INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH & DEVELOPMENT

ISSN 2278 – 0211 (Online)

An Analysis of Farmers' Challenges and Prospects for Food Self-Sufficiency in Ngoketunjia Division

Dr. Ibrahim Menkeh Muafueshiangha
Ph.D. Student, Department of Green Finance and Sustainability, Unicaf University, Zambia
Dr. Mary Mandiringana
Faculty, Department of Accounting and Finance, Unicaf University, Zambia

Abstract:
Agriculture is widely recognized as the economic backbone of the majority of developing nations, where farmers face numerous challenges in their efforts to increase output. This study aimed to examine the challenges faced by farmers and explore the potential for achieving food self-sufficiency in the Ngokentunjia division, Cameroon. Utilizing a quantitative survey research design, 300 questionnaires were randomly distributed to sampled farmers, with 285 returning completed forms. The data gathered was analyzed using IBM's SPSS and presented in charts and percentages, revealing that farmers in the northwestern region of Cameroon contend with various obstacles. These include financial constraints, insect and disease infestations, adverse weather conditions, price inflation, cultural issues, poor farm roads, and a lack of storage facilities for their produce. To mitigate some of these challenges, the study recommends the implementation of a buffer stock mechanism by the government to help limit price fluctuations and the development of a meteorological station to aid farmers in forecasting weather conditions in advance, given that adverse weather can lead to erosion and road degradation. Expanding on the study's recommendations, incorporating carbon credit initiatives, sustainability practices, and green finance can further bolster the agricultural sector's resilience and productivity. Engaging in carbon credit schemes allows farmers to earn additional revenue by adopting practices that capture or reduce greenhouse gases, thus contributing to climate change mitigation efforts. Simultaneously, promoting sustainability in agricultural operations can enhance long-term environmental health and food security. Green finance emerges as a pivotal tool in this context, offering necessary funding for the adoption of sustainable technologies and practices, the development of climate-resilient infrastructure, and the facilitation of carbon credit projects. These integrated approaches not only address immediate challenges faced by farmers but also align with broader goals of environmental stewardship, economic sustainability, and the advancement of food self-sufficiency in developing regions.

Keywords: *Farmers' challenges, Cameroon, agriculture development, Africa, green finance*

1. Introduction

Agriculture is the economic backbone of Cameroon, attracting more than 80 percent of the population and contributing substantially to the country's GDP. According to Abia et al. (2016), given that Cameroon is not a net food importer, agricultural output has tremendous potential to assist the country's over 23 million people and beyond. While the country's southern areas have maintained relative levels of food security in recent decades, political strife and instability increasingly endanger food production, particularly in the country's north and southwest regions.

Major plantations in these two areas are out of business, while others are barely functioning at 20 percent of their capacity, with about 328 million USD (about 200 billion FCFA) needed to resuscitate them (The Post Newspaper, 2019). According to Devèze (2011), many farmers have left the producing basins of the area as food prices spiral steadily due to insecurity. Also, poor administration and economic mismanagement in the early years of independence led to the collapse of the West Cameroon Produce and Marketing Board, an independent organization that supported the growth of agriculture in the then-British Southern Cameroons (Chikalipah, 2017). The lack of access to finance was widely blamed for the collapse of coffee output in Cameroon's Northwest Region, which led to the displacement of many subsistence farmers in the mid-1990s (Forbe, 2019).

Despite agriculture's significance to Cameroon's economy, Forbe (2019) highlighted that the country's attempts to increase local production and raise the rural people out of poverty have been hindered by a lack of access to financing for the industry. This said that it must be noted that approximately 23 percent of the GDP of the nation still originates from agriculture (Ball, 2016). According to Sarris (2016), financial support in the agriculture sector, provision of agro-inputs, and the right information for farmers to improve farm yields seem to be inadequate compared to the current standard in the subregion. Due to these challenges faced by Cameroon farmers, this study aims to evaluate and analyze the farmers' problems and possibilities for food self-sufficiency in the Ngoketunjia division.

2. Literature Review

Agriculture is critical to Africa's overall development (Bellon et al., 2020). The fact that prospects for manufacturing and higher-productivity service creation are currently bleak in Sub-Saharan Africa bolsters this argument, making agricultural production a viable means of stimulating economic growth (Bellon et al., 2020; Makina, 2017). This is because urban food demand is increasing, and so is the ability to substitute imported food, add value to agricultural production, and export agricultural products (Chikalipah, 2017). Unemployment and poverty are the second point of contention. Agriculture is a significant industry in the majority of Sub-Saharan African countries, particularly in the case of farm supply chains. Even moderate growth would, therefore, create a large number of new jobs and increase the incomes of a large number of low-income people (Bellon et al., 2020; Olaniyi, 2016).

The increasing nature of global warming means crops must now adapt to highly volatile precipitation, temperatures, and tempests. Horwitz (2016) argued that global warming could also be mitigated by introducing farm techniques that extract more carbon from trees and soil. Gender issues in agriculture vary by country. In Cameroon, many still regard agriculture as a domain reserved for the illiterate and female gender. Women are the breadwinners of the family in the majority of rural areas of Cameroon, tilling the soil, fetching firewood, nurturing the children, and providing for all household needs. This is a cultural issue that is evident in the Ngoketunjia Division of Cameroon's northwestern region. Also, in agricultural matters, inequalities between men and women are frequently defined by unequal access to farm inputs (Killic et al., 2015; Kristjanson et al., 2017).

Epo & Baye (2018) opined that if agriculture is to expand faster than the population, farm labor production must be increased, resulting in increased income for farmers and consumers and job creation for businesses and services. An increasing number of African farmers believe they will be unable to increase agricultural production to meet the needs of growing rural populations. Increased production for growth and productivity will be required (Chamberlin et al.,2014). As a result, farmers in Sub-Saharan Africa have recently received considerable attention for their efforts to intensify agriculture, particularly through the use of external inputs on their farms.

Additionally, numerous perspectives have been advanced about agriculture's intensification or modernization to increase yield. While some believe that increasing output through agricultural intensification is the way to go, others believe that expanding farm sizes is the way to go. Numerous success and failure stories can be told about private and public sector efforts to modernize agriculture, such as Cameroon's Operation Green Revolution in the early 1990s (Jackson, 2009). Specialization and intensification have long been the focus of dominant discourses on agricultural growth and modernization as a means of increasing agricultural productivity (Jackson, 2009). However, some researchers are now debating whether this model promotes both sustainable and resilient agriculture (see, for example, Ashkenazy et al., 2017; Knickel et al., 2017). This section discusses the rationales for agricultural growth models that emphasize the pursuit of scale and scope economies.

Despite the size and reach, economies of scale are one of the most effective strategies for increasing agricultural production in Africa (Ashkenazy et al., 2017; Knickel et al., 2017). When the overall cost per processing unit decreases as farm productivity increases, this is referred to as economies of scale (Duffy, 2009; Knickel et al., 2017). This is why large farms can produce at a lower unit cost than small farms (Ashkenazy et al., 2017; Chavas, 2008). Economies of scale are intrinsically and primarily associated with capital-intensive technological development: continuous adoption of new technologies increases production and labor efficiency while decreasing input costs per unit of output, as farmers can spread more output over the same fixed input level ended

3. Research Methodology

The researcher used a quantitative research methodology and also employed a survey design for this study. The sample for the study was drawn from the farming population in the Northwest region of Cameroon, especially Ngoketunjia. 300 farmers were randomly selected to participate in the study. Data for this study was collected using questionnaires. Out of the 300 questionnaires that were sent out, only 285 were received. This showed a response rate of 95%, which is valid for a survey study. The researcher performed validity and reliability of the research instrument by testing and retesting the instrument on a section of the sample and also by doing a pilot study. The consistency in the responses of the sampled respondents showed that the instruments were reliable and valid. Descriptive and inferential statistical tools such as percentages, tables, and charts to present and analyze the findings obtained with the use of questionnaires.

4. Results and Discussions

Out of 300 questionnaires that were sent, 285 were administered, making 95% of the response rate. 300 respondents were sampled from the farmer population in the Ngokejunjia Division of North Western Cameroon.

4.1. Questionnaire Response to the Challenges of Farmers in North Western Cameroon

Graph 4.1: Frequency of the response of farmers to the Challenges of Farming in North Western Cameroon.

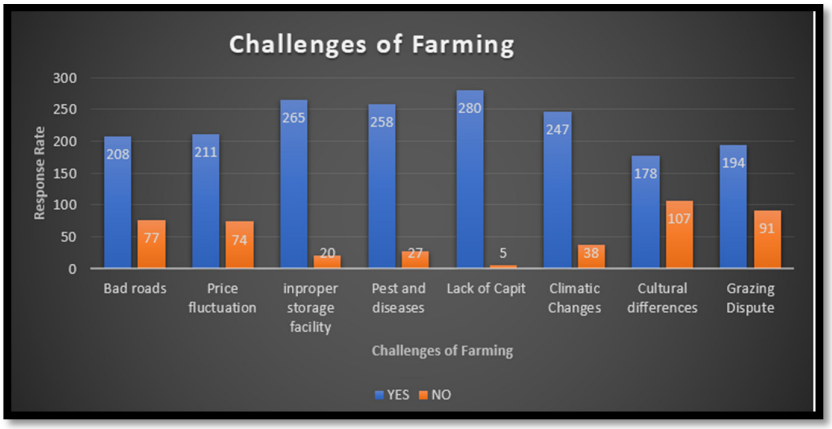

Figure 1: Challenges of Farming in North Western Cameroon
Source: Author's Compilation, 2024

Figure 1 reveals the response of the farmers on the challenges of farmers in North Western Cameroon. The figure reveals that more than 60% of the farmers responded "YES" to the stated challenges in the questionnaires. 280 (98.2%) of the respondents believed that lack of capital is a major challenge to farming businesses in the area, and 265 (92.9%) believed that lack of proper storage facilities stands as a stumbling block to successful farming in the region. This is followed by the effects of pests and diseases, with 258 (90.5%) responses. Cultural differences had the lowest response, with 178 (62.5%) respondents. These results revealed that the stated challenges contribute effortlessly to the dwindling farming activities in the area, leading to poor agricultural products coming from the region at the end of any farming season.

4.2. Interview Responses from the Farmers

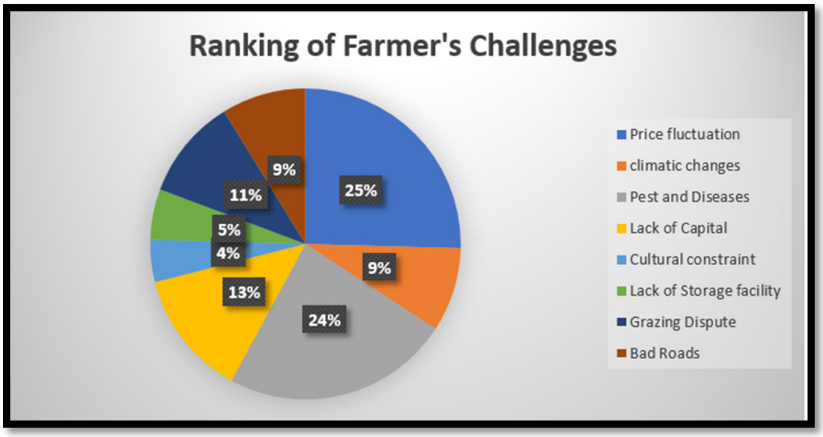

Figure 2: Ranking of Opinion about Farmers' Challenges
Sources: Author's Compilation (2024)

The objective of this study was to examine the challenges faced by farmers in one of the largest agriculture production basins in the North West Region of Cameroon. In attempting to answer this objective, information was collected from the sampled population with the use of questionnaires. Data collected from the farmers through this process are summarized in the following findings. As identified in figure 2, the challenges noted by the farmers included pests and diseases, which made up 24% of the total problems farmers faced, price fluctuations (25%), lack of capital (13%), farm-to-market roads (9%), storage facilities (5%), climatic conditions (9%), grazing disputes (11%), and cultural constraints (4%).

4.3. Pest and Diseases

In the Ngoketunjia Division of Cameroon's North West region, the persistent issue of pests and diseases poses a significant challenge to agriculture, especially concerning the production of perishable goods such as tomatoes. Despite advancements in agricultural technology and pest control elsewhere, a staggering 85 percent of farmers in the area report significant crop losses due to these agricultural nuisances. This–includes a variety of pests and the threats they pose according to the sampled farmers, as detailed on the next page:

4.4. Pests Posing Threats to Farmers

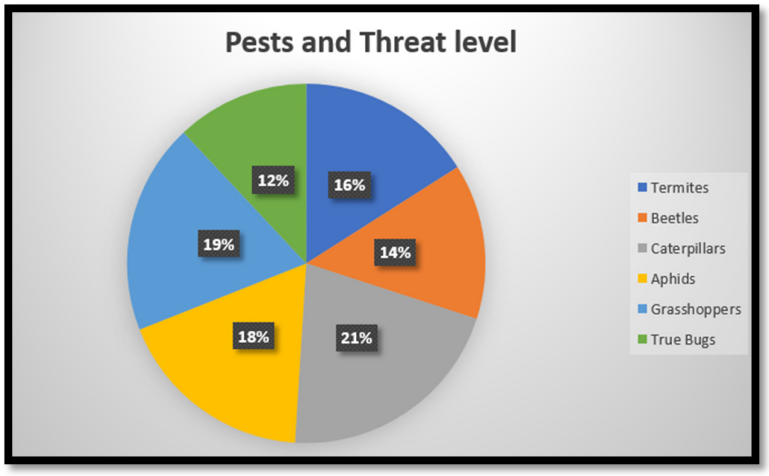

Figure 3: Pests and Their Level of Threats
Source: Author's Compilation (2024)

Figure 3 above represents the level of threats farmers face from the aforementioned pests. According to their response, caterpillars, with 21%, pose the highest threat level, followed by grasshoppers, with 19%, while the least was true bugs, with a 12% threat level. These pests contribute to a worrying trend where demand for vital crops remains unmet due to dwindling supplies, directly impacting local markets and economies.

The influence of climate change on agriculture amplifies these challenges, introducing additional layers of complexity to pest and disease management. Warmer temperatures and shifting weather patterns foster environments where pests can thrive, often leading to more frequent and severe infestations. These conditions not only accelerate the life cycles of pests like termites and aphids, making them more prolific but also stress plants, reducing their natural resistance to these biological threats. Moreover, changes in climate can disrupt the ecological balance, affecting predators that naturally control pest populations and allowing pests to expand into new areas previously unsuitable for their survival.

Figure 4 shows that the agricultural sector in Cameroon's Ngoketunjia Division is facing a critical challenge as pests significantly impact both staple and economic crops. Maize, with the highest pest impact ranking of 61, along with cassava and tomatoes, which are essential for both consumption and trade, face substantial threats from pests. These issues not only threaten the region's food security but also farmers' incomes and the broader national economy. Crops like rice, cowpea, and sweet potato, while less affected, also contribute to economic stability and are integral to the agricultural output. This situation calls for immediate and effective agricultural strategies that include climate change mitigation, the development of pest-resistant crop varieties, and improved pest management techniques to safeguard food security and economic resilience.

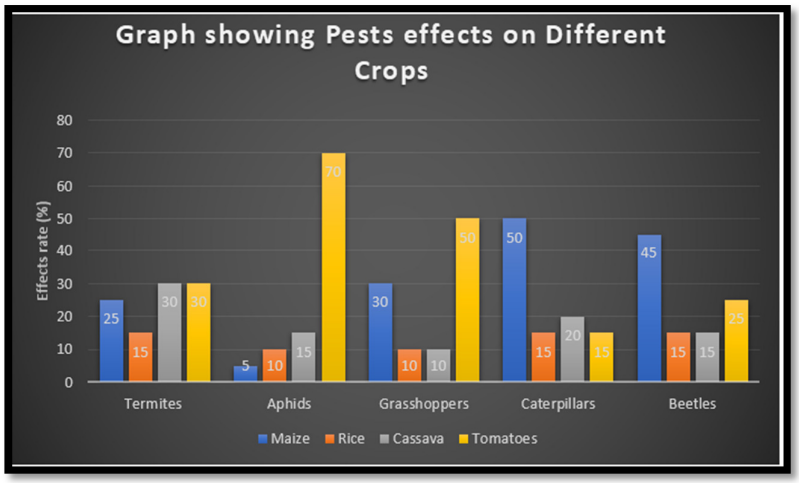

Figure 4: A Graph Showing Crops Affected Highest by Pest and Diseases
Sources: World Food Program (WFP), 2023

Figure 4 shows the different effects of pests on crops. It reveals that Aphids have the highest effects on tomatoes with 70% effects compared to other pests, caterpillars have the highest effects on maize with 50% effects, termites have

the highest effects on cassava with 30% effects, while both termites, caterpillars and beetles affect rice equally with 15% effects each.

4.5. Farmers' Disputes

Rice and maize, key cash crops in the region, face significant challenges not only from pests but also from livestock such as cows, goats, and pigs, which damage the crops by foraging on them just before harvest. The seasonal migration of cattle, prompted by the dry season, exacerbates tensions between farmers and cattle herders, leading to persistent disputes that the local traditional authorities often have to mediate. This farmer-grazier conflict is recognized by the entire community of 285 surveyed farmers as a major limitation to agricultural productivity.

4.6. Agricultural Inputs

Furthermore, there is an acute shortage of agricultural inputs. An overwhelming 93 percent of respondents are concerned about the lack of high-quality resources necessary for effective farming, including chemicals for pest and disease control. When fertilizers and insecticides are available, their high costs make them inaccessible for the majority of local farmers, exacerbating the situation due to the absence of local production facilities.

This complex agricultural landscape is further stressed by climate change, which can alter the behavior of pests and the migratory patterns of livestock, thereby intensifying farmer-grazier conflicts. A sustainable approach to address these issues is crucial, which may include creating buffer zones to reduce crop damage by livestock and improving access to affordable, quality farming inputs.

Investment in green finance could provide a solution, offering a pathway to fund innovations in sustainable agriculture. This could include the development of integrated pest management techniques, supporting local production of agricultural inputs, and fostering practices that are both environmentally friendly and economically viable. Such financial support would enable the adoption of advanced agricultural methods that reduce conflicts between farmers and graziers, promote food security, and build resilience against the adverse effects of climate change.

4.7. Price Fluctuation

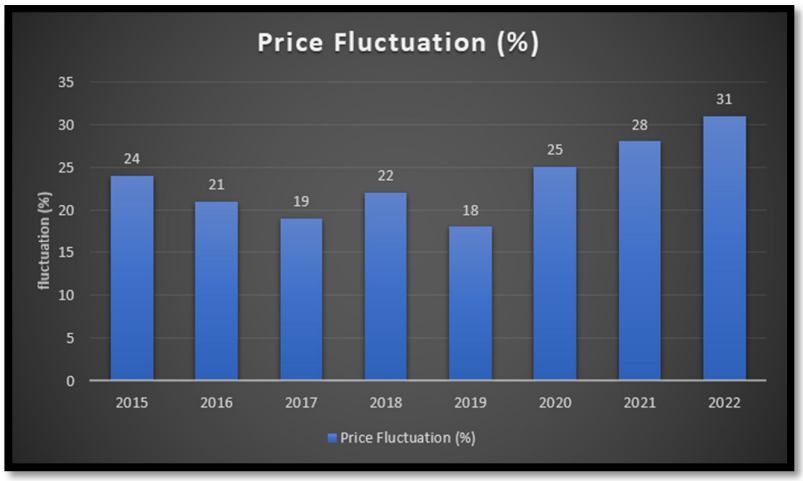

Figure 5: Price Fluctuation of Agricultura Products in North Western Cameroon from 2015 to 2022
Source: World Food Program (WFP), 2023

Figure 5 reveals the fluctuation trends experienced by farmers in the division, which has been unpredicted. The highest fluctuation was recorded in 2022 (31%), with a 3% increase from 2021, while the least was recorded in 2019 (18%), with a 4% fall from 22% in 2018 and a 7% increase in 2020 (25%). The data reveals that the agricultural sector in Ngoketunjia Division is grappling with the unpredictability of market prices for crops. This is a factor that hinders farmers from effective long-term planning and investment. Nearly half of the farmers surveyed attribute this volatility to elements beyond their control, suggesting a significant dependence on natural variables that dictate agricultural yields. This unpredictability is compounded by the financial risks associated with agricultural loans, which are viewed as perilous without the assurance of stable prices for their produce. The majority of the agriculturalists are smallholders, constituting at least 75% of the sector, and face the challenge of inadequate collateral for securing loans from financial institutions. These loans, as reported, would typically finance critical needs such as farm inputs, equipment, and machinery and enable operations like expansion and diversification. Due to these factors, the precarious nature of agricultural financing underscores the need for more supportive and adaptable financial instruments and policies that account for the volatility and risks inherent in the agricultural sector. Such measures could include flexible loan terms, subsidized interest rates, or even crop insurance schemes to mitigate the financial risk and enhance the resilience of the farming communities in the Ngoketunjia Division.

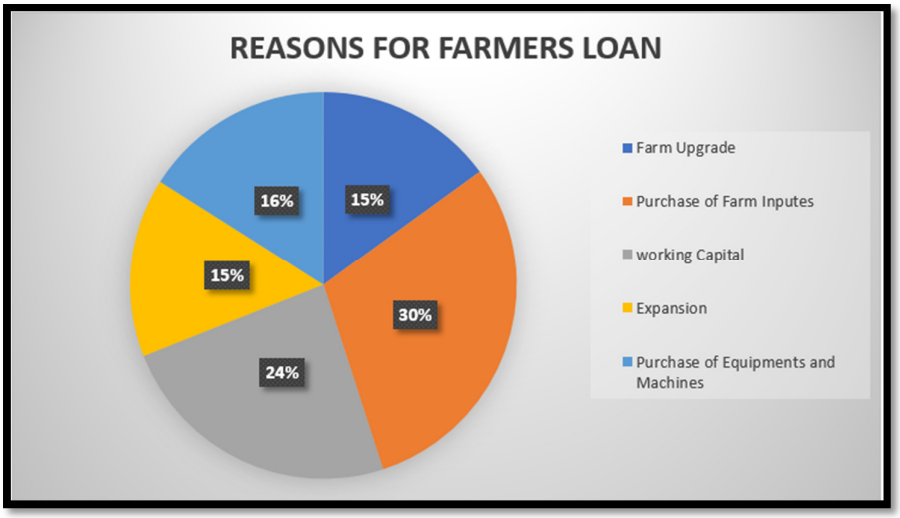

Figure 6: Reasons Farmers Take Loans
Source: Author (2024)

Figure 6 represents the reasons farmers borrow from commercial banks in Ngoketunjia Division according to the responses of the sampled farmers. It revealed that the purchase of farm inputs seems to be the most viable reason, with 30% of the farmers agreeing to it. Working capital follows with 24%, and the least is for farm upgrades and expansion, with 15% each.

The prevailing sentiment among 95% of farmers in the Ngoketunjia Division is that while borrowing for agricultural purposes carries substantial risk due to the unpredictability of farming outcomes and market instability, they are open to taking on loans under favorable financial conditions. These conditions include lower interest rates, lenient repayment schedules, and an understanding of the agricultural timelines. The farmers pointed out various potential sources for such loans, ranging from microfinance institutes known for their farmer-friendly lending policies to commercial banks, agricultural development funds, cooperative societies, and even government programs designed to bolster agricultural productivity. The willingness to engage with these diverse financial avenues suggests an acknowledgment of the potential benefits of loans if the inherent risks are mitigated through more accommodating financial services tailored to the unique demands of the agriculture sector. In this context, green finance can serve as a catalyst for sustainable development by offering financial products that not only support environmentally sound agricultural practices but also potentially provide farmers with carbon credits for their contributions to carbon sequestration. These credits can then be traded on the carbon market, offering an additional revenue stream and incentivizing practices that mitigate the impact of farming on the climate, thus turning ecological stewardship into a financially viable strategy for the farmers of the Ngoketunjia Division.

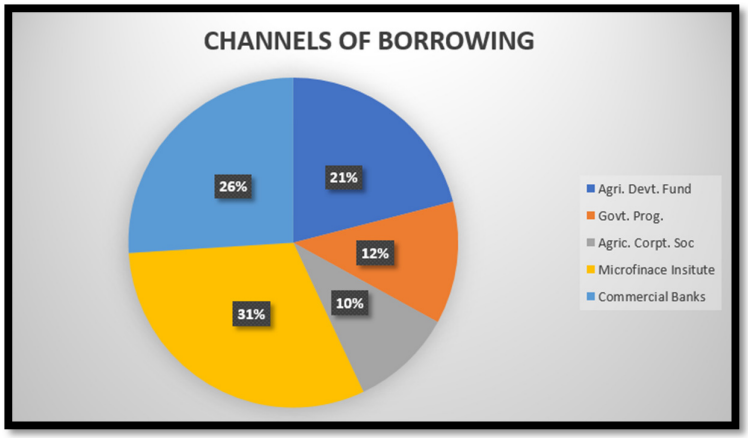

Figure 7: Channels for Farmers Loans
Source: Author's Compilation (2024)

Figure 7 presents Channels of Borrowing for the sample farmers in the Ngoketunjia Division of Cameroon. The figure shows that micro-finance banks were mostly used by farmers to borrow loans, with 30% of the sampled population agreeing to it, followed by commercial banks (26%), agricultural development funds (21%), government programs (12%), while the least is Agricultural cooperative society with 10% sampled farmers picking it.

4.8. Cultural Traits

The Ngoketunjia people have cultural traits that limit their ability to capitalize on available opportunities and maximize benefits. Agriculture as a means of subsistence is still very much alive in the area, where farmers produce mostly for consumption. This helps to explain why, despite the abundance of accessible and productive land, many areas stay fallow year after year. In other words, the people of Ngoketunjia have yet to accept the idea of second-generation agriculture advocated by the Cameroonian government. They do not see agriculture as a business but rather as a way of producing food for their families (subsistence farming), with any surpluses being sold at the market. In a typical week of seven (07) days, at least three (03) of these days are often reserved for special occasions, such as "Small Country Sunday," "Big Country Sunday," and "Ngumba Days." According to legend, if one goes farming on such days, he or she may encounter evil or anything terrible (including potential death). These are superstitions that, in the twenty-first century, should be avoided, as some residents are Christians and others are Muslims; an additional day is lost for Friday prayers in mosques or Sunday worship in churches. Without these customary vacations, farmers' production might be doubled, ceteris paribus. For example, if a farmer works three effective days each week and generates 20kg of output, that output could double if the farmer had the chance to labor for six consecutive days (Knickel et al., 2017). According to Forbes (2019), the traits include;

4.8.1. Communalism

Ngoketunjia people often have a strong sense of community and communalism, and this can positively impact farming as communities come together to share knowledge, resources, and labor. Farmers may engage in collective farming practices, such as cooperatives or communal land management, to leverage shared resources and improve productivity. However, traditional gender roles may be reinforced within these communal practices, with women often assigned to tasks considered "women's work", such as weeding or food processing, while men take on roles like ploughing or farming equipment operation.

4.8.2. Traditional Agricultural Practices

Ngoketunjia people have a rich agricultural heritage, and traditional farming practices often reflect cultural traditions. These practices may be influenced by beliefs, rituals, and customary norms. For instance, certain crops or farming techniques may be associated with cultural or spiritual significance. These traditional practices can vary across ethnic groups, and gender roles within these practices may also differ. Women may be more involved in tasks such as food crop cultivation, while men may focus on cash crop production or animal husbandry.

4.8.3. Indigenous Knowledge Systems

Indigenous knowledge systems, encompassing traditional knowledge and practices passed down through generations, play a significant role in farming. This knowledge includes local farming techniques, seed selection, pest management, and weather prediction. Women, in particular, often possess valuable indigenous knowledge related to crop diversity, medicinal plants, and food processing, as recognizing and incorporating this knowledge can contribute to sustainable farming practices and enhance agricultural productivity.

4.8.4. Matrilineal and Patrilineal Systems

Ngoketunjia people have diverse cultural groups with different kinship systems, including matrilineal and patrilineal societies. In matrilineal societies, descent and inheritance are traced through the female line, which can impact land ownership and control. In patrilineal societies, descent and inheritance are traced through the male line, which may influence access to resources and decision-making power. These kinship systems can shape gender roles and access to agricultural resources, impacting women's involvement in farming, land ownership, and decision-making within the agricultural sector.

4.8.5. Socio-economic Factors

Cultural traits intersect with socio-economic factors in influencing farming practices and gender dynamics in Ngoketunjia. Factors such as education, access to resources, social norms, and economic opportunities can shape gender roles and affect women's participation in farming. Traditional gender norms and limited access to resources and education can restrict women's involvement in decision-making, access to credit, and ownership of land, limiting their opportunities for agricultural productivity and economic empowerment.

4.9. Bad Road Network

The majority of Cameroon's producing basins are heavily enclaved, as though this is the new normal. There is a significant obstacle in the form of a shortage of access roads to transport agricultural products to markets. Apart from the insect and disease issues stated before, the majority of perishable goods deteriorate before reaching the market owing to very inadequate farm-to-market roads where they exist and their total absence elsewhere. There is a need to de-enclave all farms by building more roads and repairing existing ones to facilitate the transportation of products to markets. At least 89 percent of survey respondents identified transportation as a problem. Due to the lack of adequate farm-to-market highways, transportation costs have become prohibitively expensive for farmers, reducing profitability and deterring individuals from venturing into agriculture as a company.

The road linking Babessi to Balikumbat is not tarred and is very seasonal, as it is the same situation as the roads linking Baminka and Bamessing. These roads are dusty during the dry season and muddy and almost impassable during

the rainy season (Figure 5). The photos in figure 5 depict the challenges faced on various rural-urban roads in the Ngoketunjia municipality. Photo A is the road between Babessi and Balikumbat cut by water, while Photo B is part of the Road linking Baminka and Bamessing with potholes. Photo C is the stretch of road linking Babessi to Babungo, which is untarred, while photo D is the road linking Balikumbat to Ngoketunjia city with a "pond" in the middle. These depict the seasonal and dilapidated nature of rural-urban road transportation infrastructure in Ngoketunjia.

Figure 8: Road Network in Ngoketunjia
Source: Field Work (2024)

4.10. Lack of Storage Facilities

The challenge of inadequate storage facilities, as revealed through interviews with farmers and highlighted by Sarris (2016), underscores a significant impediment in the agricultural sector, particularly affecting the management and longevity of perishable goods such as Irish potatoes, rice, tomatoes, and carrots. This inadequacy not only leads to considerable post-harvest losses, diminishing farmers' income potential but also affects the broader community by reducing the availability of essential food items. The establishment of specialized warehouses equipped with technologies to regulate temperature and humidity emerges as a crucial solution. Such facilities would not only safeguard perishable products, extending their shelf life, but also streamline the agricultural supply chain by serving as pivotal hubs for the aggregation, processing, and distribution of these goods. This strategic investment in storage infrastructure, underscored by the insights from farmers' experiences, is imperative for bolstering food security, supporting the agricultural economy, and promoting sustainable practices, necessitating collaborative efforts from both public and private sectors.

4.11. Diminishing the Age of Farmers

The analysis in figure 9 reveals a concerning trend within the agricultural sector, highlighting a significant generational gap in farming. With fewer than 8% of young individuals engaged in agriculture as their primary profession, the long-term implications for agricultural sustainability and the country's strategy for food self-sufficiency are alarming. This detachment of the younger generation from agriculture underscores a critical challenge in maintaining a robust and dynamic farming workforce. The aging agricultural population, coupled with the youth's disinterest, signals a potential crisis in the continuity and advancement of farming practices.

The disengagement of youth from agriculture is not merely a statistic; it embodies a broader issue of economic, cultural, and technological shifts that draw younger populations away from traditional farming roles. This trend may stem from perceptions of agriculture as labor-intensive, low-paying, and lacking in modern technological application, making it less appealing compared to other sectors. Moreover, the aging of the current farming population poses questions about the transfer of knowledge and skills to future generations, which is crucial for innovation and sustainability in agriculture.

The graphical representation of the age variation among the 285 farmers surveyed in the study serves as a stark illustration of this demographic challenge. Addressing this issue requires a multifaceted approach, including the integration of modern technology and practices in agriculture to appeal to younger generations, enhancing access to education and training in sustainable farming techniques, and implementing policies that provide financial incentives and support to young farmers. Encouraging the participation of youth in agriculture is vital for ensuring the sector's resilience, innovation, and contribution to food security in the face of changing global food systems and environmental challenges.

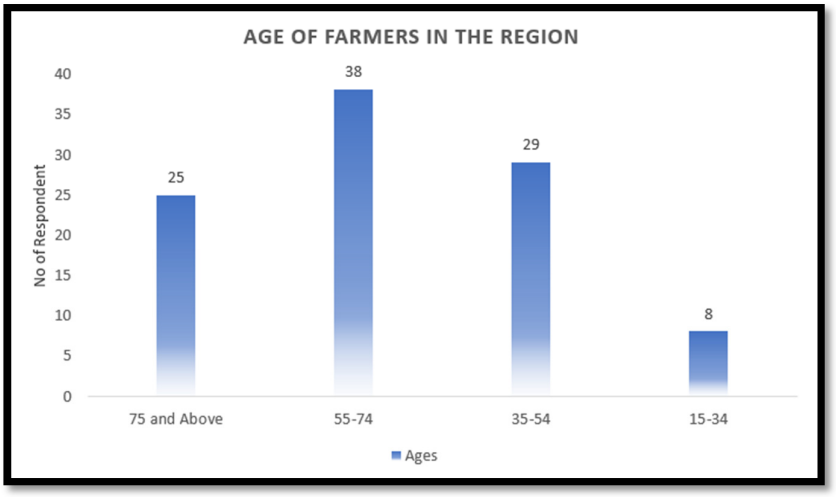

Figure 9: Ages of the Farmers
Source: Author's Compilation (2024)

Figure 9 shows the age of the sampled farmers, and it reveals that the respondents aged between 55-74 were more selected and ready for farming in Ngoketunjia municipality. The least were between the ages of 15-34, with 8% of farmers showing a diminishing desire of the younger generation to farm.

4.12. Climatic Changes

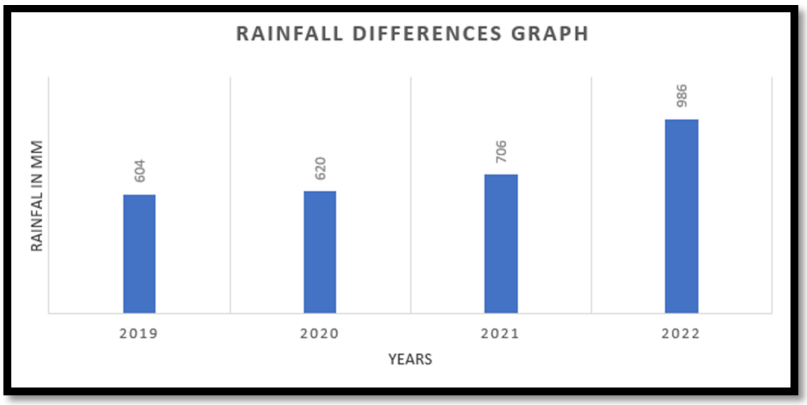

Figure 10: Rainfall Differences in Cameroon
Source: Cameron Metrological Agency (2023)

It was reported that the weather conditions affected farming activities in particular and agriculture in general in the region. Excessive rainfall, as seen in figure 10, especially in 2022 with rainfall of 986mm, damages crops and reduces yield, and the effects are exacerbated at the other extreme by excessive sunshine. Too much rain also encourages the growth of other pests, which has an indirect effect on crop yield per hectare. Farmers reported that high-speed wind has harmed maize crops in the last two years, significantly reducing yields. Regrettably, there is no insurance coverage for this type of risk faced by farmers. Third-party liability insurance is more strictly enforced by the government in Cameroon in general and the region in particular than any other type of insurance. Legislation may be limited in its ability to enforce insurance policies in the agricultural sector, particularly given that the farming population is largely illiterate. Even compulsory vehicle insurance, which is mandatory throughout the national territory, is not purchased by all vehicle owners, as they continue to evade police checkpoints.

In terms of farmers' perceptions of the challenges they encounter in agricultural practice, the farmers emphasized price volatility, pest and disease, and a lack of finance as significant impediments to agriculture growth in Ngoketunjia Division. With price stability, access to financing, and pest and disease control, farmers would be able to employ labor, purchase inputs, and educate themselves on optimal production techniques, all of which would result in increased output and productivity.

The adversities faced by farmers in the Ngoketunjia Division due to extreme weather conditions, coupled with the lack of insurance coverage for such agricultural risks, underscore the urgent need for innovative financial mechanisms and sustainable farming practices. The introduction of green finance could play a pivotal role in addressing these challenges. By prioritizing investments in sustainable agricultural technologies and practices, green finance can help mitigate the impacts of climate change on farming. This includes funding for the development of climate-resilient crop varieties, water-

efficient irrigation systems, and organic pest control methods that reduce dependency on chemical inputs. Moreover, the adoption of sustainable practices could qualify farmers for carbon credits, a promising avenue for additional revenue.
Carbon credits are earned through actions that capture or avoid the release of carbon dioxide into the atmosphere, such as reforestation projects or the adoption of no-till farming practices. By participating in carbon credit markets, farmers in the Ngoketunjia Division could potentially offset some of the financial risks associated with climate-induced crop failures. This system not only provides a financial incentive for adopting sustainable practices but also aligns the interests of farmers with global efforts to combat climate change. The integration of green finance and carbon credit mechanisms into the agricultural sector could thus serve as a dual strategy for enhancing the resilience of farming communities to climate variability while promoting environmental sustainability.

5. Discussions

The research discovered a variety of issues confronting farmers in the Ngoketunjia region. These difficulties included pests and disease, financial and cultural constraints, insufficient farm roads and warehouses, and weather conditions. Weather conditions were shown to have a detrimental impact on agricultural production in Ngoketunjia Division in this research. This result is consistent with the study's a priori assumption and with the findings of Shobande et al. (2014) and Oguijuiba (2013). In third-world nations, weather conditions have a direct impact on agricultural production. Farmers are at the mercy of nature, as natural factors such as rainfall, sunlight, and other climatic variables interact. Weather conditions have been extensively addressed in the literature. Smith and Marshall (2004) found that weather variability has a critical role in determining production globally. Apart from green technology, which enables farming in any period or region of the globe, natural causes account for the global change in agricultural methods. Crop specializations by area are a direct result of the climatic factors prevalent in certain locations. Temperate areas have a cropping culture that is markedly different from that of the tropics or poles.

On the other hand, weather conditions required a considerably longer time to establish themselves as a significant influence on agricultural output. Indeed, the most important contributions were produced beginning in the mid-twentieth century. Becker (2000), in particular, is generally recognized as a supporter or contributor to the development of agricultural theories, stressing the detrimental effect of poor weather on agricultural output. Additionally, Devarajan et al. (1996) emphasized the critical role of meteorological conditions in implementing and adopting new agricultural technology.

While it is necessary to examine and acknowledge the importance of different variables in agricultural output, the human dimension, as articulated in Solo's writings (the human-capital enhanced Solow model), is important, as noted by Gramlich (1994). Human capital is a factor that must be considered, particularly in the Cobb-Douglas development characteristic. Additionally, Romer and Lucas (1986, 1988) developed an endogenous growth model that incorporates technology change and offers empirical support. According to these theories, human capital is a critical factor in agricultural output and long-term economic growth (Estache, 2002). The unified growth models (Canning, 1999) include further discussion on agricultural productivity and economic growth, suggesting that agricultural productivity is the primary driver of long-run development.

6. Conclusion

This study aimed to examine farmers' problems and possibilities for food self-sufficiency in the Ngoketunjia division. The data for the research was gathered utilizing a structured questionnaire and interview, and the findings obtained showed 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 difficulties were shown to have a substantial effect on the production of the farmers in the area. At least 85 percent of the farmers aggregately complained about weather conditions as a restriction to the growth of agriculture. Changing weather conditions have proven to have detrimental impacts on the production of farmers in the area. This conclusion was confirmed by the empirical research performed in this study, as the weather was shown to have a statistically significant impact on the production of agriculture in the area. It was recommended that there is a need to stabilize market prices by putting up a buffer system. This is a price stability mechanism where regulations may be established to store products when supply exceeds demand to prevent prices from dropping and release stock when demand exceeds supply to prevent prices from increasing via black marketing. Given that it is the demand and supply circumstances that cause prices to vary most frequently, the building of a warehouse will assist in preserving perishable goods and surplus throughout the market process and keeping their availability consistent in the market. In this manner, the government may purchase the surplus, store it in these warehouses and release it during times of scarcity to stabilize the prices. Additionally, while weather conditions cannot be altered by humans, a better knowledge of the weather conditions may assist farmers in making smarter choices regarding the time of crop season. In this respect, there is a need for a weather station to be built to gather more climatic data on the area for improved decision-making. Finally, efforts should be made by the Government and the people to overcome the difficulties they encounter in the exercise of their profession. Specifically, there is significant demand to disenclave the producing basins by opening up farm-to-market routes in the area. This is the duty of the Government since individual small-scale farmers cannot pay the expense of roads and infrastructure development. While this discovery is particularly for the area, the uniformity of people and the physical features indicate that the findings may be applied to other regions of Cameroon. However, there is the need to conduct nationwide research with additional samples to determine whether findings would converge.

7. Recommendation

This study's findings illuminate the myriad challenges faced by farmers in the Ngoketunjia division, ranging from financial exclusion and inadequate infrastructure to volatile market conditions and the adverse effects of climate variability on agricultural productivity. The emphasis on the need for market price stabilization, improved infrastructure, and enhanced weather forecasting underscores the critical nature of these interventions for bolstering food self-sufficiency and sustainability in the region. Furthermore, these challenges, compounded by an aging farming population and the younger generation's disinterest in agriculture, highlight an urgent need for innovative approaches to revitalize the agricultural sector. Integrating green finance and carbon credit systems into the agricultural framework presents a viable pathway to address these multifaceted challenges. By leveraging green finance, investments can be directed towards sustainable agricultural practices, renewable energy installations on farms, and the development of climate-resilient infrastructure, thereby reducing the sector's environmental footprint and enhancing productivity. Simultaneously, engaging in carbon credit schemes offers farmers an opportunity to generate additional income through sustainable practices that sequester carbon, such as reforestation and improved soil management. This not only incentivizes the adoption of environmentally friendly farming methods but also contributes to global efforts against climate change. Ultimately, the integration of green finance and carbon credits could serve as a critical lever for promoting agricultural sustainability, attracting the younger generation back into farming, and ensuring the long-term food security and economic resilience of the Ngoketunjia division and potentially other regions of Cameroon.

Addressing this issue demands a comprehensive strategy that encompasses the development of resilient crop varieties, the adoption of sustainable agricultural practices, and the implementation of effective pest management systems. Enhancing the resilience of agricultural systems against pests and diseases requires an understanding of the local impacts of climate change, alongside fostering community awareness and education on adaptive and mitigative strategies. By equipping farmers with the necessary knowledge and resources, the aim is to not only protect current agricultural productivity but also ensure the long-term sustainability and resilience of food systems in the face of environmental challenges. This holistic approach underscores the importance of integrating climate change adaptation into agricultural planning and management to secure food supply chains and support rural economies in regions like the Ngoketunjia Division.

8. References

i. Abia, W., Shum, C., Fomboh, R., Epole, N. & Ageh, M. (2016). *Agriculture in Cameroon: Proposed Strategies to Sustain Productivity. International Journal for Research in Agricultural Research*, 2,(5).

ii. Ashkenazy, A., Calv~ao Chebach, T., Knickel, K., Peter, S., and Hurwitz, B., (2017). *Building Resilience in Agricultural Households and Rural Regions Evidence-based lessons from fourteen case studies in Europe and beyond (publication forthcoming).*

iii. Ball, A. (2016). *The Future of Agriculture in Cameroon in the Age of Agricultural Biotechnology. Independent Study Project (ISP) Collection*, 2287.

iv. Becker, R. (2000). *A New Database on Financial Development and Structure. World Bank Economic Review* 14, 597–605

v. Behrman, J., Wolfe, B., 1987. *How does Mother's Schooling Affect Family Health, Nutrition, Medical Care Usage, and Household Sanitation? Journal of Econometrics,* 36, 185–204.

vi. Bellon, M. R., Kotu, B.H., Azzarri, C. & Caracciolo, F. (2020). *Whether to diversify or not to diversify is the question. Pursuing agricultural development for smallholder farmers in marginal areas of Ghana, World Development*, 125,104682. https://doi.org/10.1016/j.worlddev.2019.104682.

vii. Canning, D. (1999). "*The Contribution of education and training to Agricultural Output", The World Bank Policy Research Working Paper* 2246.

viii. Chamberlin, J., Jayne, T.S. & Headey, D. (2014). *Scarcity amidst Abundance? Reassessing the Potential for Cropland Expansion in Africa. Food Policy*, 48, 51–65.

ix. Chavas, J.P., & Barham, B., (2007*). On the Microeconomics of Diversification under Uncertainty and Learning. Working Paper* No 515. Department of Agricultural and Applied Economics, University of Wisconsin, Madison.

x. Chikalipah, S. (2017). *What determines financial inclusion in Sub-Saharan Africa? African Journal of Economic and Management Studies*, Vol. 8 Issue: 1, pp.8–18, https://doi.org/10.1108/ AJEMS-01-2016-0007

xi. Duffy, M., (2009). *Economies of size in production agriculture. Journal Hunger Environment*. 4(3-4), 375–392.

xii. Forbe, H.N. (2019): *Community Livelihoods in Ngoketunjia Division, North West Cameroon. Journal of Resource and Environmental Management, Volume* 6, No. 1, 2019.

xiii. Killic, T., winters, P. & Carletto, C. (2015). G*ender and agriculture in sub-Saharan Africa: Introduction to the special issue. Agricultural Economics 46* (3): 281–284.

xiv. Kristjanson, P., Bryan, E., Bernier, Q., Twyman, J., Meinzen-Dick, R., Kieran, C., Ringler, C., Jost, C. & Doss, C. (2017). *Addressing gender in agricultural research for development in the face of a changing climate: where are we and where should we be going? International Journal of Agricultural Sustainability*, 15(5), 482–500.

xv. Knickel, K., Redman, M., Darnhofer, I., Ashkenazy, A., Calv~ao Chebach, T., Sumane, S., Tisenkopfs, T., Zemeckis, R., Atkociunien _ e, V., Rivera, M., Strauss, A., Søderkvist Kristensen, L., Schiller, S., Koopmans, M. and Rogge, E., (2017). *Between aspirations and reality: Making farming, food systems, and rural areas more resilient, sustainable, and equitable*.

xvi. Jackson, T., (2009*). Prosperity without Growth. Economics for a Finite Planet. Earthscan, London.*

xvii. Marshall, J.N. (2004). *Financial institutions in disadvantaged areas: A comparative Analysis of Policies encouraging financial inclusion in Britain and the United States. Environment and Planning A*, 36(2), 241–261.
xviii. Oguijuba, K. (2013). *The Impact of Human Capital Formation on Economic Growth in Nigeria'. Journal of Economics*, 121–132.
xix. Olaniyi, E. (2016). *Determinants of Financial Inclusion in Africa: A Dynamic Panel Data Approach. Published in: University of Mauritius Research Journal*, 22(1), 310–336.
xx. Romer, P.M. (1986*). Increasing Returns and Long-run Growth, Journal of Political Economy*, 94, 1002–1037.
xxi. Sarris, A. (2016). *Financial needs and tools for agricultural development and transformation pertinent to low-income, food-insecure countries. Fondation pour les études et recherches sur le développement international, Development Policies, Working Paper Number* 152,
xxii. UNEP (2016). *GEO-6 Regional Assessment for Africa, Nairobi: United Nations Environment Programme Wiggins, Steve and Keats, Sharada (2013) Looking Back, Peering Forward. Food Prices and the Food Price Spike of 2007/08, Project Report, ODI Shockwatch: Managing Risk and Building Resilience in an Uncertain World, London: Overseas Development Institute (ODI).*