
	Total	285	100.0

Source: Computed by author using excel 10.0 (2021)

Table 4.0g indicates that 48 (16.8%) of the farmers have been involved in agriculture for a period of 0 to 5 years; 17 (6%) for between 5 to 10 years, 175 (61.4%) for 11 to 20 years and 45 (15.8%) for 21 years and above. This implies that a majority of the farmers have gained significant experience in the area of agricultural practices in the region. This further implies that there is high reliability in the information collected given the level of experience accumulated by the farmers.

The empirical investigation and analysis that follows are based on component-based partial least squares structural equation modelling. In order to estimate the model as specified in an attempt to attain the research objectives, relevant tests or assessments are necessary. Using Smart PLS 3.0 statistical applications, two forms of analyses were performed on the hypothesized mathematical construct: an assessment of the outer measuring model and an assessment of the inner structural model. In science circles, this is a mathematical package with a visual and tabular user interface that is best suited for analyzing variant-based structural equation models. When the measurement approach is based on partial least square procedures, the program produces improved outcomes.

4.1: Pre-tests of constructs

4.1.1 Assessment of Outer Measurement Model

The outer estimation model defines the relationship between variables and their indicators in a theoretical context. Convergent and discriminant validity is tested on the calculation model.

Convergent validity is an internal consistency metric that guarantees that the parameters used to calculate each variable are measuring that variable and not other variables. Cronbach's alpha, Composite reliability ratings, and Average Variance Extracted are three parameters that can be used in partial least squares path modeling to assess the convergent validity of the measured structures (AVE).

Composite stability and cronbach's alpha were used to measure the internal consistency of the constructs or variables in this study. If items have an item loading of at least 0.70 from PLS, it ensures they share more normal variance with the construct than error variance, which is one measure of scale reliability (Carmines et al. 1979). A second approximation is Fornell and Larcker's (1981) internal precision estimation, which is used in PLS research (Chin 1998). The aim of this review is to get a score of at least 0.70. Cronbach's alpha coefficient Nunnally et al., (1994) is the third and final common method for calculating reliability, with alpha scores greater than 0.70 considered accurate. Average Variance Extracted is used to determine validity, which is interpreted as how well data collection procedures reliably assess what they were designed to calculate (Saunders and Thornhill, 2003). The following validity and reliability tests were performed to satisfy the validity protocol:

4.1.2 Convergent Validity

In this study, the cronbach's alpha and composite reliability index were used to determine internal accuracy. When an object has a loading of at least 0.70 from PLS, it means they share more common variance than error variance (Carmines et al., 1979), and alpha scores greater than 0.70 are considered accurate (Carmines et al., 1979). To operationalize these results, the interpretation is that the question items asked as proxies to financial inclusion and agricultural development were relevant. In other words, they truly represented and measured both concepts under investigation. Furthermore, the set of items used to measure each

construct was consistent in the measurement process and hence the results we obtain are not by chance or due to some random effect.

According to table 4.1, all of the computed values are greater than 0.7, which is the base point for acceptance. This means that objects have a high internal accuracy rating in aggregate and are therefore considered accurate in measuring what they were designed to measure. To put it another way, the measurement error is low, so the data can be used for further study.

Table 4.1 Construct Reliability and Validity Test

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
ACF	**0.790**	**0.994**	**0.784**	**0.686**
PROD	**0.861**	**0.883**	**0.895**	**0.636**
ENT	**0.781**	**0.713**	**0.761**	**0.502**
WC	**0.771**	**0.753**	**0.809**	**0.537**

Source: Researcher's Findings (2020)

The Cronbach's alpha and the composite reliability index have high or adequate scores for all of the constructs used in the study, especially access to finance (ACF), agricultural production (PROD), education and training (ENT), and weather condition (WC). Cronbach alpha is similar to the composite reliability ranking, but it takes into account various object loadings of the indicators derived from the theoretical model. A decent model, according to most previous research, should have a cronbach's alpha rating of greater than 0.7 and composite reliability scores of greater than 0.7 (Rahman and colleagues, 2013). The reliabilities of all build composites are greater than 0.70, indicating adequate internal consistency.

The average variance derived (AVE) is a statistic that compares how much variance a latent variable captures from its measurement elements or indices and how much variance is captured due to measurement errors. AVE should be greater than 0.5, according to Fornell and Larcker (1981), meaning that the latent variables consume at least 50% of the

measurement uncertainty. Since they have no explanatory ability, low-loading indicators should be excluded from the model (Aibinu and Al-Lawati, 2010).

As seen in table 4.1, all of the latent structures under research, including access to credit, agricultural production, schooling and training, and weather conditions, have AVE values and factor loadings of at least 0.5. For both objects, all products have strong loadings, with the majority reaching 0.60, suggesting convergent validity. Convergent validity was defined as a result of following this criterion.

4.1.3 Discriminant Validity

The Fornell–Larcker criterion and the Cross loadings test, which show how distinct a variable is from other variables, are two measures used to determine discriminant validity (Hulland, 1999). The Fornell and Larcker (1981) parameters are used to assess discriminant validity at the construct level, which ensures that a variable shares more variance with its assigned measurements than with all other variables. Each variable's AVE should be higher than every other variable's highest squared correlation. Table 4.2 shows the correlation matrix of the factors, with the main diagonals representing the square root of the calculated average variance (AVE).

Table 4.2: Fornell-Larcker Criterion

	ACF	PROD	ENT	WC
ACF	**0.697**			
PROD	-0.119	**0.798**		
ENT	0.110	0.508	**0.549**	
WC	0.180	-0.485	0.491	**0.733**

Source: Computed by Author using SmartPLS3.0 (2020)

The diagonal items in the table represent the square root of AVE, which is a measure of variation between a construct and its indicators, while the off-diagonal items show squared similarity between constructs. As seen in the factor association matrix in Table 4.2. The AVE with the lowest value was 0.549 (for education and training constructs), which is greater than

the largest squared association between any two constructs (0.508) (between education and training and production). The AVE of the individual factors was lower than the mutual variance between factors, meaning that discriminant validity was confirmed. The survey items have ample convergent and discriminant validity, according to the results of studies of reflective objects and related structures.

The second criterion is cross loads, requiring the loads of the indicators on their own variable structures to be higher than any cross loads with other variable constructs (Chin, 1998). The cross-charge effects are seen in Table 4.3, which shows that all studies agree that the variables or configurations of the model are of discrimination. Indicator loads for access to finance, for example, are more than all other variables or structures and its indicators acf1, acf 2, acf4 and acf5. This checks the discriminant criteria of validity cross loading.

Table 4.3 Cross Loadings Factor Analysis

	ACF	PROD	ENT	WC
acf1	0.943	0.135	0.143	0.186
acf2	0.896	0.073	0.083	0.160
acf4	-0.365	0.036	0.022	-0.032
acf5	-0.342	-0.029	0.031	-0.035
prod1	0.064	0.903	0.411	0.369
prod2	0.183	0.645	0.481	0.551
prod4	0.024	0.826	0.308	0.210
ent1	-0.002	0.346	0.700	0.259
ent2	0.009	0.434	0.825	0.246
ent3	-0.056	-0.123	-0.177	-0.139
ent4	0.143	0.116	0.302	0.123
ent5	0.256	0.222	0.464	0.656
prod6	0.069	0.905	0.459	0.386
wc1	-0.216	0.201	0.196	0.355
wc2	0.131	0.356	0.263	0.682
wc5	0.244	0.400	0.523	0.890
wc6	0.205	0.419	0.398	0.874
prod8	0.072	0.669	0.084	0.132

Source: Computed by Author using SmartPLS3.0 (2020)

A new approach for the estimation of discrimination validity in partially small squares in structural equation modelling is the heterotrait-monotrait (HTMT) correlation ratio and is one of the main facets of model analysis. Before discrimination is identified, researchers cannot rest assured of the correctness or merely the statistical difference of the findings that support the structural paths suggested. Table 4.4 shows the implications of the HTMT scale.

Table 4.4: Heterotrait-Monotrait Ratio (HTMT)

	ACF	PROD	ENT	WC
ACF				
PROD	0.121			
ENT	0.498	0.678		
WC	0.399	0.548	1.023	

Source: Computed by Author using SmartPLS3.0 (2020)

For instance, Fornell-Larcker parameters and (partial) interloading are not normally able to detect a lack of discrimination, whereas the HTMT criterion clearly exceeds them. Validity of two reflective systems was discriminated against when the value for HTMT is less than 0.90. The research constructs pass the discriminating HTMT validity test. When all values are less than 0.90, a discriminatory meaning between two reflective structures has been established. Both constructs have been used to evaluate the structural model in a general way using the above precise and true constructs.

4. 2: Inner Structural Model Assessment

The next step is to evaluate structural model accuracy when the structures in the measurement model are certified as stable and accurate. This involves an examination of the model's ability to predict results and the links between the buildings. Criters such as a multi-coordinarity, T-statistics and a path coefficient (O value), effect size and predictive relevance of the model are taken into account when analyzing the internal structural model.

4.2.1 Assessment of Multicollinearity Structural Model

In structural models, it's important to look for substantial levels of collinearity between predictor and explanatory variables. The outer variance inflation factor (VIF) and inner VIF values are used to look for multicollinearity in the path model using SmartPLS 3.0 linear regression. In theory, a variance inflation factor of 5.0 or more indicates the existence of a multi-collinearity problem (Henseler et al., 2009).

Table 4.5a: Outer VIF Values

	VIF
acf1	2.203
acf2	2.202
acf4	**1.730**
acf5	**1.725**
prod1	**2.109**
prod2	**1.272**
prod4	1.499
ent1	**1.174**
ent2	**1.235**
ent3	**1.078**
ent4	**1.091**
ent5	**1.063**
prod6	**1.901**
wc1	**1.036**
wc2	**1.253**
wc5	**2.442**
wc6	**2.355**
prod8	**2.161**

Source: Computed by Author using SmartPLS3.0 (2020)

There is no question of multicollinearity between the predictor constructs and the predicted values, as seen in Tables 4.5a and 4.5b, because the values are all below the tolerance limits of 5.0. The magnitude of the VIF is 2,442 for external and 2,466 for internal values, showing that there is no multi-coordinarity and the variables are thus suited for further analysis. The predictor correlation has been ineffective because it results in poor conclusions and distorted findings, according to Jamal (2017).

Table 4.5b: Inner VIF Values

	ACF	PROD	ENT	WC
ACF		1.466		
PROD				
ENT		1.575		
WC		2.320		

Source: Researcher's Findings (2020)

Identifying suppressor variables in research is very relevant to ensure consistency of findings and relevance of recommendations. According to Akinwande, Dikko and Agboola (2015) a suppressor variable captured by multicollinearity presence should only is allowed in a regression analysis if its VIF is less than five (5), consistent with the findings and observations in table 4.5a and 4.5b.

4.3 Presentation of empirical results

4.3.1 Analysis of the challenges faced by farmers in Ngoketunjia Division

The first objective of this investigation was focused on examining the challenges faced by farmers in one of the largest production basins in the North West Region of Cameroon. In attempting to attain this objective, information was collected from the sampled population with the use of questionnaire and complemented with interview that was conducted with 22 farmers. Data collected from the farmers through this process are summarized in the paragraphs that follow:

4.3.2 Problem of pest and diseases

It may be sad to report that in the 21st century when paste and diseases have largely been brought under control in many parts of the world is still a major problem to agriculture in Ngoketunjia Division of the North West region of Cameroon. At least 85% of the farmers interviewed reported that insects, termites and other unidentified pray have made perishable products like tomatoes go out of the market. While the demand for this product and many remain high, supply is in danger due to pest and disease. This problem is compounded by

lack of capital to acquire chemicals that can help prevent these insects praying on the farm produce.

Furthermore, rice and maize farming which are some of the most commonly cultivated cash crops in the region face similar challenges of cows, goats, pigs and other animals praying and feeding on them just when they are mature for harvesting. The nomadic nature of the cattle and their breeders especially during the dry season in search of food and water has constantly keep farmers and cattle breeders at logger heads in the region. According to the traditional leadership in the region, one of the greatest cases settled every year is farmer grazier conflict. This problem needs serious attention given that all the 285 farmers reported it as a constraint to agriculture in the region.

There is the virtual absence of chemical and other inputs to fight the pest and diseases. The issue of lack of quality inputs in the production process was reported by at least 93% of those involved in the survey. Fertilizers and pesticides in high demand are not readily available, and when they are, the cost is unbearable for most of the local farmers. These inputs sometimes are out of reach of the farmers because there is no local production.

4.3.3 Price fluctuation and lack of credit facility

In addition, constant fluctuation in market prices of especially agricultural products does not allow the farmers to do long term planning. There is high risk and uncertainty concerning investment in the area of agriculture particularly because many of the determinants of yield according to the farmers 42.5% of the respondents are outside their influence. This means that natural forces continue to dominate in terms of determining the outcome of the farming process in Ngoketunjia Division. According to them, without price stability, borrowing to finance agriculture is risky.

The absence of mainstream financial institutions in the region partly explains why the borrowing culture is lacking in investors or farmers in the region. Though some local microfinance institutions exist, the conditions for borrowing excludes many farmers from accessing loan or micro credit to power the farming process. At least 75% of those involved in agriculture are small scale farmers who lack the necessary collateral security required by these financial institutions as condition for accessing credit. 95% of the respondents indicated that though risky to borrow due to variability and uncertainty about farming, they could borrow to finance production if the lending conditions were favourable.

4.3.4 Cultural challenge or limitation

The population of Ngoketunjia have cultural characteristics that do not allow them to take advantage of available opportunity and maximize gains. The idea that agriculture is for feeding of the household is still very active in the region where farmers produce mainly for consumption. This explains partly why despite widely available and fertile lands, many portions remain fallow year in year out. In other words, the concept of second-generation agriculture being promoted by the government of Cameroon is yet to be embraced by the population of Ngoketunjia. They do not see agriculture as business but as a means of providing the necessary food for the households in which only surpluses are any are taken to the market for sale.

Also, the idea that some days are reserved as “traditional or cultural days” in which no farming takes place partly accounts for low production of agricultural commodities by the farmers. In a normal week of seven (07) days, at least three (03) of such days are usually kept aside such as “Small Country Sunday, Big Country Sunday, Ngumba Days”. The tradition is that if one goes farming during such days, evil or something bad (including possible death) can happen to such individual. These are practices that should be discouraged in this 21st Century. Since some of the populations are Christians and others Moslems, a further day is

lost for Friday prayers in the mosque or Sunday worship in churches. In the absence of these traditional holidays, farmers' productivity could be doubled under conditions of ceteris paribus, that is, if a farmer uses just three effective days in a week and produces 20kg of output, such produce could double if the farmer has the opportunity to work for six consecutive days.

4.3.5 Absence of farm to market roads and storage facilities

As if it is the new normal in Cameroon, most of the production basins are highly enclave. There is a serious challenge of lack of access road to evacuate farm produce to the market. Most perishable products apart from the issue of pest and diseases earlier mentioned gets bad before reaching the market due to extremely poor farm to market road where they do exist and its complete absence elsewhere. There is need to dis-enclave all the farms by constructing more roads and rehabilitating others to allow for easy movement of produce to the market. At least 89% of the respondents of the survey highlighted that transportation is one of the challenges they face. The absence of good farm to market roads have make transport cost too high for the farmers, making profitability insignificant and as a consequence driving away people who could have venture in agriculture as a business.

Furthermore, the absence of relevant and affordable warehouses makes storage of produce very challenging. Irish potatoes, rice, tomatoes, carrots and many other crops have been reported to have gotten bad because of the absence of good storage facility. Special warehouses are required for the storage of perishable crops so that it could serve the population in general and farmers in particular better.

Data collected further suggest that the farming population is getting old while the youthful population are not very much interested in agriculture. This was a major challenge affirmed by all the 49% of the participants involved in this study. Information from these

representatives suggests that less than 5% of farmers are made up of youths, who are not taking agriculture as a main occupation. This has serious and far-reaching implications on the sustainability of agricultural production and food self-sufficiency model for the country.

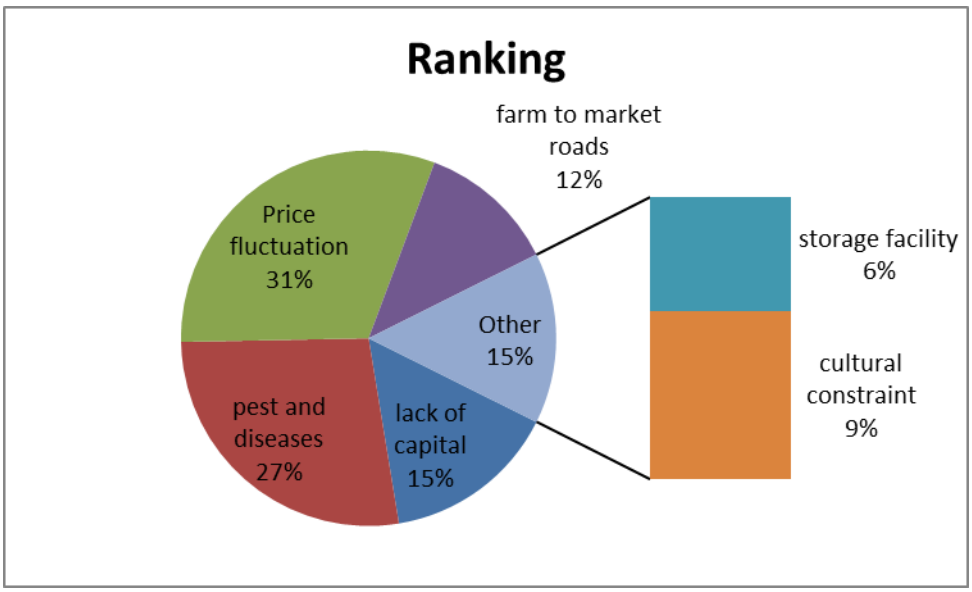

Figure 4.1: Ranking of opinion about farmers challenges

Source: computed by author using field statistics

In terms of ranking farmers opinion in relation to the challenge that they face in the practice of agriculture, the farmers interviewed prioritized price fluctuation, pest and disease and the lack of capital as major hindrances to the development of agriculture in Ngoketunjia Division. With stability in prices, availability of finance and pest and disease brought under control, farmers would be able to hire labour, buy inputs as well as educate themselves on best production practices that would consequently increase output and productivity.

Furthermore, though the absence of farm to market road, lack of storage facility and cultural constraints were ranked low, their implications on the productivity of agriculture and the development of value chain cannot be undermined. Any culture that is counterproductive is uncalled for in the world of business. Figure 4.1 reveals that 6% of the farmers consulted require modern storage facilities to enhance their production, while 9% lamented the negative

consequences of the culture of the people on productivity and agricultural development in general. While the farmers never saw educational attainment as a challenge for production and sustainability of agriculture in the region, they recognised the role farm inputs can play in enhancing total production in the region.

The weather condition was also reported to have impacted farming activities in particular and agriculture in general in the region. Excessive rainfall damages crop and reduce yield and the effects are compounded by too much sunshine at the other extreme. Too much rain also cases other pest to flourish, thereby indirectly affecting the crop yield per hectare. Farmers reported that high speed wind in the last two years damaged maize crops and reduced the yield considerably. Unfortunately, there is no insurance cover for such risk faced by the farmers. In Cameroon in general and the region in particular, the government enforces third party liability insurance more than any other insurance cover. Legislation may be limited on the enforcement of insurance policy in the area of agriculture, particularly as the farming population are largely uneducated. Even the compulsory vehicle insurance enforced throughout the national territory is not bought by all vehicle owners, as they continue to bride themselves out of police check points.

4.3.6 Analyses of the extent to which the existence of financial institutions and access to financial resources affect farmers' output (production) in Ngoketunjia Division

In other to achieve the research objectives two and three relating to the role of financial resource availability and the existence of financial institutions on the productivity of agriculture in Ngoketunjia Division, the study employed the path regression analysis. Path analysis is a technique introduced by Sewall Wright to determine if a multivariate collection of non-experimental data corresponds well with a certain a priori causal model (Karl, 2016).

4.3.7 Coefficients (O values) and T-statistics value

Path coefficients are used to assess the structural model and the significance of the hypothesis (original sample). The squared multiple correlations (R2) for a latent endogenous variable are used to analyze partially least square trajectory model, rather than the usual results that are divided into the model, showing how well the model matches the supposed connection. The bootstrapping method is used to figure out how important a theory is (Chin, 1998). A bootstrapping procedure for approximating the route coefficients was used with 285 subsamples. The initial poll, mean sample, standards variance, T-statistics, and probability are listed in Table 4.6. The T values represent the coefficients of hypothesized path.

Table 4.6: Path Coefficients (Mean, STDEV, T-Values)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
ACF -> PROD	-0.017	-0.011	0.064	0.261	**0.795**
ENT -> PROD	0.376	0.380	0.053	7.127	**0.000**
WC -> PROD	-0.316	-0.322	0.076	4.131	**0.000**

Source: Computed by Author using SmartPLS3.0 (2020)

The measurement indicators for financial inclusion in this study are the availability of financial institutions and access to finance, while education and training and weather condition were control variables. The following hypothesis was tested using path regression and the results are as seen in table 4.6.

Out of the 17 indicators used to capture the constructs' availability and assess to financial resources, 14 were significant in this measurement. The coefficient of availability and access to finance as an indicator of agricultural productivity is -0.017 as presented in Table 4.6. This means that the lack of access to financial resources largely due to the absence of mainstream financial institutions and high rates charged by the limited microfinance institutions in the region is negatively impacting agricultural productivity. In other words, the availability of financial resources through access to finance is limited and hence the

contribution to agricultural productivity is less than expected (marginal). This result literally means two things: (1) that farmers in the region do not have access to financial resources as banks are limited and farmers lack the requisite collateral and (2) that because of the lack of access to financial resources, it cannot contribute to agricultural development in the region. However, this finding is in conformity with established theories that lack of financial inclusion will inhibit agricultural development whereas access to it facilitate and promotes growth.

This result indicates that a 1 unit change in access to finance will bring about 0.017 unit change in the productivity of agriculture in the region. In other words, improvement in access to finance will enhance productivity. Hence, lack of access to finance does hinder agricultural productivity in the region. The negative value is interpreted in terms of lack of access to finance rather than finance negatively affecting agricultural productivity. As a consequence, it is possible for finance to enhance or support agriculture through its effective use, for, access to financial resources in itself without effectiveness in its use will not enhance agricultural production.

This result is insignificant at any of the acceptable social science threshold limits of 1%, 5% and 10% respectively. This means theoretically, the negative finding cannot be used for forecasting. In other words, there is insufficient evidence at 99%, 95% or 90% confidence interval to support the idea that access to finance will negatively impact agricultural productivity in the region. A T-value of 0.261 and a probability value of 0.795 support this.

In summary, the findings of objectives two and three relating to the effects of the availability and access to financial resources on agricultural development shows that:

1. Access to financial resources in Ngoketunjia Division is highly limited due to lack of collateral security by a vast majority of the farmers in the region and hence its

contribution to productivity is insignificantly low with a coefficient of -0.017. This result means that at the moment, there is limited access to financial resources by the farmers. This is justified by the negative coefficient of parameter estimated. As explained above, any unit change or positive development in line with making financial services closer to the farmers will enhance productivity and vice versa.

2. Availability of finance institutions captured in the financial inclusion variable is also insignificantly negative. This means that financial institutions are scanty in the region. No commercial bank exists in the region with only spotted credit unions (microfinance institutions) that have rather departed from the traditional mission of providing services to the poor. In fact, microfinance institutions today are for the rich and well to do as interest rates are exorbitant (sometimes above 12% per annum), further excluding the poor farmers from benefiting from loan schemes. The mere availability of the few, limited or scanty microfinance institutions in the region does not translate to improved farm productivity because farmers are actually excluded from its services. However, availability of financial institution is a necessary condition but not sufficient to stimulate agricultural productivity in the region.

Apart from access to finance and availability of financial resources, other factors are responsible for explaining the productivity of agriculture in the region. As specified in the theoretical model in chapter three, the level of education and training attained by farmers affects the level of implementation of technology and hence determine the output of the farmer. The path regression result on Table 4.6 shows that education and training (ENT) positively and significantly influences agricultural productivity in Ngoketunjia with a coefficient of 0.376 and T-value of 7.127. This t-value indicates that the result is significant at 5% level. This implies that education and training significantly contribute to productivity as it, enlightens farmers, allowing for mind transformation while training builds the necessary

technical capacity for the adoption and implementation of technology driven approach to farming. While majority of the farmers did not attend formal education, a lot of informal training was reported to have taken place with the help of common initiative groups and the government. In the field of agriculture, technological transition necessitates less formal schooling and more direct learning through on-the-ground skill building and exchange of best practices. This explains why, as a latent construct, education and training has an important and positive impact on the productivity of farmers in the area.

The result is significant at 1% with a probability value of 0.000. A 0.00 probability indicates the highest significant level and exactness in statistical testing for the result obtained. This means that there is at least a 99 percent chance that informal farmer capacity building in the area has a substantial positive impact on farmer productivity. In other words, with a coefficient of 0.376, the improvement in productivity is directly proportional to education and training. This means that a unit increase in education and training (improvement) would result in a 0.376 unit increase in agricultural productivity in the area, and vice versa. As a result, education and training are important considerations in the agricultural sector.

Furthermore, the weather has a major and negative impact on the region's agricultural production. The coefficient of -0.316, T-value of 4.131, and Probability value of 0.000 are all found in the weather situation (original sample). This means it has a huge indirect negative impact on agricultural productivity. Climate conditions have an adverse effect on the level of output of agricultural products to the tune of 0.316 unit point. This explains why a unit shift in weather causes a negative return on productivity of up to 0.316 unit point. As a result, the atmosphere is not conducive to farmers' productivity.

Weather condition, which comprises a set of environmental factors beyond the control of man therefore, has consequences on the production of the local farmers in the region. The amount

of rainfall, its variability, sunshine, climatic factors such as temperature, humidity, are all environmental or weather conditions related to agricultural production in the region. This is explained by the fact that not all commodities require excessive rainfall, sunshine and other climatic variables. Unfortunately, these indicators are out of the control of man, especially as Ngoketunjia is found in a third world country where greenhouse production technology is completely absent. The farmers therefore are at the mercy of nature when it comes to productivity of their farms. This explains why output varies throughout making economic and financial forecasts extremely difficulty for the farmers.

4.4 Hypotheses Testing

After examining the empirical findings of this study, it is time to test our pre-formulated hypothesis. This process is meant to verify if our tentative guests about the subject matter were valid or not. Two main hypotheses were formulated for this study and will be tested as follows, starting with the relationship between financial inclusion and agricultural development:

4.4.1: Testing of hypothesis one: There is a statistical significant effect of financial inclusion on the agricultural productivity in Ngoketunjia Division

The test of hypothesis is conducted based on the significance level reported by the T-value and P-values of the constructs in the model and the result presented on table 4.6. From the findings presented on Table 4.6, there is an insignificant negative relationship between access to finance and availability of financial institutions on the productivity of agriculture in the region based on the probability and T-value at reasonably accepted levels of significance, that is, between 1% and 10%. In other words, the hypothesis that there is a significant effect of access to finance and availability of financial institutions on the productivity of agriculture in the region is rejected. This is based on the fact that there is no statistical evidence supporting

the fact that access to finance and availability of financial resources significantly influence productivity. Consequently, we fail to accept the null hypothesis of this study.

4.4.2: Testing of Hypothesis two

We advance to test the hypothesis relating to education and training using empirical statistical data as follows:

H_o: Education and training does significantly affect the agricultural productivity in Ngoketunjia Division

The effect of education and training on the productivity of agriculture in Ngoketunjia Division was found to be positive and significant at 1% level, implying 99% reliability or confidence. This implies that education and training significantly affect output in the region. This finding permits us to accept the hypothesis as education and training have been demonstrated to significantly affect the productivity of agriculture in the region. There is lack of sufficient statistical evidence to reject the hypothesis, given its probability value of 0.00.

4.4.3: Post estimation tests

The forecasting power of research models is largely determined by the post test, which is out to ascertain the validity of empirical findings. In this study, we conducted a series of post-tests to help consolidate the positions established in the results above. The following are therefore considered relevant in this study:

4.4.4 Multiple Determination Coefficient (Assessing the value of R^2)

The PLS path models show major, reasonable, and small, respectively, square correlation values 0.67, 0.33, and 0.19 as measures of multiple determination. A small R^2 value reflects the inability of the explanatory variables to account for significant changes in the dependent constructs in the model while a high of moderate value shows the strength of the explanatory

construct. The R^2 of each dependent latent construct is less than 0.4, as seen in Table 4.7, which means that the effect is moderate. This illustrates how improvements in the financial inclusion variable (measured by the availability of microfinance institutions and access to accessible financial resources) influence productivity, as well as other exogenous latent constructs such as education and training, and weather variability.

To put it another way, the R^2 value obtained from PLS path regression results indicates how well the explanatory variables jointly account for variation in the dependent construct, as measured by agricultural productivity in the Ngoketunjia division. The exact result reveals that a 1% change in these independent or explanatory latent constructs results in a 34.3% difference in performance, with the remaining 65.7% generated by factors not used.

Table 4.7: R Square

	R Square	R Square Adjusted
BD	0.343	0.332

Source: Computed by author using SmartPLS3.0 (2020)

Both the adjusted and the R^2 values are significantly low, justifying that there are many other factors that jointly determine the productivity of agriculture in the region. While acknowledging the role played by access to finance, education and training as well as variability in natural conditions, it is important to note that these conditions without a veritable market for the sale of the produce will not spur productivity. Ngoketunjia Division is essentially an agrarian economy where subsistent farming is predominant. This is particularly important in justifying the case against the contribution of finance availability to the output. Unless second generation agriculture (agriculture for or as a business) is imparted on the population and seen as productive investment, farmers will continue to aim at subsistence. Even when ready market exists for the sale of the products, farm to market road, post-harvest management difficulties and lack of adequate storage facilities would prevent

farmers from optimizing the value of land in the region. In other words, these other factors, amongst others account for the remainder 66% of variation in agricultural productivity in the region. Policy issues regarding the stimulation of agriculture should as a consequence consider these factors.

4.4.5 The Effect size coefficient (f2)

Each predictor structure's impact on the dependent structure is calculated by effect size. Once an independent construct is excluded from the PLS Path Model, it is measured that the changes in the square correlation values have a substantial effect on the significance of the dependent construct. For calculating the effect size f 2 the following equation can be used (Chin, 1998).

$$f^2 = \frac{R^2\text{included} - R^2\text{excluded}}{1 - R^2\text{included}}.$$

The predictor or independent build have a strong effect in a systemic phase when f 2 is 0.35, mean when f 2 is 0.15, and little when f 2 is 0.02 (Cohen, 1992). The results and conclusions are summarized in Table 4.8.

Table 4.8: Cohen's f square (f^2) results

	ACF	PROD	ENT	WC
ACF		**0.000**		
PROD				
ENT		0.137		
WC		0.058		

Source: Computed by author using SmartPLS3.0 (2020)

From Table 4.8 financial inclusion observed through availability and access to finance resources has the smallest effect of 0.000 on productivity. This implies that they represent a very weak negative effect on agricultural productivity in the region. This conforms to the result earlier presented on Table 4.5. It can also be observed that education and training have an f square value of 0.137 and weather condition of 0.058 which all falls within the range of

moderate effects on agricultural productivity. The Cohen's effect size, according to Selya et al., (2012), allows for the evaluation of local effect size, i.e., the effect size of one component within the range of a multivariate regression model. As previously stated, a moderate impact size further supports the null hypothesis. In addition to null hypothesis validity checking, effect sizes have a metric of functional significance in terms of the extent of the effect that is independent of sample size (Selya et al., 2012). As a result, our sample size is called independent, and the significance of the explanatory variables is known.

4.4.6 Model's Predictive Relevance

To evaluate the precision of a partial least squares path model, Q2 statistics are calculated. By blindfolding itself and repeating the observed values, the model is able to estimate (Tenenhaus et al., 2005). Q2 greater than zero (0) in structural equation models indicates that the formula is predictively significant, while Q2 less than zero (0) indicates that it is not. As a relative indicator of predictive significance, values of 0.02, 0.15, and 0.35 indicate that an exogenous construct has a low, medium, or high predictive relevance for a given endogenous construct, respectively.

Predictive relevance is a crucial test for determining model validity; it is a post-test in which the Q2 metric is an indicator of a block of manifest variables' predictive relevance (Stone, 1974). If a tested model has a significant predictive relevance, we expect the Q^2 statistics to be greater than zero. From the finding in Table 4.9, there is strong evidence of predictive relevance. Availability of financial institutions and access to finance has a coefficient of Q^2=0.259 while weather condition has Q^2 value of 0.287. These two manifest variables have medium predictive relevance on the productivity of agriculture in Ngoketunjia Division. Furthermore, education and training with Q^2 value of 0.038 indicate a small predictive relevance on agricultural productivity in the structural model and in the region. Based on the

work of Cohen (1988), the model comprised of the manifest variables has predictive relevance and thus important for forecasting and decision making. This test further confirms the one conducted on the test of statistical relevance of the result based on the student T-statistic and the probability value.

For the measure of two types of Q2 statistics, blindfolding techniques can be employed: cross validated communal and cross validated redundancies. The cross validated community methodology evaluates the ability of the model to anticipate metrics from its structures directly using a cross validation and a calculation model. Table 4.9 shows the Q2 values for the tested building community.

Table 4.9: Construct Cross validated Communality (Total)

	SSO	SSE	Q² (=1-SSE/SSO)
ACF	1,600.000	1,186.171	0.259
PROD	2,000.000	1,106.568	0.447
ENT	2,000.000	1,924.676	0.038
WC	1,600.000	1,141.255	0.287

Source: Computed by Author using SmartPLS3.0 (2020)

The cross validated redundancy methodology uses the path model equations to predict eliminated data points using both the inner structural model and the outer measurement model. A cross validated redundancy approach is used to estimate the excluded data points in the developed PLS Path model. Table 4.10 shows Q2 effect for the statistical relevance of the model and inference.

Table 4.10: Construct Cross validated Redundancy (Total)

	SSO	SSE	Q² (=1-SSE/SSO)
ACF	1,600.000	1,600.000	
PROD	2,000.000	1,690.434	0.155
ENT	2,000.000	2,000.000	
WC	1,600.000	1,600.000	

Source: Computed by Author using SmartPLS3.0 (2020)

The cross validated redundancy of the constructs together has a medium predictive importance on agricultural production in Ngoketunjia Division, according to the findings. The Q2 value of 0.155, which is greater than 0, indicates this. As a consequence, values above the threshold limits are compatible and essential for policy formulation because they correctly forecast the dependent construct's future path of travel.

4.5: Assessing the sustainability of agriculture in Ngoketunjia Division

The fourth objective of the thesis relates to the examination of the sustainability of agriculture in Ngoketunjia Division. Agricultural sustainability literally measures the ability of the farm to cope with stress and continue to provide for the present as well as future needs of the population. Lynam and Herdt (1989) reports that there are two key parameters in establishing the sustainability of agriculture in any particular region: (1) examination of changes in the yield of the farmers and (2) changes in total factor productivity. To better contextualize these sustainability issues, this study examined some of the farming characteristics such as the use of fertilizers, the farm sizes, the professionalization of agriculture, the age of the farmers, and consistency in the practice of agriculture, amongst others.

The study found evidence of excessive use of fertilizers which has long term consequences on the quality of the farm products, particularly inorganic fertilizers. This kills some of the natural nutrients in the soil and makes for continue dependence on the importation of fertilizers as there is no manufacturing plant in Cameroon. Furthermore, the farm sizes are relatively small, raising doubts about its ability to feed the ever growing population. This is due to the complete absence of mechanisation in the practice of agriculture in the region. Only small scale individual farmers operate using mainly manual/local labour. This type of agricultural practice can only support subsistence livelihood.

We also found evidence of very old farms and farmers themselves as the youths continue to shy away from the practice of agriculture, described as peasant job. Many Cameroonian youths prefer white collar jobs despite its comparatively low return with agriculture. While the absence of legitimate government support and poor market facilities has been described by some as the reasons why they do not see future in agriculture, it remains the backbone of the economy, providing for over 70% of the population.

All these factors make the yield from agriculture relatively small as total factor productivity is quite low. The political crisis (civil war) which has hit the region very hard since 2016 has forced many farm actors to abandon the area due to insecurity. In the absence of genuine solution to the crisis, the farms may be unable to feed the population in the near future, raising questions once more about the sustainability of agriculture. Therefore, based on the definition of Lynam and Herdt (1989), we conclude that agriculture in Ngoketunijia is not sustainable in the long run despite its ability to feed the population at the moment. For long term sustainability, the concept of second generation agriculture i.e., agriculture as a business must be put in place as prescribed by the President of the Republic, with the necessary condition being the availability of the right type of infrastructure to support it.

In this chapter, we have demonstrated that about 95% of the questionnaires given out to participants of the survey were returned largely because of direct administration procedure adopted by the field assistants. We have also shown that more adults, more males and mostly uneducated farmers took part in the survey. We conducted some tests to evaluate the relevance of the data and results such as average variance extracted for the assessment of the outer model, convergent validity test, which shows that the constructs were all valid based on reasonable Cronbach alpha values. We have also demonstrated that farmers in the region face mounting challenges, including but not limited to poor infrastructure, low commodity prices, poor weather conditions, lack of finance and capital, amongst others. We have further shown

that there is the absence of financial inclusion. This means that farmers are actually excluded from the finance sector mainly due to its unavailability and limited access for those that do remain, resulting in a sub-optimal or negligible contribution to growth. In this respect, we find proof of a negative association, confirming our hypothesis that financial inclusion has a statistically important impact on productivity.

CHAPTER FIVE

DISCUSSION OF RESULTS

In this section, we shall discuss the main findings by way of comparing our finding with other findings in the field as well as theories. This is necessary to situate the finding within global perspective and to see if there is convergence of divergence for internationalization. We start by recapitulating the main findings and then engaging on its discussion.

5.1 Access to finance or financial inclusion and agricultural development in Ngoketunjia

The absence of access to credit as an indicator of financial non-inclusiveness is predicted to have a negative impact on agricultural production. Scientifically, this means there is the absence of financial inclusiveness in the region. The absence of financial inclusiveness means that farmers cannot benefit in any way from services provided by the bank or other financial providers. In this way, the financial system fails to support rural agricultural production in the region. This finding supports the theoretical expectation that money as a source of capital is essential for the development of agriculture and, by extension, agricultural productivity in the region. However, it is consistent with the results of Barbier and Bugas (2003), Brunet (1996) and Agrawal (2011) who found out that inadequate access to finance stifles agricultural growth in urban settings while in most rural areas, agriculture is seen as a regular occupation that holds the family afloat, usually requiring the use of family labour. Furthermore, Brunet (1996) reported that since agricultural activities are considered as a long-term project, some available finances are diverted to short term economic activities.

In some cases, the finances are available but the procedures and conditions to get them are tight and complex, making its contribution to agriculture sub optimal or marginally insignificant. While finance service provision generally remains underdeveloped in Ngoketunjia, with only five cooperative movements visibly active, farmers are yet to

understand and make full benefit of the services. Access to finance was supposed to have a positive impact on agricultural production, but the results of this report, while not surprising, contradict the conclusions drawn by Adebayo and Oluyemi (2018) and Natter et al (2008). The finding explains that access to finance creates an opportunity for growth for most farmers since they could invest at a zero or little interest rate. However, this in reality becomes another huddle as microfinance institutions charge extremely high interest rates compared to mainstream financial institutions which are visibly absent.

Anne (2013) used access to finance as a measuring indicator for financial inclusion in order to assess the impact of financial inclusion on agricultural sector development, arguing that Africa has all the potential for agricultural growth but lacks the financial resources to realize that potential. As a result, financial access can have a positive impact on the agricultural sector's development. Minghi (1991) found that a positive lag effect is often observed where access to finance is high or the share of agricultural productivity is high, confirming this positive impact of access to finance on agricultural productivity. For regions with a very low share of agricultural jobs and a very high agricultural productivity, a negative lag effect is extremely important. In this case, competition for financial capital has the result that agricultural factors' mobility is limited, limiting non-agricultural production.

Negatively significant, the competition effects dominate the short-term contribution of financial inclusion to agricultural production, according to contemporaneous relationships between access to finance and agricultural productivity. Overall, the result is extremely negative. This is interpreted as a confirmation of the local farmers' dominance of the competition impact, which is hampered by a lack of access to capital. However, including the current impact raises the possibility that this inference merely represents the probability of a spurious causation. Independent research from the field of finance deserves to be given more

weight. Competition among farmers, on the other hand, appears to be a greater barrier to fostering high levels of agricultural productivity in Cameroon (Ngeh, 2017).

Makka (1989) found that regions in France, Scandinavia, and Northern Italy have positive transmission effects in employment and negative competition effects on agricultural production, indicating that access to finance has a negligible impact on agricultural productivity. It's difficult to know what policy conclusions to draw from these highly simplistic results from a much nuanced study. In regions where increased access to finance aids agricultural productivity concentrating solely on access to finance does not imply that agricultural productivity can be improved. These are also the regions with the greatest need for agricultural structural reform, which is best facilitated by the development of better and more moderate financial assistance. Agriculture development policies that minimize access costs and promote innovation are more likely to be applicable in all regions than simply providing access to capital, which is unlikely to be productive or competitive.

5.2 The role of education and training on agricultural productivity in Ngoketunjia Division

In terms of education and training, this research found a positive and significant relationship between education and agricultural productivity. This means that education and training was found to support agricultural development and hence productivity in the area of study. The more educated the farmers are the better the farming outcome for both the farmers, their families, and by extension, the nation. This is in line with the apriori expectation of this study which suggests that $\lambda_2 > 0$. According to Wuttaphan (2017), competitive advantage and sustainability in the complex business world can be gained through investment in human capital. Leroy (n.d) reported that education is an engine of growth and key to development in every society, based on its quality and quantity.

From literature, this finding conforms to the result obtained by early scholars in the likes of George (2016), Seethepalli *et al.* (2008), Estashani *et al*. (2003), Canning and Pedroni (2004). These researchers concluded that without education and training, and particularly programs that directly enhance the capacity and capability of farmers, the output is likely to remain constant, if not fall over time. Training is the magic that adds value to the human being who then adds value to other resources. In particular, transformative education in the findings of Njimanted (2017) is the sole determinant of productivity in the western highlands of Cameroon. The implication of this result is consistent with the conclusion of Muyia, Nancy and Kit (2004) who commended the role education plays in human development.

However, this finding is contrary to the work of Sanchez *et al.* (1998) who reported that education and training negatively affect agricultural productivity. This contrary view is justified by the fact that educated and trained farmers change their focus and start searching for white-collar jobs so as to earn quick cash especially in third world or developing countries. This is the sad reality in many of the developing countries that believe that agriculture is for the underprivileged. In fact, many farmers in the third world countries are uneducated, making adoption and diffusion of technology very difficult.

Manuel (2010) opined in related literature that education and training can be highly successful in combating poverty, meaning that when agricultural production is high, poverty is reduced. The effect of education and training on productivity is economically important, according to simulations for Latin American countries, highlighting the growth acceleration and reduction in inequality that would result from increased availability and quality of the various types of education and training. Aschauer (1989) claimed that human capital is a significant determinant of agricultural production. The results, however, were considered to have an implausibly strong economic importance and were not resistant to the application of more sophisticated econometrics (Cashin, 1995).

Education and training play a significant role in agricultural production, according to recent observational literature, which is mostly focused on cross-country panel data. Canning (1999) used panel data from a wide number of countries to reach a similar conclusion, while Demetriades and Mamuneas (2000) used OECD data. Roller and Waverman (2001) find high output effects of human capital growth in industrial countries in a framework that controls for future endogeneity in agricultural productivity. Both Fernald (1999) and Njimanted (2017) reported related findings for education and preparation, using industry data from the United States and Cameroon, respectively.

In a study of the impact of human resources on agricultural productivity, Easterly and Rebelo (1993) discovered that developing farmers' skills significantly improves agricultural productivity. Sanchez-Robles (1998) also claim that overall evaluations of local farmers' physical education and preparation are strongly and significantly related to agricultural production. According to Easterly (2001), recognizing the progress of developed countries' agricultural sectors requires a calculation of education and training density. Most importantly, the fact that education and training increase agricultural production shows that they can be a core win-win factor in agricultural growth.

Weather condition and farm productivity

Weather condition in this study was found to negatively affect agricultural productivity in Ngoketunjia Division. This finding is in line with the a priori expectation of this study and conforms to the findings of Shobande *et al.* (2014) and Oguijuiba (2013). Weather condition is directly responsible for agricultural productivity in third world countries. The farmers are at the mercy of nature through the interplay of natural forces of rainfall, sunshine and other climatic variables. The importance of weather condition has been largely discussed in literature. Smith and Marshall (2004) reported that weather variability is key in output

determination throughout the world. Apart from green technology that allows for cropping in any period of time and area of the world, natural factors are responsible for the shifting agricultural practices seen throughout the world. Regional crop specificities are a direct function of the climatic variables evident in such regions. Temperate regions present a cropping culture far distinct from those of the tropics or the poles.

Weather conditions, on the other hand, took much longer to emerge as a main factor in agricultural productivity. In fact, from the mid-twentieth century onwards, the most significant contributions were made. Becker (2000), in particular, is widely regarded as a supporter or contributor to the advancement of agricultural theories, emphasizing how bad weather reduces agricultural productivity. Furthermore, Devarajan et al. (1996) stressed the importance of weather conditions in the implementation and adoption of new agricultural technologies.

While discussing and acknowledging the role of various factors in agricultural production, the human dimension, as described in Solo's works (the human-capital augmented Solow model) as stated by Gramlich (1994), is critical. The Cobb-Douglas development feature specifically requires human capital as a consideration. Furthermore, Romer (1986) and Lucas (1988) created an endogenous growth model that includes technological transition and provides concrete evidence. Human capital is a key driver for agricultural production and long-term economic development, according to these models (Estache, 2002). The unified growth models (Canning, 1999) contain further debate in the area of agricultural productivity and economic growth, predicting that agricultural productivity is the cause of long-run development.

In this chapter, we have demonstrated that our result is not isolated as similar findings have been obtained elsewhere, mainly in developing countries. The findings converge in most

cases to what is happening in other regions and the globe at large. There were also evidence of some divergence as a consequence of regional characteristics and differences. Weather condition is a problem for the whole of developing countries as greenhouse technology is not easily transferred and applicable. Education as a universal human right contributes to improved productivity while financial exclusion limits or inhibits the inputs and by extension, the output of farmers.

CHAPTER SIX

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

This Chapter presents the main summary of the findings as well as policy recommendation for better management of the problem identified in this thesis. The chapter ends with a general conclusion of the thesis**.**

6.1 Summary of main findings and implications

This thesis was set out to investigate the role of financial inclusion on the productivity of agriculture in the Ngoketunjia Division of the North West Region of Cameroon. To simplify the investigation, financial inclusion was captured using constructs such as ease of access and availability of financial institutions while productivity was measured in terms of output. The data for the study was collected using a structured questionnaire and interview and the results obtained are summarized as follows:

The study found out that farmers in the region have a lot of difficulties ranging from inadequate financial resources (financial exclusion) due to the absence of appropriate financial institutions and the required collateral security, lack of capital to acquire farm inputs, the absence of good farm to market roads, constant price fluctuation, amongst others. These challenges were found to have a significant impact on the output of the farmers in the region. At least 85% of the farmers aggregately complained of weather conditions as a constraint to the development of agriculture. Changing weather conditions have shown to have adverse effects on the output of farmers in the region. This result was supported by the empirical analysis conducted in this study as the weather was found to have a statistical significant effect on the productivity of agriculture in the region.

The result further revealed that financial inclusion variable was negative and insignificant. This in essence means that farmers are excluded from financial services as access to credit

facility is limited by the absence of mainstream financial institutions while at the same time micro credit institutions available charge excessively high interest and requires collateral which is out of the reach of many local farmers in the region. Without finance in the right amount, farm inputs cannot be acquired and agriculture will continue to be practiced using rudimentary tools for subsistence. It is this absence of means from financial service providers to acquire inputs and other factors of production that makes its contribution to agricultural development marginal.

Education and training were found to have a substantive and important impact on the region's agricultural productivity. Though many farmers were not very educated, there has been a lot of effort put in place by civil society organizations, the government and farmers associations to improve on the agricultural knowledge of the farmers through numerous workshops and seminars organized for such purposes. Through interview, some of the farmers indicated that formal education is not what is needed in the farm though it counts, rather, it is professional target education that relates directly to what they do that matters. According to them, such education can be better attained only when one is involved in farming and/or rearing of animals. Specifically, the path regression result revealed education and training has a positive coefficient 0.376. This implies that for a unit change in the knowledge based on the farmers through training, there is the possibility of a 0.376 unit change in the productivity level.

However, despite these results, the analysis further suggested there are many other factors not captured in the model that collective have a positive and insignificant effect on the productivity of agriculture in the region. This revelation is contained in the coefficient of multiple determination (R^2=34.3). Though not significant and hence not relevant for policy decision making, such factors should never the less be neglected when practice-based agriculture is concerned. This is because some variables or constructs may have statistical irrelevance but practical relevance, usually described as spurious results in statistical science.

Therefore, factors such as government policy, state of development of the region, political stability may fall within the set of excluded variables being captured within the context of R^2.

This study also concluded that because of the varying constraints limiting the growth of agriculture in Ngoketunjia, long terms sustainability is questionable as farmers are old, youths not considering agriculture as a business that can provide for them, excessive use of pesticides, amongst others. This conclusion is further reinforced by the ravaging conflict that has hit the region very hard since 2017.

6.2 Recommendations

Based on the results presented in chapter four and the summary in 5.1, the following policy emerges for stakeholder consideration:

- Efforts should be made by the Government and the population to overcome the challenges they face in the practice of their profession. Specifically, there is high need to dis-enclave the production basins by opening up farm to market roads in the region. This is the responsibility of the Government as individual small-scale farmers cannot afford the cost of roads and infrastructure construction. While this finding is specifically for the region, the homogeneity of population and the physical characteristics implies that the result can be extended to other parts of Cameroon. However, there is the need to undertake a national study with more samples to see if results will converge.

- There is need to stabilize market prices by setting up buffer scheme. This is a price stabilization mechanism where policies can be made to stock goods when supply exceeds demand to prevent prices from falling and release stock when demand exceeds supply to prevent prices from rising through black marketing. Given that it is

the demand and supply conditions that make prices to fluctuate most often, the construction of a warehouse will help preserve perishable commodities, excess during market process and make their availability constant in the market. This way, the Government can buy the excess and store in these warehouses and release them during periods of shortage so as to stabilize the prices.

- Collective effort is also necessary to make financial inclusion a reality in the region. Most of the farmers were reported not to have even bank accounts. Microfinance institutions should assist in the development of agriculture by encouraging farmers to open account holding, educating them on the role of micro finance in the development of agriculture and making lending conditions friendly. In this way, farmers will become part of the financial system with great implications on their output.

- Government should encourage farmers to get be trained in the many agricultural schools in the country. Jakiri Veterinary College, Bambili School of Agriculture, Santa Cooperage College are all schools opened by the state for the training of farmers and operators in the agriculture sector in Cameroon. With improved capacity, output and hence productivity is likely to increase.

- While the weather condition cannot be changed by man, a better study of the weather condition can help farmers make improved decision in relation to timing of production season. In this regard, there is need for a weather station to be set up to collect more climatic data about the region for better decision making.

- To reduce the risk farmers take, a policy to introduce agricultural insurance scheme for farmers to take care of adverse environmental and market shocks could boost the long term productivity of agriculture in the region by indemnifying farmers.

- With the liberalization of the sector by the powers that be, foreign investors with capital and equipment can come in and boost the productivity in the region, given that large production basin exist with huge potentials for output maximisation that benefits everyone. By cutting interest rates, these foreign investors including local farmers can optimize the value of their inputs and hence output.

General conclusion

This thesis set out to examine the impact of financial inclusion on agricultural development in Ngoketunjia, North West Region of Cameroon. One of the specific issues in the study was to examine the contribution of financial inclusion to the development of the agricultural sector in Ngoketunjia, as well as the examination of the challenges faced by farmers in the region. To help strengthen the understanding of the problem, an alternative hypothesis that financial inclusion has a statistical significant effect on agricultural productivity in the region was formulated. It was also established that the relevance of a study of this nature cannot be underestimated especially as agriculture has been demonstrated to be the backbone of the economy of the region and the country as a whole.

To put the work within empirical and theoretical contexts, literature was reviewed from relevant sources linking the two main variables of financial inclusion and agricultural productivity or growth. We established a strong theoretical link between financial inclusion and agricultural development with varied evidences around the world. We further established that such conclusion was not uniform as there were mix conclusions in a limited number of studies. Financial liberalization leads to financial deepening which culminates in better agricultural productivity for farmers which better the lives and livelihood of the farmers. After carefully reviewing the relevant literature, it is remarked that there is convergence of evidence, both theoretical and empirical establishing valid linkages between financial

inclusion and agriculture development. By reviewing literature, we were able to formulate a conceptual and an empirical model for the thesis. Data as a consequence was collected mainly from primary sources using questionnaire and interview, and analysed using descriptive statistics, content analytics and the partial least square approach to structural equation modelling.

The results show that farmers in the region are excluded from the finance sector because the mainstream banks are absent and microfinance institutions charge very high costs, restricting them from accessing the much-needed financial capital. This makes the contribution of the financial sector to agricultural development sub-optimal. The contribution of the financial sector to agricultural development is therefore far below expectation. Being the main thrust of the thesis, the hypothesis that financial inclusion has a statistical significant effect on agricultural productivity was tested and the result demonstrated that there is an insignificant relationship between access to finance and availability of financial institutions and the productivity of agriculture in the region. This negative result reflects the absence of financial inclusion. In other words, the hypothesis that there is a significant effect of access to finance and availability of financial institutions on the productivity of agriculture in the region was therefore rejected. This conclusion is largely due to the absence of mainstream financial institutions like commercial banks, agricultural development banks, amongst others in the region. There is a big question to know if there would be a significant effect of access to finance and availability of financial institutions on the productivity of agriculture in the region in case the respondents to our questionnaire, farmers, would be familiar and with some positive past experiences in using such financial possibilities with lower costs which is the case of farmers in other developed countries such as USA, EU or some of the Asian countries. If farmers from Ngoketunjia Division are not experienced with such cheap and attractive finance sources which would increase their productivity and profits they tend to

believe that access to finance and availability of financial institutions do not positively impact the productivity of agriculture in the region. On the contrary, education and training erewere found to positively and significantly affect the productivity of agriculture in the Ngoketunjia Division.

The thesis further demonstrated that farmers in the region face several challenges relating to the practice of agriculture. Particularly, because of bad governance and corruption which is rife in the country, many public projects such as road infrastructure, particularly farmo-to-market roads are seasonal, making many products perish before they get to the market. Being a third world country, the farmers are at the mercy of persistent price fluctuations as they can do little or nothing to influence current market prices. Other challenges such as lack of collateral security to borrow from the banks, high interest rate, risk of weather variability as greenhouse technology is absent, amongst others were highlighted. These challenges make agriculture to be non-sustainable especially in the long term, despite the ability of the farm to feed the population in the short run.

Based on these results, the thesis recommends that efforts must be put in place to make farmers have access and to benefit from services provided by financial institutions to boost their ability to have the necessary inputs for production. Education of farmers and progressive access to the cheaper finance sources such as bank loans, equity, bonds, multilateral loans, development loans, etc with some track records would probably impact the farmer's decisions and answers to the same questionnaire. Specifically, a subsidy policy that allows farmers have input to aid production is relevant, as well as the reduction of interest rates to allow farmers to take loans from the credit union that dominates the financial sector in the region. Government subsidies in the area of training and development will be a much welcome situation for the farmers. An insurance scheme should also be put in place to reduce the risk posed by natural factors, amongst others. It is therefore the general conclusion that farmers

are excluded from the finance system in the area, a situation that should be reversed as early as possible.

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Appendix 1: Questionnaire

QUESTIONNAIRE

THE IMPACT OF FINANCIAL INCLUSION ON AGRICULTURAL DEVELOPMENT IN NGOKETUNJIA DIVISION, NORTH WEST CAMEROON

Dear respondent,

This research is an endeavour to identify and estimate the impact of financial inclusion on the development of agriculture in Ngoketunjia Division, Northwest Cameroon. Your responses will make a great contribution to the achievement of this very important academic exercise. The questionnaire is being administered within the framework of a Doctorate of Business Administration (DBA) Research Project in Swiss School of Business and Management. Confidentiality will be highly observed and the information you provide will be used for academic purposes only. Kindly spare some minutes of your busy schedule and share your point of view about this subject matter with us.

Thank you in advance for your cooperation.

M. Ibrahim Menkeh

Reg. Nº: ……

Section I: Demographic Information. Kindly mark as appropriate

Age range ☐ 0 -17
☐ 18-35
☐ 36-59
☐ 60^{+}

Gender ☐ Male
☐ Female

Marital status ☐ Single
☐ Married
☐ Divorced
☐ Widow(er)

Academic Qualification
☐ No formal education
☐ FSLC ☐ Ordinary Level
☐ Advanced Level

☐ Bachelor Degree

☐ Master Degree and

Main Occupation ☐ Farming

☐ Small Business

☐ Teacher/Nurse/Doctor

☐ Others (Specify)

Longevity in agricultural activity (years)

☐ 0 - 5

☐ 5-10

☐ 11-20

☐ 21+

Please kindly place a tick (√) against the appropriate respond in the corresponding boxes: SA=Strongly Agree, A=Agree, D=Disagree, SD=Strongly Disagree and ID=Indifferent.

Section II: Financial inclusion/inclusiveness of farmers

S/N		SA	A	ID	D	SD
1	Agricultural farmers can get financial resources from banks/micro finance institutions to enhance production					
2	The financial resources are affordable for farmers					
3	Financial institutions are currently meeting the needs of the farmers					
4	Financial institutions are able to grant credit to farmers					
5	Farmers deposit their savings in the available financial institutions					
6	Financial institutions manage efficiently their risks and gurantee the financing for farmers through various schemes					
7	Financial institutions are sustainable in meeting the needs of the farmers					
8	Financial institutions acts as advisers to the farmers					
9	Farmers have equal access to opportunities offered by financial					

	institutions					
10	ATM machines exist to serve farmers/customers					
11	There is a bank for every 100,000 adults					
12	Customers/farmers own deposit accounts in financial institutions					
13	Micro-insurance exist to mitigate climate risk					
14	Banks conduct financial education/awareness campaign					
15	There is training on financial management by financial institutions					
17	Farmers make useof mobile banking services such as mobile money					

SECTION III: agricultural production and development

S/N		**SA**	**A**	**ID**	**D**	**SD**
18	The farmers have the potentials to maximize return					
19	There is risk of food crisis in the region					
20	Yield from the farm is encouraging to allow for continuous production					
21	A lot of pesticides is used in production					
22	Water is readily available for irrigation					
23	Machines are used in the production process					
24	Agricultural production is profitable in the region					
25	There is equality in food distribution					
26	There is easy access to land for agricultural expansion					
27	Farmers are knowledgeable in methods of production					
28	Output is enough to sustain the local population					
29	Output fluctuates regularly and hence income from agriculture					
30	Additional Livelihood programs exist to sustain farmers during off season					
31	There are sustainability programmes available to develop farmer's prosperity in the private sector					
32	Farmers are being trained on GAP/GEP to maximise yield					

Section IV: Education and Training of stakeholders

S/N		**SA**	**A**	**ID**	**D**	**SD**
33	I can classify myself as educated					
34	Training is needed to join agriculture					
35	Training is done by the government or government agency					
36	Training is done by civil society organization					
37	Training is done by cooperative union members					
38	There is high need of training to succeed in agriculture					
39	Training improves skills of farmers					
40	Through training, new production methods are learned					
41	My output has increased because of training					
Section V: Weather variability						
42	There is too much sunshine in the region					
43	The intensity of the sun directly affects crop yield					
44	Rain fall is adequate to enhance productivity					
45	Wind speed damages crops					

46	The temperature is appropriate for agriculture					
47	Weather conditions have deteriorated over time					
Section VI: Challenges to agricultural development in Ngoketunjia						
48	Weather variability continue to hamper agricultural development					
49	Capital is the most significant constraint to expansion of agriculture in the region					
50	Farmers have low level of education/knowledge in modern production					
51	Poor quality land for expansion					
52	Limited use of equipment					
53	There is easy access to and from farms by road especially for harvesting					
54	Good Quality seeds/ seedlings are available to farmers and affordable prices					
55	There is the absence of irrigation facilities to ensure all year round production					
56	there are no storage facilities for perishable products					
57	The existence of diseases and pests reduces output/yield					
58	The is the lack of marketing facilities to showcase farm products					
59	Farm produce gets bad often due to poor road network					

Other challenges faced by farmers. List them in order of significance

1.

2.

3.

4.

5.

Appendix 2: Interview guide

SOME SAMPLE INTERVIEW QUESTIONS WITH MAJOR FARMERS/AGRICULTURAL STAKEHOLDERS IN NGOKETUNJIA DIVISION TO SUPPLEMENT QUESTIONNAIRE

1. What is the main challenge with agricultural development in this region?

2. How sustainable is agricultural production?
3. Can agriculture sustain the population in the long term?
4. Can we have food today, tomorrow and in the future?
5. What is the output level over the years?
6. Has there been progress or regress in the production of crops in this region?
7. How inclusive are financial service in the region?
8. Are financial services affordable?
9. Is there exclusion in the delivery of financial services?
10. How engaged are the youths in agricultural production in the region?
11. What public support do you receive for agricultural production? Are financial institutions backed by public guarantees or insurance programmes to reduce the risk of financing?
12. Is the cost of financing of agriculture production acceptable (interest rates on loans for example)
13. What collaterals do financial institutions require to provide financing? Is it a problem for agriculture producers?
14. What would you advise to improve the financing of agriculture producers by financial institutions in Ngoketunjia division?