WATER SUPPLY SCHEMES, COMMUNITY CAPACITY BUILDING, AND PRO-AGRIPRENUERSHIP AMONG MBORORO HOUSEHOLDS IN WESTERN HIGHLAND OF CAMEROON

by

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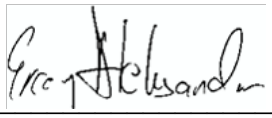
APPROVED BY 

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DEDICATION

To my beloved wife Mme Nteh Cecil Fola

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I specifically express my deepest gratitude to supervisor Dr. Kunal Gaurav at the Swiss School of Business and Management, Geneva, Switzerland, who took the pains and patience to guide me throughout this research exercise. I perceived my appreciation to be incomplete without of course commending the admission team that grants me the opportunity to study in this noble institution.

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ABSTRACT

WATER SUPPLY SCHEMES, COMMUNITY CAPACITY BUILDING, AND PRO-AGRIPRENUERSHIP AMONG MBORORO HOUSEHOLDS IN WESTERN HIGHLAND OF CAMEROON

Mohtangongho David Njewoh
2024

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The study analyses the effects of water supply schemes and agriculture community capacity building on pro agripreneurship among the Mbororo households at the West and North West Region of Cameroon. Data used in the study was elicited through the survey questionnaire administered on a sample of 475 households who lives in the rural setting in the various areas. Cluster sampling approach was used in grouping proximity villages into four zones and purposive sampling technique was adopted in selecting the households. The objectives of the study were achieved empirically by relying on the maximum likelihood estimation techniques in general structural equation modelling; principal component analysis was used to construct the indexes, and ordinary least square estimation method for consistency test in the findings. The results show that water supply schemes have a significant positive effect on pro agripreneurship at 1% significant level. The results equally indicated that agriculture community capacity building has a significant effect on pro agriprenuership. The signicificant of the effect of water supply scheme and agriculture community capacity building on pro agripreneurship means that a 1 unit increase in the

level of water supply schemes cause 38.8% surge in the level of pro agripreneurship while agriculture community capacity building on the other hand resulted to an increase in pro agripreneurship to the tune of 35.2%. The findings also show that community capacity building does not strengthen the contribution of water supply schemes on pro agripreneurship. The results equally indicated that there is no statistically significant mean difference in pro-agripreneurship between male-headed and female-headed Mbororo households in the western highland of Cameroon. Based on these findings, the study therefore recommends that policies aimed at promoting rural agripreneurship development among indigenous group should adopt an integrated approach of agriculture community capacity building programs and water supply schemes initiatives.

Keywords: Community, Agripreneurship Sustainability, Inclusive Development, Cameroon.

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Chapter I:

INTRODUCTION

1.1 Background to the Study and Scope

Water Supply Schemes, community capacity building, and pro-agriprenuership is an important research topic which can contribute positively towards the sustainable livelihood of farmers especially in developing countries. Agriprenuership, which involves adding values through transformation, and acquiring relevant skills and resources to improve the livelihood of the farmers, is one of the most relevant sectors yet to receive substantial empirical evidence (Umeh et al., 2020). It provides enormous and unlimited economic opportunities in terms of job creation. Adeyanju, Mburu and Mignouna (2021) conducted a study assessing the contribution of agricultural capacity building programs among young agripreneurs in Nigeria. The study found out that agricultural capacity building contributed positively on youth agriprenuership.

In addition, most farmers in developing countries are into seasonal farming even though it is their primary source of income. But with the availability and affordability of a water supply schemes, farming and the transformation of products can go on throughout the year. It has also been argued that one of the ways to stimulate economic growth in low-income economies is by investing in infrastructure and human capital. It will enable the have not in the society to join the global economy through the private-sector-led economic growth (Anderson et al., 2006). The importance of water supply schemes and community capacity building are critical for promoting agriprenuership in most developing countries.

Agriculture remains the backbone for sub-Saharan African countries, as it accounts for over 23% of the gross domestic product (GDP) in the subregion (Nyambo et al., 2022). Most African countries heavily relied on food importations, which causes most of sub-Saharan Africa to flood billions of dollars annually abroad. Their heavy reliance on food importation is attributed to the challenges that farmers in the subregion are facing. Farmers in sub-Saharan African countries and Cameroon faced a lot of challenges. These challenges cause difficulties in growing crops, affecting yields and farm income. These challenges include unreliable rainfall patterns, inadequate government support, drought, access to markets, lack of technology to manage post-harvest losses, lack of climatic change adaptation and mitigation strategies, and absence of capacity extension services to strengthen the agricultural value chain.

Njang and Thalut (2023) argue that increasing the social capital base of small-scale agri-entrepreneurship can improve relational-based conditions for small-scale agribusinesses. The study further maintained that farmers that are members of farming cooperatives are likely to benefit from shared resources like farm inputs, farm extension services training, and access to markets. Additionally, building strong relationships with other farmers will not only lead to knowledge sharing but also provide an opportunity for a supportive environment for innovation and improvement in the livelihood of the farmers in the subregion. In another study, Lyon (2000) analyses the contribution of trust networks and norms to agricultural production, financial systems, and marketing in Ghana. The study revealed that social capital is important for the growth of the private sector.

Water supply schemes and community capacity building can facilitate collective action and cooperation necessary for the promotion of agripreneurship among

households in developing countries. It can be argued that access to water supply scheme can permit farmers to farm all year round thereby increasing farm income and reduction in food poverty and hunger.

According to Andrew (2010), Cameroon national water and sanitation policy incorporates some of the guiding principles of the MDGs and SDGs. Some of the policies of MDGs adopted by Cameroon include availability and affordable access to portable drinking water to Cameroonians by 2025, the supply of water and sanitation services as well as regionalizing the decision-making process concerning the allocation and prioritisation of extended services. Moreover, it has also been argued that adequate water supply provides the ability to irrigate and to spend extra time in local gardens, resulting in improvement in harvests and incredible wealth (Perry, 2017).

Therefore, the effects of water supply schemes, community capacity building, and pro-agriprenuership among the Mbororo community in Cameroon is yet to receive substantial empirical evidence that would provide useful insight for government policy of regional and inclusive development.

1.2 Research Problem

Agriculture remained one of the socio-economic activities that water supply schemes can impact. However, the extent to which it contributes to agriprenuership is yet to receive sufficient empirical evidence, especially among the Mbororo community in the western highland of Cameroon. There is a lot of disagreement in the literature on the nature of the effect of water supply schemes and community capacity building

on pro-agripreneurship. Some studies argued that sustainable agricultural production can only be achieved through value added and better use of the scarce resources (Zecevic, et al. 2019). Building the capabilities of the Mbororo household as means to promote agriculture-led development remains one of the major challenges towards inclusive and regional development in Cameroon. It will lead to better management of it limited resources efficiently. It has also been argued that inadequate provision of social facilities, such as a water supply scheme for drinking and irrigation among the Mbororo community in Cameroon, may undermine the activity of the government and many stakeholders towards the promotion of agripreneurship given that agriculture remains the backbone of most developing countries' economies.

Providing excellent and sufficient drinking water to the masses can prevent most illnesses, reducing time spent on water collection and thereby creating more time for schooling and income-generating activities, which in turn would improve the socio-economic life of the people. Many water supply projects were implemented from 2013 to 2015 in most of the communities in the north west region of Cameroon. For instance, the construction and rehabilitation of portable water supply scheme by gravity in Njinikom in Belo Sub Division, construction and rehabilitation, and extension of Gola and Kobla water supply scheme in Bali Sub Division, construction and rehabilitation, and extension of Golan and Kobla water supply scheme in Balikumbat Sub Division, construction, rehabilitation, and extension of Ako-Abuenshie water supply scheme in Ako Sub Division.

The Mbororo community who mostly lived in rural setting in the regions failed to benefit from these water projects.

The Mbororo communities still suffer from acute water supply shortages and lack of adequate skills that could have contributed in improving on their livelihood. The low level of skills can be attributed low level of education. Moreover, lack of adequate skills may lead to poor distribution and usage of the water supply scheme. Capacity building of the local community may either strengthen or weaken agripreneurship. It is against these backdrops, that the study seeks to analyse how building the capacity of the local community and provision of water supply schemes influences pro-agripreneurship among the Mbororo community in the western highlands of Cameroon. In other words, this study aims to provide an insightful into how water supply schemes and community capacity building affect agripreneurship in the western highland of Cameroon.

1.3 Purpose of Research

The study analyses the effect of water supply schemes. community capacity building, and pro-agripreneurship among Mbororo households in the Western highlands of Cameroon. The study also analyses whether community capacity building moderate the nexus between water supply and agripreneurship. And lastly, the study analyses if there is mean difference between females and males headed households in agripreneurship. There has been a significant discourse among agricultural policymakers in developing nations on the potential of integrating water supply systems and strengthening the capacity of households as means to promote

agriculture-led development since agriculture is considered the backboned of most of developing countries' economies. Several studies in the literature argued that insufficiency of social amenities, such as water supply system for drinking and irrigation, can hider agricultural production and transformation. Community capacity-building will be specifically focused on agricultural training and the extent to which it can contribute to pro-agripreneurship. Boasting the agricultural sector have the potential to reduce unemployment.

1.4 Significance of the Study

The findings of the study will guide policymakers' actions of the government. It will also contribute to the optimal integration of capacity building (According to Bartram et al., 2015), management of water resources and redistribution in promoting agripreneurship in rural Cameroon throughout the years. In addition, the accessibility to water supply schemes and better water management remains indispensable among third world countries' social and economic life. The reason is because it is still considered a major challenge.

Therefore, analysing the effect of the water supply scheme and community capacity building on agripreneurship among the Mbororo community in the western highland of Cameroon is critical as it will guide and inform policy actions of inclusive development in the rural setting in Cameroon.

Moreover, the findings obtained from the study will add to the existing literature on socio-economic issues, thus giving bedrock for other research since research is never done in solitary. It will also enable the local government through the councils to better allocate it scarce resources towards the distribution of the water supply schemes, engaging the Mbororo youths, women, and men in economic empowerment capacity building with a focus on agriculture transformation.

1.5 Research Purpose and Questions

To accomplish the principle, aim of the study, the specific objectives outline below was formulated to guide the study:

- To assess the effect of the water supply scheme on pro-Agripreneurship among Mbororo households in the western highland of Cameroon.
- To explore the extent to which community capacity building influences pro-agripreneurship among Mbororo households in the western highland of Cameroon.
- To investigate whether community capacity building moderates the linkage between the water supply scheme and pro-agripreneurship among Mbororo households in the western highland of Cameroon.
- To analyse if there is a mean difference in pro-agripreneurship among Mbororo female and male households in the western highlands of Cameroon.

- Understanding the nexus between water supply schemes, community capacity building, and pro-agripreneurship among Mbororo households in the Western highlands of Cameroon will provide the empirical evidence to support policy actions of government and other stakeholders. More specifically, the following research questions was raised:
- Does the water supply scheme affect pro-agripreneurship among Mbororo households in the western highland of Cameroon?
- How does community capacity building influence pro-agripreneurship among Mbororo households in the western highland of Cameroon?
- Does community capacity building moderate the effect of the water supply scheme on pro-agripreneurship among Mbororo households in the western highlands of Cameroon?
- Are female-headed households more pro-Agripreneurship than the male-headed households among the Mbororo community in the western highland in Cameroon?

Chapter II:

REVIEW OF LITERATURE

2.1 Conceptual Review

In recent times, there has been a significant discourse among agricultural policymakers in developing nations on the potential integration of water supply systems and the strengthening of farmers' capabilities as means to promote agriculture-led development. The inclusion of empirical information is necessary in order to provide guidance to policymakers. There is an ongoing argument regarding the insufficiency of social amenities, such as water supply system for drinking and irrigation, within the Mbororo community in Cameroon. This insufficiency has the potential to hinder the efforts of the government and various stakeholders in promoting agripreneurship, as agriculture continues to be the engine of economic growth in many developing nations and Cameroon in particular. The assignment provides a comprehensive overview of various concepts, followed by an examination of theories, and empirical literature, as outlined thereafter.

2.1.1 Concept of Agricultural Capacity Building

The notion of agricultural capacity development is characterised by its multidimensional nature, whereby it encompasses varying interpretations among individuals and agricultural policymakers in varied disciplines. It is not easy to pin down the definition of agricultural capacity building to a particular entity because its

dynamic and evolving in nature. Within the context of this study, agricultural capacity building is used interchangeably with agricultural training and development. Some studies have recognised agricultural education as agricultural capacity building (Mgendi et al., 2022; Yang et al., 2021). Additionally, Swanson et al. (2008) have explored agricultural capacity development in the context of agricultural extension. Agricultural advisory services and agricultural extension are sometimes used synonymously. Chambers (2014) argued that building the capabilities of rural communities is crucial for sustainable development, while Christoplos (2010) emphasizes the importance of capacity building in agricultural extension services for enhancing rural livelihoods.

However, according to Food and Agriculture Organization of the United Nations (FAO), (2022) agricultural advisory services refer to the provision of capacity development to smallholder farmers in developing nations, with the aim of enhancing their lives via increased productivity and food security (Swanson et al., 2008). Enhancing proficiency in the areas of enhanced seed varieties, soil fertility, efficient water utilisation, and effective crop protection measures is vital for augmenting agricultural yields. The acquisition of essential value-added skills or competences is vital for the meaningful development and agricultural training to take place.

Furthermore, the literature has recognised three distinct categories of capacity development, namely community, institutional, and individual. Goodman et al. (1998) provide a definition of community capacity development, whereby it is characterised as both a process and a result. In contrast, Chapman and Kirk (2001)

suggest that community capacity building is indispensable in facilitating the sustained growth of a community. Nevertheless, the concept of community capacity development lacks a precise and definitive definition, since it does not adhere to a certain dimension. Within the scope of this research, the notion of community capacity-building will be specifically focused on agricultural training. The agricultural sector in Sub-Saharan Africa is often seen as exhibiting suboptimal performance, despite the implementation of recent reforms with the objective of enhancing agricultural production (Balgah et al., 2023).

Agriculture is often regarded as one of the pillars for economic development in many developing nations. The agricultural sector's play a significance role in reducing unemployment through income generation, and food security. However, its growth is hindered by various factors such as insufficient training, limitations in financing production, lack of development skills, and inadequate access to essential factors of production, particularly water supply schemes. According to Birchall and Simmons (2009), the authors proposed that agricultural training contributes in the alleviation of poverty and addressing the issue of high unemployment.

According to recent research conducted by Oluwakemi (2021), it has been suggested that the implementation of agricultural capacity building initiatives has the potential to facilitate transformative development. This phenomenon occurs due to the fact that the process of enhancing agricultural capacity enables farmers to get access to innovative practises and technologies, hence leading to improvements in agricultural output and the overall living circumstances of producers (Coltrain et al., 2000).

According to the definition provided by Halim and Ali (1997), agricultural capacity development refers to the process of obtaining specialised skills aimed at enhancing one's performance in agricultural activities. The provided definition has a prescriptive nature and would benefit from a more comprehensive elucidation of the specific skill sets that farmers must learn to enhance their productivity. Anther definition was that provided by Diab and Yacoub (2020), as they argued that training in agriculture encompasses the process of instructing, enlightening, or educating farmers with the aim of equipping them with the necessary skills and knowledge to effectively engage in farming practises and assume roles that include significant challenges and responsibilities.

Mgendi et al. (2022) posit that vdagricultural training programme encompasses a sequence of both official and informal short-term educational initiatives designed for a collective of farmers, with the aim of achieving certain goals. Agricultural training interventions are especially intended to assist the transfer of information and skills pertaining to specific agricultural concerns, with the aim of benefiting farmers. According to Wonde et al. (2021), it has been posited that although farmers may possess familiarity with the training material, such as new technologies or innovations, widespread adoption of this information may still be pending.

Agricultural development means activities associated with livestock production or land use for planting, growing, cultivating, and harvesting crops or participating in a wildlife management plan. These activities may include clearing and cultivating

specified crop ground areas, constructing fences to contain livestock, constructing stock ponds, and other similar agricultural activities. The core principle underlying the development of self-reliant small-scale farmers involves implementing interventions that enhance farmers' capacity in six crucial domains: participation in decision-making processes, inclusive engagement, utilisation of personal resources, adeptness in self-governance, perseverance, and assuming accountability for one's actions (Ndlela and Worth, 2021). Nagler and Naudé (2014) argued that off farm enterprise depends on individual capabilities, household characteristics and institutional factors.

According to Eremie (2006), agriculture capacity building may be described as the systematic process by which various stakeholders and organisations enhance, establish, modify, and maintain their ability throughout time to advance sustainable agricultural growth and improve the welfare of all parties concerned.

Furthermore, the development of agricultural capacity has significant importance in equipping farmers and businesses with essential competencies, expertise, and assets to achieve favourable outcomes. Hence, the present study defines agriculture capacity building as the systematic acquisition, enhancement, and preservation of a wide range of agricultural skills and knowledge by individuals and farmers' organisations within a specific geographic region. These skills and knowledge encompass various aspects of agriculture, including land utilisation for planting, cultivating, and harvesting

crops, as well as understanding decision-making processes, fostering inclusive participation, leveraging persistence.

2.1.2 Concept of Water Supply Schemes

According to brikké *et al.,* (2003), a water supply system is a network of pipes flowing independently in two grades: with high and low-quality water. They argued that high quality water can be directed for domestic usage, while the low-quality water can be directed towards other utilities like watering or gardening, industrial, and commercial usage. It was further argued that inclusive development can be facilitated through access to water, irrespective of the quality and the form of usage (sutherland *et al.,* 2015). In addition, the water supply for secondary usage, especially in the agricultural and commercial sectors, can lead to significant harvest improvement, leading to incredible wealth. Khandker et al. (2014) in another study found out that improved water access in rural Bangladesh led to an increased agricultural productivity and diversification of economic activities.

In another study, Dzidic and Green (2012) substantiate the different types of water supply, underground water supply and non-portable groundwater resources. However, it was argued that both have a significant positive effect in supporting agriculture initiatives. The study also argued that irrespective of the type of water supply, they are useful for farming and non-farming activities. Also, another research developed different means by which water can be supplied using delivery schedules

of irrigations and flow of water; part of these rotational schemes was used (Roerink et al., 1997). The remote sensing of irrigation was via evapotranspiration, which considers the availability of soil moisture, the types of crops and soils in the basin of Rio Tunuyan (Roerink et al., 1997).

Guimarães *et al.* (2016) documented that water supply can be captured regarding inclusive accessibility and governance. However, the lack of the usage of technology to promote water supply in society constitutes a significant challenge. Most studies focused on developing nations challenged by water complexity management in urban regions with high population growth (Van der Bruggen et al., 2010; Hope et al., 2020). Perret (2002) argued that irrigation schemes in South Africa around unfavourable rural areas have contributed positively in shaping the 1998 National Water Act in South Africa. Ryman (1984) in investigating the effect of investment in capacity on supply of water for irrigated agriculture from underground water storage study, found that the level of groundwater supply capacity influences the cost of irrigation.

Prokopy (2005) defined water supply schemes as water provisions for drinking in impoverished rural areas. Opare (2011) noted two phases of the co-management period to achieve water supply in their communities. The study also posited that water supply is relevant for sustainable development efforts. The first three-month phase consists of intensive inter-management, where the communities pair up with private and public institutions to care for the water system. After achieving this phase, the

community's people learned new skills. In the second phase, phase two, the private companies were not considered, so only the communities were in charge of everything, and the goal was achieved. According to Knox et al. (2012), operationalised irrigation is efficient during the dry season. The concept of water supply schemes is also called irrigation from the literature.

Broader literature on infrastructure development and rural entrepreneurship studies shows that water supply scheme contributes positively to rural entrepreneurship Alvarez & Busenitz, 2001; Valerio et al., 2014; Ács et al., 2018).

Other studies examined water supply in the community based on the existing problems, beneficial achievable impacts, and factors that influence sustainability (Carter et al.,1999). Some of the study revealed that water supply activities are affected mainly by two general factors, which are natural hazards and human threats. The natural hazards constitute flooding, drought, earthquakes, water burn diseases, and wind, while the threats caused by man are chemical, cyber and physical (Li, 2007). Furthermore, the initiatives of the World Bank that aimed to construct water systems in developing nations via the concept of public-private partnerships can have tremendous effects on the level of agripreneurship. The private domain considers the strategic critical places of the value chain water supply, such as utilisation management and treatment of water for the essence of efficient enhancement of the free community water field (Ameyaw & Chan, 2015).

Water has become very scarce despite the increase in the demand for it, which implies that the threat of a water crisis in the world realists may be a significant challenge for farmers, especially in developing countries (Van der Bruggen, Borghgraef, & Vinckier, 2010). Its scarcity may result in rationing. It may also lead to broader inequality in water supply distribution in some areas.

Recent studies focus on the sustainability of water supply for agricultural, domestic, and commercial usage. For instance, it is argued that sustainability of water supply in nations, societies and communities can be achieved via the implementation of different irrigation schemes for farming, borehole water systems, groundwater panels, the recycling of already used and poor water alongside technology, all these means are going to help in fostering water availability in nations and reduces the rate of scarcity (Dzidic & Green, 2012; Knox et al. head, 2012; Van der Bruggen, Borghgraef, & Vinckier, 2010). In the context of the study, we will adopt the definition provided of water supply provided by Dzidic & Green (2012), Knox, Kay, & Weatherhead (2012), Van der Bruggen, Borghgraef, & Vinckier (2010).

2.1.3 Concept of Pro-Agripreneurship

Agripreneurship, which involves adding value through transformation, and acquiring relevant skills and resources to improve the livelihood of the farmers, is one of the most relevant sectors yet to receive substantial empirical evidence (anarah et al., 2020). adeyanju et al. (2023) conducted a study assessing agricultural capacity-building programs' contribution to youth agripreneurship in nigeria. The study relies

on endogenous treatment and probit regression; the results indicated that socioeconomic factors such as education, marriage, age, place of residence, and perception of training were significant predictors of agripreneurship.

Zecevic et al. (2019) considered agripreneurship as a transformation towards a circular bioeconomy, which can enhance national strategies for sustainable agricultural production, better use of resources, and waste reduction. This definition focuses on the value added to the agricultural sector in general. Value added through transformation can also improve on outputs and the living conditions of everybody, especially in the developing countries where agriculture is considered the backbone of the economy.

According to Oliveira (n.d.), agripreneurship refers to entrepreneurship in agriculture. At the same time, Reynolds et al. (1999), entrepreneurship is a notion that includes converting an idea or vision into an innovative business or venture or growing an existing firm by an individual, a team of people, or a well-known business. Integration of entrepreneurship and agriculture through valorisation, community engagement, effective leadership, and agro-business is considered agripreneurship. Incorporating creativity, creating opportunities, accepting risks, and changing business strategies to adapt to changing environments in agriculture, especially for developing countries, can have tremendous effects on livelihood outcomes. In another study, Kahan (2013) argued that innovation and creativity remain challenging for most farmers as they often need more experiences, access to services, people, or markets, and skills that can enhance their success as entrepreneurs (Wongtschowski et al., 2013).

In investigating the socioeconomic determinants of agripreneurship in northern Nigeria. It was found that gender, community background, family background, family economic status were positively and significantly related (Barau and Adesiji, 2017). Agripreneurship combined entrepreneurship and agriculture, with emphasis on developing sustainable and long-lasting agricultural sector. The process of integrating innovative technology solutions that can help farmers to cultivate all year round is part of agripreneurship. Agripreneurship makes agriculture make profitable and responsive to global concern of food security and hunger.

In the context of the study, agripreneurship will be considered a multidimensional process involving innovation, creativity, access to services and people, access to market, taking risks, changing business strategies, and translating ideas and vision into new business in agriculture.

2.1.4 Theoretical Framework

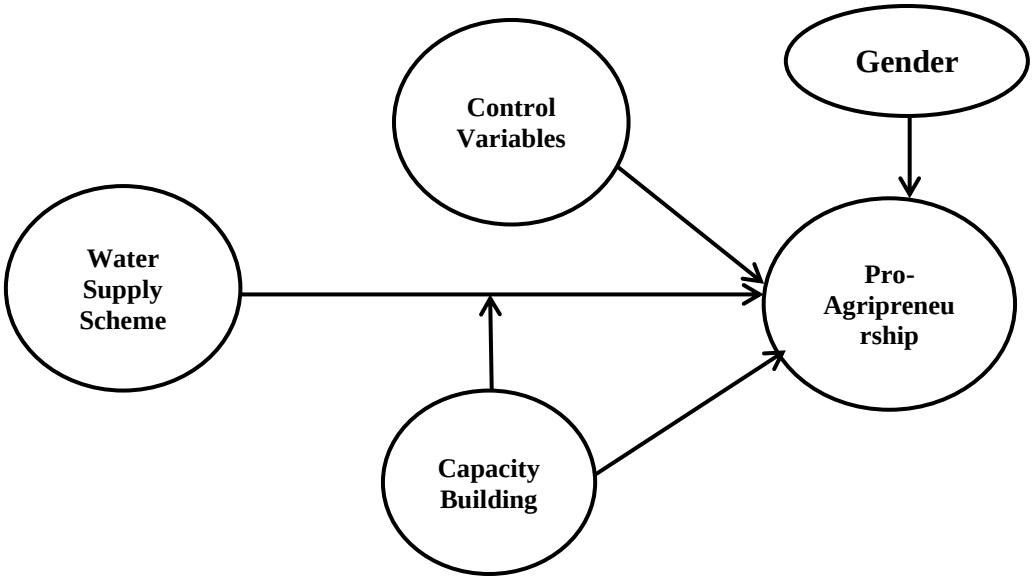

Figure* 2.1*: *Linkages between the between the Concepts studied*

Source: *Compiled by the Researcher, 2023*

Figure 2.1 shows the linkages between concepts used in the studies as defined earlier under conceptual review. The water supply scheme is an exogenous construct as many dimensions of water supply scheme would be captured. It has a direct effect on pro-agripreneurship. Agricultural capacity building is a co-founding construct or moderator. It is an intervening variable in link between water supply scheme and pro-agripreneurship. The gender of households' head is a binary exogenous variable. The model also shows that community capacity building can also have a direct effect on pro-agripreneurship besides its moderating roles. Socio demographic variables

were used as control variables in the model.

2.2 Theoretical Review

2. 2.1 Becker and Mincer's Theory of Human Capital

The notion of human capital was introduced by Becker and Mincer during the early 1960s. The authors suggested that skills, knowledge, experience, habits, and personality traits are crucial instruments for enhancing productivity. The theoretical framework was established upon the following principles. Firstly, it posits the notion that human capital refers to the intangible economic worth attributed to an individual worker's expertise and competencies. The underlying premise is logically sound within the framework of the research, since experience and skills are essential factors in the realm of agricultural education. The assumption made does not specify the extent or scope of the skill set.

Nevertheless, this implies that other elements, including education, training, intellect, skills, health, and other qualities highly regarded by employers, such as loyalty and punctuality, are taken into consideration. According to the human capital hypothesis, individuals have the potential to enhance their productivity by acquiring high-quality education and undergoing comprehensive skills training. Detractors of the theory believe that it suffers from inherent deficiencies, exhibiting an excessive degree of oversimplification, and further exacerbating the issue by conflating the concepts of labour and capital.

According to the findings of Blundell et al. (1999), human capital theory underscores the significance of investing in education as a means to gain skills and training, ultimately leading to an augmentation of individual capital. This concept elucidates the process via which individuals may acquire the requisite skills and competences that enable them to achieve exceptional performance in diverse professional environments. According to Tan *et al* (2015), the acquisition of information and skills is expected to enhance productivity inside the workplace. The significance of education in the labour market has seen a notable escalation. Intellectual and human capital are seen as replenishable reservoirs of production. The sort of education that farmers get significantly influences agricultural output and, therefore, the livelihood assets they possess.

The impact of education training on agricultural output is contingent upon several aspects of production, such as capital equipment. According to Freeman (1986), the inclusion of human capital as a component of production should be reconsidered, since it primarily serves as an indicator of an individual's potential and ability. Gintis (2006) conducted a study that examines the concept of human capital, specifically focusing on the endeavours aimed at enhancing individuals' entitlements and privileges. Ginitis' assumptions are prescriptive in nature, although they lack the comprehensive delineation of the procedural aspects pertaining to the enforcement of the right. The majority of scholarly research in this field mostly centres on the topics

of agripreneurship, management aptitude, and proficiency in operating a structured enterprise while assessing potential risks and possibilities.

Djomo and Sikod (2012) assert that human capital has many facets. Three elements of human capital are identified in their study on the relationship between human capital and farm revenue and agricultural production in Cameroon. A stock of skills, information, and personality traits that are embodied in the capacity to execute labour in order to generate economic value were the components that were identified. In a different study, Crook et al. (2011) made the case that experience, and education increase human capital, which is crucial for an organization's performance. In another study, Riddell (2007) argued that labour earnings, which represent productivity, and educational attainment have a significant and established positive association.

Broader literature is of the opinion that countries with higher rates of educational enrolment and training institutions experience faster economic growth compared to countries with low rates of enrolment (Mankiw et al., 1992; Riddell, 2007). Modern growth theory sees human capital as an important growth factor. The study further argued that it is not only important for growth but also relevant for democracy or AIDS (Hanushek & Woessmann, 2008).

Within the framework of this research, the human capital theory provides a means to comprehend the notion that agricultural training plays a role in enhancing the

economic resources available to farmers. The acquisition of the agripreneurial idea, characterised by a business-oriented mentality and market-driven attitude, may be facilitated by training (Mahmoud, 2018; Poulton & Macartney, 2012).

2.2.2 Bourdieu's Theory of Practice

Bourdieu (1930-2002) was a French sociologist and philosopher whose research "left an indelible mark on the field of educational and cultural sociology", especially outside the French territory. The Esquisse d'une théorie de la pratique (1972) is one of his most important works of Bourdieu. According to Bourdieu, there is an uneven distribution of resources in society. One could classify Bourdieu's Theory of Practice as a Grand Theory. A grand theory is a broad, abstract, normative theory of human nature and behaviour that may be applied to various contexts and fields of study (Jackson, 1988).

In this respect, Bourdieu's Theory of Practice has, for instance, been used as a theoretical framework in Organizational Studies, Marketing, and Human Resource Management, to name only some fields of application. One of Bourdieu's most essential and criticised contributions expressed in our entry quote is the reconciliation of the dualism(s) of structure and agency, structuralism and constructivism, determinism and freedom, or macro vs. micro (Grenfell, 2011; Bourdieu, 1972).

Social structures and the international market have been central to sociological theory(Berard, 2005). They are used to highlight those patterns of social life that are not reducible to individuals and are durable enough to withstand the whims of

individuals who would change them (Hays, 1994). Structures act as rules and determine and condition individuals' thoughts and behaviours.

A pure structuralism perspective would imply that people 'behave' as robots programmed to act according to structured patterns, a perspective that appears too rigid. On the other hand, the voluntarism or agency perspective suggests that individuals are entirely free in their choices and always have an array of alternatives (Hays, 1994). In his Theory of Practice, Bourdieu attempts to overcome these dualities. He explains strategy or practice by the complex interplay of his central concepts: field, habitus, and capital.

2.2.3 Theory of Economic Development by Adam Smith

The theory of economic development by Adam smith was concerned with the challenges of economic development. The nature and causes of the wealth of nations gained significant attention in His publication 1776. One of the assumptions of the theory is that self-interest is what motivates individuals to persuade economic activities. The theory further suggests that if individuals are allowed to follow their self-interest, community welfare can be achieved. The assumption that individuals should be left free to pursue their self-interest and as such community welfare can be improve can be criticised on the ground that it may results to exploitation. For instance, if individuals are allowed to pursue their self-interest in water supply schemes it may results to exploitation and externality given that water supply

schemes are not equally distributed. Moreover, individuals may pay less attention to external costs associated their activities.

The theory also supports the liassez-faire system of the economy where households can freely pursue economic activities without intervention of the government in the functioning of the market. The theory posited that the forces of demand and supply which are the pillars of the market mechanism suffice to restore any form of disequilibrium without necessary government regulations. The role of government in the distribution and management of natural resources like water resources which is ignored by this theory cannot be overlooked. The importance of government regulations in water resources management are in two ways. Firstly, to control on the over exploitation of water resources and make the water resources available at affordable costs to individuals and firms as well as to empower the local community with the necessary skills to carry out maintenance. Secondly, the government also intervention in natural resources management through imposition of taxes and grant subsidies to private sector for provision of water supply at affordable costs to its citizens.

The theory of development by Adam Smith also suggests that the reasons why some countries are lagging in development are because of lack of technical ability to efficiently utilised it scarce resources instead of over exploiting it. Smith argued that division of labour and capital accumulation are necessary pillars for any

development. Based on this argument, people invest because of expectation of the profits that can be accumulated in the process. If everyone is allowed to pursue their interest the community interest may hardly be achieved as not everyone participate in the market. There is need for government intervention to ensure that the resources are equitably distributed to reduce the level of inequality of water resources.

The theory is very relevant for the study as it pointed out the pivotal and equal role that each stakeholder namely individuals, firms, and government can play in the management of natural resources as the pursue their self-interest.

2.2.4 Theory of Social Capital

Putnam (1993) argued that social capital is the inter-relationship between social network, trust and norms that facilitate action and cooperation for mutual benefits. Putnam developed that social capital theory to explain the role of social network, trust, and norms on improving on the welfare of the community through collective action. The theory further argued that social relationships and networks within and between communities if well-coordinated can lead to improve social outcomes and thus inclusive development. Putnam also pointed out that social networks, norms, and trust are features of social organizations.

Meanwhile on the other hand, Coleman (1988) posited that social networks, which is one of the dimensions of social capital, is a very important channel that facilitates the

exchange of information. It was further maintained that the quality of information transfer because of the interaction largely depends on trust, and norms.

The theory assumed that high levels of trust between individuals in society can ease the exchange of more knowledge, while norms regulate and influence the behaviour of individuals. The theory also assumes that collective action and cooperation are essential inputs for improving community welfare. The third tenet of the theory supports the view that social relationships are indispensable in facilitating cooperation for mutual benefits in the community.

However, the theory of social capital as put forwards by Putnam (1993) can be criticized on a few issues. Even though social relationship is critical in reducing conflict at the community level and therefore necessary in facilitating collective action and cooperation in the society it effect is limited because inequality and power dynamic in the society are also essential. Moreover, there are complex interaction that can also have a strong influence on the social outcomes.

The theory can as well be criticised on its simplicity. The social outcome in any given society depends not only on networks, trust and norms. It failed to incorporate the cultural heritage, level of human capital development and entrepreneurship for sustainable livelihood.

The theory is very useful in understanding the nexus between water supply schemes, agriculture community capacity building, and pro agripreneurship among the

Mbororo households in the Western Highlands of Cameroon. The reason is because it provides valuable framework for understanding how collective action and cooperation can leverage on community development initiative such as water supply scheme to promote the well-being of everyone. The theory also suggests that economic development policies prioritize building social capital beside the pursuit of economic growth and development.

2.2.5 Theory of Capacity Development

The theory of capacity development was developed by Lennie and Tacchi (2013). They argued that capacity development is a process whereby individuals, organizations, institutions, and community strengthened their abilities and skills to achieve their development goals.

The theory assumes that capacity development is a continuous process, and individuals as well as organizations can improve on their skill sets through training, coaching and extension services. The definition of capacity development according to Lennie and Tacchi (2013) ignores the social and financial capital which can complement capacity building for community development.

The theory equally assumed that capacity development is a long-term process, and it requires sustained efforts and investment. This assumption can be criticised on the ground that most rural setting in developing countries, which are still struggling with poverty and access to basic services education and water supply scheme may find it very difficult to invest in building their skills and ability by themselves. There even

through the theory failed to indicate that critical role plays by the government in the provision of public services it remains critical in the supports and building of community in most urban areas in developing countries.

The theory is very important as it permit to understands the nature of capacity building that can be very useful among the Mbororo community in the western highland of Cameroon. This is because capacity development depends on the specific needs, priorities, and circumstances of the community. In the case of the Mbororo households in the western highlands of Cameroon, agriculture community capacity building is very relevant.

2.2.6 Theory of Marginal Costs and Benefits

Price is an important signalling mechanism in understanding how the market economy operates. However, market price fails to capture the real costs and benefits accruing to the third parties, resulting in inefficiency in the allocation of scarce economic resources. Market failure occurs when third parties who are not directly involved in the production nor the consumption of the community or services are affected by the process.

The theory assumes that individuals and organizations make decisions based on the availability of information that they have. The model also assumed that the marginal benefits of each additional unit of investment decreases as the total investment increases. The theory also assumes that each additional unit of investment is associated with an increase in costs.

The theory was developed by Alfred Marshall in 1842. The theory states that the optimal level of investment any economic activities occurs when the marginal benefits of the activities is equal to the marginal costs of the activities.

The theory has profound implications in the understanding of the additional benefits and costs associated with the supply of water schemes and agricultural capacity building to the Mbororo households living in the rural setting in Cameroon.

2.3. Empirical Literature

Nwibo et al.,2016 analyses the factors which influences agripreneurship among the rural households of Ishielu Local Government area of Ebonyi State in Nigeria. The study concluded that access to credit, agricultural training, income level of the agripreneurs, availability of social amenities, fertility of the soil, and type of farming methods have a positive significant effect on agripreneurship among rural households. The model was estimated using a multi-logit regression analysis. Multivariate logistic regression without accounting for the possibility of reverse causation between agricultural training and agripreneurship as both are simultaneously determined may result in under or overestimating the coefficients. Using the two-stage instrumental variable approach could have remedied the situation.

However, the study did an excellent job in the operationalization of the concept of agripreneurship. The study argued that agripreneurship is the integration of entrepreneurship into agriculture. The study also incorporates components of the

definition of agripreneurship provided by Sancho (2010). The definition considers agripreneurship as a process whereby farmers become determined, creative, innovative, willing to take calculated risks, and always looking for opportunities to improve and expand their farm business. The study recommended that adequate provision of crucial social infrastructures such as electricity, good roads, water supply, and proper information dissemination to rural households on identifying viable agripreneurial opportunities tend to spur agripreneurship growth.

Rosenzweig et al. (2004), in their study investigating water resources for agriculture in a changing climate, described that competing industrial and municipal demands influence the availability of water supply for agriculture. It further argued that climate change and the hydrologic cycle are the significant constraints farmers face regarding water availability for irrigation. The paper concluded that technology and water management improvements are crucial for sustainable crop cultivation growth.

In another study on the status of African agriculture and capacity development challenges for Sustainable Resilience from Global Economic Shocks, Mmaduabuchukwu (2013) posited that even though agriculture is the backbone of most African countries, lack of capacity development is one of the significant challenges for the sustainability of the sector. The study further reported that adequate transformation of the agricultural sector is a prerequisite for agriculture to contribute to achieving the Millennium Development Goals on food security and zero hunger. Other capacity development challenges highlighted in the study which are relevant

for agripreneurship were sustainable and profitable market access to smallholder producers, improvement in agricultural research and efficient technology dissemination, the extension of areas under sustainable land management, irrigation and efficient water control options, re-capitalization with improved microfinance and access to agro inputs.

Mamman (2014) in investigating the effect of entrepreneurship education on capacity building among small and medium size enterprises in Nigeria found that teaching of entrepreneurship education in tertiary institutions has no significant effect on capacity building and establishment of SMEs. No evidence of significant effect was attributed to faulty curriculum and delivery as well as exogenous factors such as lack of startup capital, energy and inadequate infrastructure. Despite the findings, the study made an important contribution in highlighting the important of capacity building at improving individuals' ability to exploit his or her potentialities in aspects of human endeavour such as economic, political and social affairs.

Another study still in Nigeria was carried out to document the nexus between capacity building, entrepreneurship, and sustainability also found that entrepreneurship in Nigeria can be sustained by capacity building (Nwazor, 2012).

According to Idawati et al.,(2016) in another study on effective training model of capacity building for entrepreneurship women based on empowerment community revealed that the women creative skills are high but their ability to manage finances is low. The study recommends that the training model should identify women with

potential high creative skills and ability to manage finances on average and trained them.

Another study was carried out by Bylon et al. (2015), The study argued that small business owners have accessed facilities offered by the enterprise support organizations', mainly in the areas of management training and financial assistance as a way of building their capacities for growth and development.

Issa (2013) conducted a study on building the capacity of agricultural extension personnel to implement the agricultural transformation agenda in Nigeria effectively and claimed that there is no hope for a transformation agenda across the country because of the shortage in the number and quality of extension personnel. The study used a survey research design approach based on evidence from literature, reports of organisations, and experiences from field research in order to establish the link. The study also identifies some of the indicators of capacity building as viable institutions and related organisations, commitment and vision of leadership, financial and material resources, and skilled human resources.

Dzidic and Green (2012) conducted a community acceptance of an alternative water supply scheme and sustainable urban design, using qualitative analysis and multistage technique; this uses parameters such as non-potable groundwater, sustainable urban water design characteristics, and turbidity of ground H20. The research study adopted the thematic analysis. Making use of questionnaires and interviews through a community-based approach. The study could have indicated

how the multistage sampling approach was carried out. The estimate is doubted and not specific; the researcher administers the questionnaires in a community which does not cut across as demand by multistage sampling. The research promotes other water supply methods, such as "non-potable groundwater schemes and turbidity of groundwater to enhance gardening, cooking in Australia." The research uses different approaches to collect data.

However, it is recommended that social values be overcome to encourage households to implement more sustainable strategies by promoting competition among neighbours to follow and adopt the greenest housing design. Hope et al. (2020) demonstrated that enhanced water infrastructure in rural Kenya was associated with greater engagement in small-scale agriculture and entrepreneurship.

Roerink et al. (1997) related crop water consumption to irrigation water supply. The study used evapotranspiration schemes, which considered tools which are "potential and actual evapotranspiration." It also considered the primary, secondary and tertiary unit of irrigation channels in the study area. The methodology for the study was a qualitative method and thematic data. It uses data from the field obtained from delivery irrigation schedules in the tertiary point in the unit of Viejo Rotamo from the 2nd to the 8th of March in 1990. Also, data was obtained from the "Digitalised irrigation unit boundaries (GIS)", where the indicator values for each unit of evapotranspiration were extracted. The study should have explained how the GIS obtained the values indicating each unit's evapotranspiration. The research shows that

the utilisation of crop water has the same actual pattern, which is detected from the top level of irrigation to the lower farm level, having a coefficient of variations from 14% for the Pixel level, 8.6% for tertiary and 6.1% for the secondary level. So, the constant pattern was because groundwater flow equalised the spatial trend of crop H20 utilisation.

Guimarães, Malheiros and Marques (2016) worked on inclusive governance based on water supply and sanitation services in social vulnerability areas. Field works and workshops were used as elements for inclusive access to know the effectiveness of the work in progress. Moreover, indicators for inclusive governance, such as functions of the authorities, institutional instruments, and utilities, were used to also know how well the work was efficient. This research used content analysis and frequency formulae; the inclusive access indicators were used to measure the connectivity rate of the piped network in house settlements. Meanwhile, inclusive government indexes were used to capture the governance processes which assure the achievement of water and sanitation for inclusive access to motivate the participation of the public and stakeholder transparency.

The work did not fully expatiate how vulnerable people have been affected by the impact of water access. Also, the strategised method used for capturing the exclusive population is unspecified. The findings were that, via capacity building, workshops and transparency, they could provide the accessibility of water and sanitation for people experiencing poverty and the community. Access to water and sanitation can

impact positively on the livelihood of the poor community (Khandker et al., 2014; Alvarez and Busenitz, 2001; Aguinis et al., 2019).

Van der Bruggen *et al* (2010) investigated the causes of Water Supply (W.S.) Problems in Urbanised Regions in Developing Countries. The study used 3 factors: "high population growth rate, inadequate W.S. infrastructural investments, limited natural resources." These parameters were affected by decisions of political instability, civil wars, and destitution. Qualitative methods were used to compare continents based on their water availability, such as their population area, the average for water resources, and water availability per capita. Also, descriptive and graphical methods were used; they show the population ranges in millions for rural and urban areas and the years from 1950 to 1960. The study produces trend analysis for the different continents' populations from 1950-2060.

However, the study needed to explain how the estimation was done by focusing on the extended future estimate. The findings revealed that sanitation and water supply can be well achieved in urban regions with stability in their military and political system. However, it is less experienced in developing nations than in developed ones. Opare (2011) assess the sustainability of water supply through a phased community management approach: lessons from Ghana's "oats" water supply scheme. The research study implemented participatory management, traditional decision-making, community participation and management. The methodology used for the study is a community-based approach via focus group discussion (monthly, Quarterly

meetings) and contributions from stakeholders and public and private agencies. Also, training sessions and reviews.

The total population in the community or even a sample size was not mentioned, which called for concern. The research talked about those who are isolating themselves but has yet to explain how it manages the isolated individuals. The finding revealed that the management scheme that manages water supply in communities is a panacea for sustainable water supply in the community.

Perret (2002) researched Water policies and smallholding irrigation schemes in South Africa, looking at the history and new institutional challenges. It determines some of the water policies and irrigation schemes that are of small scale, discriminative legal policies, the nature of water sources, the present difficulties and reforms, useable water that is under a property right and the latest management of water institutions. The study used historical information and events, water policies and institutional rights to determine its findings based on irrigation schemes using the National Water Act 1998. a lot of contradictions and failures were discovered in S.A. The National Water Act, which assists in managing the difficulty of the water, may need to be revised to handle the nature of scarcity of resources, competitive users, the performance of society and the development of jobs. The findings show that fairness, destitution reduction, and rural regions' growth can be achieved via good

management of the NWA alongside goods institutions and oriented market environments.

Knox *et al* (2012) expatiate on water regulation, crop production, and agricultural water management, Understanding farmer perspectives on irrigation efficiency. The paper developed parameters such as Regulatory environment, Abstraction controls, Benchmarking, schedules and Equipment regarding managerial and operational value. The same of 8 farmers and questionnaires were used; only farmers who know about the practice of mixed irrigation farming were selected. So, the research used qualitative research, and Likert scale questions were developed. Descriptive statistics and graphical presentation were implemented. There is a bias in the research because only those with practical knowledge of irrigation with mixed farming were considered. Also, the sample size used needed to be bigger (n=8). It was noticed that irrigation was a multidimensional concept with different views. Also, it has become scarcer and more valuable in England.

Carter *et al* (1999) determine the impact and sustainability of community water supply and sanitation programs in developing countries. The study evaluated the impacts of the current problems (its aspects, consequences, and immediate outcomes) and the impact of its actual and potential benefits concerning its infrastructure, users and clients. Meanwhile, sustainability looks at the pragmatism utilisation of the constructs. Community participation, community-based approach, Private sector

involvement. Need more resources to achieve sustainability of communities by government. The research discovered that projects with limited impacts can be achieved quickly. Furthermore, small, Limited sanitation and supply of water in developing nations leads to massive energy and time wastage and diseases related to water and defecation.

Prokopy (2005) finds the relationship between participation and project outcomes: Evidence from rural water supply projects in India. The research uses variables such as the contribution of capital cost, household decision-making based on household satisfaction, time savings and management. It used a stratified random sampling method in which 2 villages were sampled, Karnataka 25 samples and UP 20 samples. The statisticians used 10 years of field experience. The sources of this data were from households, past projects and organisations about their community engagement on projects such as water supply and sanitation regarding the current and past water utilisation. Both descriptive and inferential statistics were used to evaluate the regression model used in the study. The study should have considered a specific methodology and the techniques and methods of data collection. Also, even the sample size is to be doubted because it mentions different sample sizes in different areas of the work. Again, the study uses qualitative and quantitative analyses, which made the research too under standard.

A significant association exists between cost capital donation and tariff rates, but this rate of tariffs shows an insignificant association with other controlling variables. All

in all, it shows that the cost of capital positively impacts the outcome of projects. Ameyaw and Chan (2015) evaluated and ranked risk factors in public–private partnership water supply projects in developing countries using a fuzzy synthetic evaluation approach. This work operationalised its concepts into noticeable risk factors and the different levels of total risk elements such as finance, politics and technology. The paper uses a fuzzy synthetic evaluation (FSE) technique to assess the risk factors in growth nations. The study made use of questionnaires as a means of data collection. This research uses reliability, mean score and fuzzy synthetic evaluation analysis. The analysis used for the study, and the results are too complex. It mainly utilises the critical risk factors when the study has adopted a lot of other factors. According to the findings, using analysis of FSE, the financial risk has the highest risk level, the second risk level is legal and political, and the last and smallest risk level is technology. The study recommends implementing FSE by every organisation and institution for their decision-making.
Bezu and Holden (2014), argued that higher levels of education in rural Ethiopia contribute to the shift-away from agriculture towards non-farm activities.

In similar study, Foster and Rosenzweig (2004) argued that education can accelerate the transition out of agriculture in rural areas. These indicate that formal education is negatively associated with pro agripreneurship because the time gap opportunity costs.

Addo (2018) argued that the participation of young people in agriculture is not only for food security and unemployment issued. The major issue was technological and digital revolution in the agrifood sector. The study concluded that a holistic approach is needed in developing and promoting agripreneurship competences among young graduates. In addition, that emphasis should be laid on enhancing entrepreneurship traits and skills as well as strong technical business management skills.

Otache (2017) in exploring agripreneurship development as a strategy for economic growth and development in Nigeria found out that Nigeria have neglected the agricultural sector and that it depends so much on oil sector couple with corruption and policy inconsistency. The study recommends stronger economic diversification with a focus on agripreneurship.

Tripathi and Agarwal (2015) in another study in India on rural development through agripreneurship found that agripreneurship is pro poor and it is also capable of transforming the rural economy modern economy. The study equally posited that despites the importance of agriculture education there are challenges.

Studies have shown that women face constraints in access farm inputs, land assets, and credit limiting their ability to engage in agricultural entrepreneurship. For instance, studies have found that women are less likely to own land, have access to formal credit, and receive training and extension services compared to men (Doss, 2013; FAO, 2011).

World Bank (2012) argued that despite these challenges, empirical evidence suggests that female entrepreneurship can play an important and equal role in economic development. The study further suggested that there are needs to understand the specific barriers and opportunities women in agricultural entrepreneurship faces. Farmers in sub–Saharan Africa face challenges due to unreliable rainfall pattern, harsh sunlight and drought causing difficulties in growing crops and low farm income in addition to the gender challenges that prevent women for accessing land and credits.

In another study Chant (2013) maintained that Female entrepreneurs in agriculture face unique challenges, including limited access to markets, information, and networks. Moreover, societal norms and expectations can restrict women's ability to engage in entrepreneurial activities, perpetuating the gender gap in Africa.

However, the challenges faced by women in agriculture can be addressed by embarking on initiatives that promoting agri-entrepreneurship among women, such as training programs and access to credit and markets (FAD, 2014).

2.4 Summary

The literature revealed that past studies used descriptive analyses to understand the linkage between water supply schemes, community capacity building, and agricultural transformation (Mmaduabuchukwu, 2013; Issa 20113). Most of the

studies in the literature indicate that community capacity building, and pro-agripreneurship was poorly captured. As it was captured using only one question items on the questionnaire as compared to this study, which captured it by creating an index.

Furthermore, the concept of community capacity building is poorly captured in most of the studies in the literature (Halim and Ali, 1997; Diab and Yacoub, 2020). They argued that agricultural training encompasses the process of instructing, enlightening, or educating farmers with the aim of equipping them with the necessary skills and knowledge to effectively engage in farming practices. Essential components of capacity building such as access to innovation practices and technologies, perseverance, accountability, inclusive engagement, self-governance, management of personal resources, and decision making are ignored in most of the studies. None of the studies have actually taken into consideration all these factors as indicators of community capacity building.

However, most of the studies agreed that community capacity building can plays a vital role in alleviating poverty and addressing the issue of high unemployment. In another by Gyenfie (2014), aimed at explaining the linkage between programme planning approaches and livelihood outcomes of farmers in Ghana using multistage sampling approach and Kruskal-Wallis H Test and Mann-Whitney U Test. It was found out that agricultural extension services in Ghana improved the performance

and livelihood outcomes of farmers. Thereby suggesting that agriculture community capacity building is a tool for pro-poor programmes for the Mbororo community in the western highland of Cameroon. According to Mwamakimbula (2014) most farmers are motivated to attend extension education training to learn new ways of doing things to enhance agricultural production and farmers preference.

Most of the studies in the literature on the concept of community capacity building and agripreneurship in the literature failed to distil the concepts to reflect the contexts of the studies. This study takes into consideration all the key components of capacity building identified from the literature reviewed. Without taking into consideration all the facets of the various concepts in the study, would results to the concept gap. The concept gap if not handled would create a concept vacuum.

Most of the studies in the literature captured the concept of water supply scheme, community capacity building, and pro-agripreneurship using single variable item (Roerink et al.,1997; Rosenzweig et al.,2004; Sancho, 2010). This study has closed the gap by considering the various facets of the concepts, by developing as an index. The literature reviewed also indicated conflicting views on the nature of the effect of community capacity building on pro-agripreneurship. Some studies indicated that community capacity building contribute positively on agripreneurship (Nwibo *et al.*, 2016; Sancho, 2010; Issa, 2013) whilst other studies instead indicated a negative relationship (Mmaduabuchukwu, 2013). Mmaduabuchukwu (2013) indicating that

lack of capacity development is one of the significant challenges for the sustainability.

In another study carried out by Rosenzweig et al. (2004), it was concluded that concluded that technology and water management improvements are crucial for sustainable crop cultivation growth and therefore suggesting the moderating role of community capacity building on the water supply scheme and agripreneurship nexus. There has been a significant discourse among agricultural policymakers in developing nations on the potential integration of water supply systems and the strengthening of farmers' capabilities to promote agriculture-led development. However, studies have yet to combine these three concepts in a study.

Malapit et al. (2020) argued that there is a significant gender gaps in agricultural productivity across six African countries and attributed it to differences in access to resources and opportunities. In similar study, Akter et al. (2017) on gender disparities in agricultural entrepreneurship in Southeast Asia. The study also established a significant gender gap in agriculture. Much literature has not been documented in this area.

Chapter III:

METHODOLOGY

3.1 Overview of the Research Problem

In recent years, there has been a lot of debate among policymakers on inclusive development and agripreneurship among people residing in the rural setting in Cameroon. Inadequate provision of social facilities such as the water supply scheme for drinking and irrigation among the Mbororo community in Cameroon may undermine the government's and many stakeholders' activity towards the promotion of agripreneurship, given that agriculture remains the backbone of most developing countries' economies. In addition, the provision of a water supply scheme to the masses can prevent most of the illnesses many may be responsible for due to poor-quality water (Wolf, et al. 2022). It also reduces the time spent searching for water in the rural setting. The water supply scheme is important because it creates more time for schooling and other income-generating activities, which would improve people's socio-economic life.

Government intervention in the form of community capacity building is the predominant means by which social mobilization toward development goals is achieved. And as such the policymakers need informed empirical input on how provision of water supply scheme and community capacity building can boast pro-

agripreneurship among the Mbororo community in the Western highland of Cameroon. The promotion of entrepreneurship in rural communities is another popular development strategy, fostered in an effort to improve household income and health status. The benefits of pro-entrepreneurship would lead to sustainable improvements in the income and health of the poor in rural areas.

Both government agencies and NGOs have sought to achieve this through the various agricultural support programs, some of which emphasize specific cash crops, livestock, or fishing, and others which are more comprehensive in the range of enterprises they seek to develop. However, there lack comprehensive scientific evidence that can help shaped their policy of redistribution of essential economic resources. The study aims at providing an insight of the nexus between water supply scheme, agricultural community capacity building and pro-agripreneurship among the Mbororo community in the Western Highland of Cameroon.

3.2 Operationalization of Theoretical Constructs

In this section, the relevant related theories and models that explained the key concepts in the study were used to guide the operationalization of the hypothesised constructs.

3.3 Research Purpose and Questions

The study aims to analyse the effect of water supply schemes. community capacity building, and pro-agripreneurship among Mbororo households in the Western highlands of Cameroon. Several studies in the literature argued that insufficiency of social amenities, such as water supply system for drinking and irrigation, can hider

agricultural production and transformation. Community capacity-building will be specifically focused on agricultural training and the extent to which it can contribute to pro-agripreneurship.

To accomplish the principle aim of the study, the specific objectives outlines below was formulated to guide the study:

- To assess the effect of the water supply scheme on pro-Agripreneurship among Mbororo households in the western highland of Cameroon.
- To explore the extent to which community capacity building influences pro-agripreneurship among Mbororo households in the western highland of Cameroon.
- To investigate whether community capacity building moderates the linkage between the water supply scheme and pro-agripreneurship among Mbororo households in the western highland of Cameroon.
- To analyse if there is a mean difference in pro-agripreneurship among Mbororo female and male households in the western highlands of Cameroon.
- From the specific research objectives, the following research questions will be addressed:
- Does the water supply scheme affect pro-agripreneurship among Mbororo households in the western highland of Cameroon?
- How does community capacity building influence pro-agripreneurship among Mbororo households in the western highland of Cameroon?

- Does community capacity building moderate the effect of the water supply scheme on pro-agripreneurship among Mbororo households in the western highlands of Cameroon?
- Are female-headed households more pro-Agripreneurship than the male-headed households among the Mbororo community in the western highland in Cameroon?

3.4 Research Design

The study adopts cross sectional survey research design, that is, quantitative research method since the objective of the study is to gain an understanding of the effect of water supply scheme, agriculture community capacity building, and pro-agripreneurship among the Mbororo households in the Western Highlands of Cameroon. However, diverse approaches of research can be necessary to get the global perspective. According to Tashakkori and Creswell (2007) mixed method of research increase the validity of the finding as it is not only limited to collects and analyses data, but also integrates the findings, and draws. The study study focuses on quantitative research approach due to limited resources and the socio-economic and political issues that Cameroon is currently going through.

The quantitative research approach uses questionnaires as the primary data collection tool. The data was elicited from the questionnaires by quantified, coded, and keyed in the Statistical Package for Social Sciences (SPSS) version 20 software. After

coding the data into the software, the variables were subjected to cleaning and some of the variables were generated into binary and others into indexes. The research were structure into Likert scale question items. The quantitative survey design is crucial because it investigates a given population by selecting samples to analyse and discover the occurrence of the entire population. Conway (2006) argued that surveys are the best designs to adopt where subjects' perceptions, views, and beliefs are sought, hence the researcher's option of survey research design are essential. Even though the used of mixed research design approach is quite encouraging in some cases, it is often very expensive to implement.

3.5 Population and Sample

3.5.1 Population

The population of the study is members of households who are 18 years and above who are actively engaged in farming activities within the 17 Mbororo communities in the Northwest and West region of Cameroon. The Mbororo are one of the national minority groups recognized as indigenous people by United Nation in Cameroon.

The Mbororo are mostly nomadic cattle herders and farmers. The depends on its for their livelihood and mostly reside in the rural setting where grazing and farmland is more accessible. The Mbororo in Cameroon were originally from the Adamawa region, but many now live in the Western Highlands and Far North region of Cameroon. They are considered as the largest and most widely dispersed group of

cattle people in Cameroon, with an estimated population of 250,000 (Jahel et al., 2019). They are proud people, who place a high value on their customs and culture and have resisted efforts to settle down. Despite their low level of education, access to healthcare facility, and inadequate access to water supply scheme, the Mbororo are polygamous in nature with many children. Approximately 80,000 of them live in the North-West Region of Cameroon (Amadou 2017, 38), and about 200 in Badem.

The Mbororo people in the western highlands of Cameroon also whose activities are primarily pastoralists are engaged in agriculture. As farmers faced challenges of unreliable rainfall pattern, drought, harsh sunlight, and low access to education causing difficulties in growing crops and low farm income respective. The grow crops such as maize, beans, and potatoes.

3.5.2 Method of Sampling and Sample Size

The study adopts both cluster and purposive sampling approaches. This is because member of the households who live within the study areas were difficult to be reached, as they were mostly herders and farmers. The justification for the use of purposive sampling is that, it is not only easy and convenient to administer but depend on the judgment of the researcher about the subject. The cluster sampling was use in grouping proximity Mbororo communities into five zones. Communities in Zone 1 were: Kejom Ketinguh, Bambili, Bambui and Sabga, communities in zone 2 include Fedong, Santa, Sop, and Ntubew. While zone 3 include: Galim, Bamendjin, and

Foumbou. In zone 4, Didango, Mancha, Matekek, Membain, Bafole, Mancha Bani were selected as part of the sample. Purposive sampling was then employed in selected the households to participate in the study. Mbororo households in Zones 1 and 2 are from the North-West region of Cameroon while zone 3 and 4 were from the western region of Cameroon.

Most studies are of the opinions that sample size depends on the methods and techniques of analysis. For instance, Schreiber et al., (2006) argued that sample size is affected by normality of the data and estimation methods.

Their study further suggests that for a single parameter to be estimated using the maximum likelihood method there should be at least 10 respondents or 10 cases. The implication of their argument is that if there are 20 parameters in a study to be estimated the minimum sample size should be 200. While according to Anderson and Gerbing (1988) a minimum sample size for a study that adopts a maximum likelihood estimation technique with multivariate normality should be greater than 100. Based on the argument and considering the maximum likelihood estimation technique, the total sample size for this study was 475.

3.6 Participant Selection

The study selected both males and females headed households as they were the primary decision makers and were willing to contributes to the survey. Other reasons while they were selected was because of the ease of access to them. Other people that were available and willing to participate but were sick were excluded from participating in the survey because of ethical considerations. Participants that could not respond to the survey by themselves, were asked the questions and the response options were read to them to indicate their interest. Households where burial ceremonies was going on was also excluded because of ethical reasons.

3.7 Instrumentation

The questionnaire for the study comprises of structured closed-ended questions and Likert scale question items. The questionnaire was divided into four major sections: Section A comprises the demographic information of the respondents; Section B contains questions capturing community capacity building while section C includes: pro-agripreneurship and section D is on water supply schemes.

The concept of water supply scheme, community capacity building, and pro-agripreneurship are multifaceted and therefore can only be captured using so many question items on the questionnaire.

Most of the studies identify in literature failed to capture most of the relevant features of the concepts use in the study. In the context of this study, agricultural capacity involved training, access to innovative practices and technologies, leadership,

management, ability to solve agricultural problems, resources mobilization. These factors will lead to improvements, effective and efficient usage of economic resources in agricultural output and the overall living circumstances of farmers (Coltrain et al., 2000). Another reason of using many question items was to reduce the issue of content coverage bias that may occur because of the use of single question item as a concept.

The instrumentation bias was also controlled in the study by ensuring that unreliable test instruments were rejected in further analysis. By not allowing the respondents who participated in answering the questionnaire to participate again or influence other respondents. By preventing the respondents who have already participated from participating again or influencing others who are yet to participate permit to control for incidental learning or maturation bias. The controlled of maturation bias is very important in ensuring internal validity (Nnamdi, 1991).

3.8 Data Collection Procedures

They are two principal sources of data use in the study. The main source of the data was derived from the questionnaires that were administered to Mbororo households in the various zones that were selected to participate in the study. The secondary sources of data used in the study were textbooks, research articles, reports, internet resources and magazines.

Firstly, six data collectors were recruited, trained, and deployed to the field for the data collections. They were trained on how to administer the questionnaire, obtained the consent of the participants, managed crisis in the field, key in the data in excel and present the reports of challenges they faced. After every day of field data collection, there was briefing to address some of the challenges face by the data collectors. After obtaining the authorizations to decent to the field and collaborating with communities' leaders, it was easier to meet with the various households and only those that are involved in agriculture and were above the age of 18 years, willing to participate and healthy were selected to be administered the questionnaire.

Each questionnaire was estimated to take close to 7 to 10 minutes and pen was provided to each participant to facilitate the completion of the questionnaire. Some of the reasons for the use of the questionnaire in this study can be attributed to the fact that it is easy and inexpensive to administer relative to interview. In addition, a lot of data can be collected within a shortest possible time. The question items on the questionnaire were well frame to reduce misinterpretation bias. The data collection process was intended to last for a week, but it took a month to complete the process of data collection.

Secondly, the questionnaires were coded into SPSS version 23 and the data was extracted from the administered questionnaire. The data was transfer into STATA software for data management. Before subjecting the data for descriptive and inferential analysis, the data was check for possibility outliers and missing values. Then after due to the larger number of question items under water supply schemes,

agriculture community capacity building, and pro agripreneurship, it was submitted for principal component analysis. An index was predicted and normalised for each of the constructs as clearly explained under the methodology section in chapter three. The index was used to proxy for the various concepts in the study.

3.9 Model Specification and Data Analysis

3.9.1 Modelling the Effect of the Water Supply Scheme on Pro-Agripreneurship among Mbororo Households in the Western Highland of Cameroon

To empirical achieve the objective, this study adopt the model of Nwibo et al. (2016), as they argued that access to credit, agricultural training, income level of the agripreneurs, availability of social amenities, fertility of the soil, and type of farming methods have a significant positive effect on agripreneurship in Nigeria. Perret (2002) in analysing the contribution of water supply policies on irrigation schemes in South Africa, with a focus on past policies and new institutional challenges arrived at the conclusion that there is need to revise the water supply policy because of it relevant to social development.

The concept pro-agripreneurship is multifaceted, meaning it can only be adequately measure using so many indicators. Agripreneurship is captured as multidimensional process involving innovation, creativity, access to services and people, access to market, taking risks, changing business strategies, and translating ideas and vision

into new business in agriculture using principal component Analysis (PCA) as opposed to some of the studies in the literature.

In order to construct the pro-agripreneurship index, the principal component analyses (PCA) was employed since PCA is designed to model relationships between indicators and the construct. The index of pro-agripreneurship will be generated using the formula below. It is assumed that $\boldsymbol{i}$ designated individual households and PA is the values of the composite index generated. The mathematical exposition for the index is given by;

$$\boldsymbol{PA_{it}} = \frac{\sum_{k=1}^{K}\sum_{jk=1}^{JK} W_{jk}^{k} L_{JK}^{K}}{K} \qquad 3.1$$

Where; $\mathrm{PA}_{\boldsymbol{it}}$ represents pro-agripreneurship index for all the Mbororo communities considered**;** K is the number of indicators; W is the proportion attributed to each extracted component; L is the explained variance of the indicators.

The index generated produces both negative and positive values for the index, thus posing some interpretations difficulty. Therefore, it must be normalised within the range of 0 to 1, though fractionalised and not binary. By so doing, it eliminates the negative values of the index by adjusting the scores within the range of 0 to 1. The mathematical expositions for the normalized index procedure are outlined below.;

$$\widetilde{\boldsymbol{PA_{it}}} = \frac{\mathrm{PA} - \min(\mathrm{PA})}{(\max(PA) - \min(\mathrm{PA}))} \qquad 3.2$$

Where is max (PA) is the maximum value while min (PA) is the minimum value of pro-agripreneurship index predicted after fitting the PCA. The exogenous variable in this objective is water-supply scheme. Table 3.1 present the questionnaire item and its description that were used in creating a composite index for pro agripreneurship using principal component analysis.

Table 3.1 1: Indicator of Pro Agripreneurship

s/n	Question Item	Description of Dimension
1	Transformation of agricultural outputs into supply chain can enhance national strategy for sustainable agriculture	Knowledge of value chain
2	Valorisation of agricultural products through technological innovation will create more opportunities	Awareness of Technology innovation solutions
3	Agro-entrepreneurial skills can help the household	Agribusiness skills

4	Promotion of agricultural transformative empowerment program for the community will promote agripreneurship	Agripreneurship empowerment
5	Adoption of smart farming practices will lead to an increase in farm outputs and hence pro-agriprenuership practices	Knowledge of adoption of smart farming
6	Provision of farming inputs to farmer by government of Cameroon encourages agriprenuership	Support provision of farm inputs by government
7	Financing innovation in agriculture by both domestic and international community is very important for sustainable pro-agriprenuership	Availability and affordability of finance

By the same token of appreciation and mathematical expositions the index for water supply scheme was also be constructed and normalised using set of question items as observed in Table 3.1. The endogenous variable in this objective is pro-agripreneurship. The robust model will be fitted using the ordinary least square estimation techniques while the maximum likelihood of structural equation modelling will be used to test the casual effect of water supply scheme (WSS) on pro-agripreneurship. The model is specified as follow;

$$PA_i = \vartheta_1 + \vartheta_2 WSS_i + \vartheta_3 PEDU_i + \vartheta_4 SEDU_i + \vartheta_5 TEDU_i + \vartheta_6 X + \varepsilon_1 \qquad \textbf{3.3}$$

PEDU is a dummy variable for primary education; it takes the value 1 if the respondents have attended primary education, 0 otherwise. SEDU and TEDU represent secondary and tertiary education, respectively, and are also binary. X represents the vector of exogenous covariates used in fitting the model (sources of income, age, marital status, and years of experience of farmers). The parameter ε_1 captured the idiosyncratic terms, which are other variables that can also affect pro agripreneurship. However, they are assumed to have a mean value of 0 and a standard deviation of 1. The coefficients v1, V2, V3, V4, V5, and V6 are parameters to be estimated in the pro-agripreneurship function using ordinary least square estimation technique and the maximum likelihood estimation technique of structural equation modelling. The coefficient of water supply scheme is expected to be positive. The reason is that most farmers in sub-Saharan Africa countries faces unreliable rainfall

pattern, drought and harsh sun light causing difficulties in growing crops over the years. Access to water resources have the potential to boast quality and productivity. Educational levels are also expected to be positive correlated with pro agripreneurship. Positive relationship between education and agripreneurship means that skills acquired the various level of education is relevant in improving pro agripreneurship and vice versa. Table 3.2 present the description of the variables used in fitting model in objective one equation 3.3.

Table 3.1 2: Description of the Variables

Variable	Code	Description
Dependent Variable	---	---
Pro-Agripreneurship Index	pa	Continuous
Independent Variables	---	---
Water Supply Scheme Index	wss	Continuous
Control Variables	---	---
Marital status (1=married, 0 otherwise)	married	Binary
Gender (1=Female, 0	female	Binary

otherwise)		
Education (1=no education, 0 otherwise)	noedu	Binary
Education (1=Primary education, 0 otherwise)	pedu	Binary
Education (1=Secondary education, 0 otherwise	sedu	Binary
Education (1=Tertiary education, 0 otherwise)	tedu	Binary
Years of farm experience	yhexp	Continuous
Farm size (1=5 hectares and above , 0 otherwise)	fs	Binary
Age of Households Head	age r	Continuous

Source: Compiled by the Author, 2023

3.9.2 Modelling the Extent to Which Community Capacity Building Influences Pro-Agriprenuership among Mbororo Households in the Western Highland of Cameroon

The literature reviewed on the nexus between community capacity building and pro-agripreneurship presents conflicting views on the nature of the effect. Some studies indicated that community capacity building contribute positively on agripreneurship (Sancho, 2010; Issa, 2013) whilst other studies instead indicated a negative relationship (Mmaduabuchukwu, 2013). Mmaduabuchukwu (2013) argued that lack of capacity development is one of the significant challenges for the sustainability of the sector. This second objective in the study is motivated by the two strained in the literature. Agricultural capacity building is an exogenous variable while pro agripreneurship is endogenous. Agricultural community capacity building is multidimensional as it encompasses various aspects of agriculture skills and knowledge, including land utilisation for planting, cultivating, and harvesting crops, as well as understanding decision-making processes, fostering inclusive participation, leveraging persistence. In the context of this study all the facets of agricultural capacity building were captured using principal component analysis.

In order to construct an index for agriculture community capacity building, the principal component analyses (PCA) was employed. Since PCA is designed to model

relationships between indicators and the construct. The index of agriculture community capacity building was generated using the formula below.

$$\boldsymbol{ACCB_{it}} = \frac{\sum_{k=1}^{K} \sum_{jk=1}^{JK} W_{jk}^{k} L_{JK}^{K}}{K} \qquad 3.4$$

It is assumed that $\boldsymbol{i}$ designated individual households and $ACCB$ is the values of the composite index generated. Whereby $\mathrm{ACCB}_{\boldsymbol{it}}$ represents agriculture community capacity building index for all the Mbororo households considered**;** K is the number of indicators; W is the proportion attributed to each extracted component; L is the explained variance of the indicators. Table 3.3 present the description of the indicators used in the formation of agricultural community capacity building.

Table 3.1 3: Indicator of Agriculture Community Capacity Building

s/n	Question Item	Description of Dimension
1	Acquisition of skills in agricultural practices is indispensable for community development	Agricultural practices skills Acquisition
2	Skills in the usage of improved seed are critical farm on improving farm outputs	Usage of Improved Seeds skills
3	Building skills in post-harvest management will improve farm storage and reduce food losses	Post-harvest Management skills
4	Capacity Knowledge on planting one seed per hold is critical for improving yield	Planting Knowledge
5	Developing skills through supporting the group's planning and evaluation of action, activities, and engagement will lead to an increase in the social welfare of the community	Social capital skills

6	Learning monitoring from more experienced field coordinators working in the community is very important	Monitoring and coordinating skills/Knowledge
7	Organizing opportunities for sharing and networking with other groups are relevant capacity building skills	Networking and Trusting skills
8	There is a need for the community to voluntarily develop their community	Knowledge of the benefits of collective action
9	Skills in decision-making are an essential element of community capacity-building	Decision Making competence
10	Efficient and effective utilisation of community resources can be achieved easily if the community is trained	Managerial efficiency skills

11	Training will build the confidence of the households towards innovative initiatives	Capacity development facilitations skills
12	Community capacity building can make the community more responsible and accountable	Accountability skills
13	The community can develop the spirit of team involvement in the management of local resources	Leadership skills
14	Knowledge of effective farm practices can easily be learned through knowledge-sharing grouping	Knowledge of effective farm practices
15	The communities will equally learn some of the methods to support their community by working jointly with other community, government and organisations	Knowledge on Methods to support their community

The index generated will produce both negative and positive values for the index, thus posing some interpretations difficulty. Therefore, it must be normalised within the range of 0 to 1, though fractionalised and not binary. By so doing, it eliminates the negative values of the index by adjusting the scores within the range of 0 to 1. The mathematical expositions for the normalized index procedure are outlined below.

$$\widetilde{\boldsymbol{ACCB}}_{\boldsymbol{it}}=\frac{\text{ACCB}-\min\left(\text{ACCB}\right))}{(\max(\mathit{ACCB})-\min\left(\text{ACCB}\right))} \qquad 3.5$$

Where is $\max(\mathit{ACCB})$ is the maximum value while min (ACCB) is the minimum value of agriculture community capacity building index predicted after fitting the PCA. The exogenous variable in this objective is agriculture community capacity building index. By the same token of appreciation and mathematical expositions agriculture community capacity building index was also constructed and normalised using the set of question items on Table 3.3.

In addition, the question items under agricultural capacity building with the loading factor of 0.5 and greater was returned for further analysis by fitting of the structural equation modelling using the maximum likelihood estimation technique. According to Hair et al., (2018), any item with loading of less than 0.50 should be considered for de-selection from the rest of the variables for exploratory factor analysis. The question items with the loading factor of 0.5 was used to generate an index for agriculture community capacity building (ACCB). The index was normalized to get

rid of negative values, which poses interpretation challenges. The model is specified as follows.

$$PA_i = \boldsymbol{\beta_1} + \boldsymbol{\beta_2 ACCB_i} + \boldsymbol{\beta_3 PEDU_i} + \boldsymbol{\beta_4 SEDU_i} + \boldsymbol{\beta_5 TEDU_i} + \boldsymbol{\beta_6 X} + \boldsymbol{\varepsilon_2} \qquad \textbf{3.6}$$

PEDU is a dummy variable for primary education; it takes the value 1 if the respondents have attended primary education, 0 otherwise. SEDU and TEDU represent secondary and tertiary education, respectively, and are also binary. X represents the vector of exogenous covariates used in fitting the model (sources of income, age, marital status, and years of experience of farmers). The parameter ε_1 captured the idiosyncratic terms, which are other variables that can also affect pro agripreneurship. However, they are assumed to have a mean value of 0 and a standard deviation of 1. Where $\boldsymbol{\beta}$ is vector of coefficients to be estimated using ordinary least square and maximum likelihood estimation technique of structural equation modelling. Table 3.4 presents the description of variables in objective 2 of the study.

Table 3.1 4: Description of the Variables

Variable	Code	Description
Dependent Variable	**---**	**---**
Pro-Agripreneurship Index	pa	Continuous
Independent Variables	**---**	**---**
Agriculture community capacity building Index	accb	Continuous
Control Variables	**---**	**---**
Marital status (1=married, 0 otherwise)	married	Binary
Gender (1=Female, 0 otherwise)	female	Binary
Education (1=no education, 0 otherwise)	noedu	Binary
Education (1=Primary education, 0 otherwise)	pedu	Binary
Education (1=Secondary	sedu	Binary

education, 0 otherwise		
Education (1=Tertiary education, 0 otherwise)	tedu	Binary
Years of farm experience	yhexp	Continuous
Farm size (1=5 hectares and above , 0 otherwise)	fs	Binary
Age of Households Head	age r	Continuous

Source: Compiled by the Author, 2023

3.9.3 Modelling the moderating effect of agriculture community capacity building on the nexus between water supply scheme and pro-agriprenuership among Mbororo households in the western highland of Cameroon

This objective seeks to determine whether agriculture community capacity building modulates the strengthened or the direct of the effect of water supply scheme on pro agripreneurship among the Mbororo households in Cameroon. In order to realise this objective, the moderating construct agricultural community capacity building and the exogenous construct water supply scheme were mean centred before interacting the variable. In other words, the mean of the independent and moderator was computer and subtracted from both constructs. One of the reasons for centring the constructs is to account for possibility of high multicollinearity in the analysis. In addition, the construct is also centred to ease interpretation difficulty that might arise as results of the interaction. The model is specified as observed below.

$$PA_i = \boldsymbol{\alpha_1} + \boldsymbol{\alpha_2 InterCACCB} * \boldsymbol{CWSS_i} + \boldsymbol{\alpha_3 ACCB_i} + \boldsymbol{\alpha_4 WSS_i} + \boldsymbol{\alpha_5 PEDU_i} + \boldsymbol{\alpha_6 SEDU_i} + \boldsymbol{\alpha_7 TEDU_i} + \boldsymbol{\alpha_8 X} + \boldsymbol{\varepsilon_3} \quad \textbf{3.7}$$

Where the coefficients α is vector of the parameters that will be estimated using Maximum likelihood estimation technique and Ordinary least square estimation for robust check. The variables in the Model in equation 3.7 are summary on Table 3.5.

Table 3.1 5: Summary of the Variables in Objective three

Variable	Code	Description
Dependent Variable	---	---
Pro-Agripreneurship Index	pa	Continuous
Independent Variables	---	---
Agriculture community capacity building Index	accb	Continuous
Water supply scheme Index	wsc	Continuous
Moderating Variables		
Center Agriculture community capacity building Index	caccb	Continuous
Center Water supply scheme Index	cwsc	Continuous
Interaction	Intercaccb *cwsc	Continuous
Control Variables	---	---

Marital status (1=married, 0 otherwise)	married	Binary
Gender (1=Female, 0 otherwise)	female	Binary
Education (1=no education, 0 otherwise)	noedu	Binary
Education (1=Primary education, 0 otherwise)	pedu	Binary
Education (1=Secondary education, 0 otherwise	sedu	Binary
Education (1=Tertiary education, 0 otherwise)	tedu	Binary
Years of farm experience	yhexp	Continuous
Farm size (1=5 hectares and above , 0 otherwise)	fs	Binary
Age of Households Head	age r	Continuous

3.9.4 Modelling the Household Gender Gap in Pro-Agripreneurship among the Mbororo Community in the Western Highland in Cameroon

Objective four was aimed at exploring the gender gap in pro-Agripreneurship in among the Mbororo community in the western highland of Cameroon. To analysis if there is any mean difference in pro-Agripreneurship between the male and female headed household.

For Female headed household, the model is specified as follows;

$$PA^f = \vartheta_1 + \vartheta_2 PEDU^f + \vartheta_3 SEDU^f + \vartheta_4 TEDU^f + \vartheta_5 X^f + \varepsilon_4{}^f \quad \textbf{3.8}$$

For male headed household, the model is specified as thus;

$$PA^m = \theta_1 + \theta_2 PEDU^m + \theta_3 SEDU^m + \theta_4 TEDU^m + \theta_5 X^m + \varepsilon_8{}^m \quad \textbf{3.9}$$

Both Model equation 3.8 and 3.9 was estimated using one way analysis of variance estimation techniques and the mean of pro-Agripreneurship for both females headed, and male headed household shall be compared. The study relied on one way analysis of variance to compare if there is a significant mean difference in pro agripreneurship between males headed and females headed households among the Mbororo community in the western highland of Cameroon.

3.10 Research Design Limitations

Authorization Consent was be gotten from the senior divisional office of the district before the data collections, though it is very challenge. Another limitation is that the data collectors were drilled on the intent of the study and on how to manage field crisis. The questionnaire was prepared in a way to guarantee the anonymity of the respondents as such they not required to offer any form of personal identification. Strict confidentiality of the respondents was ensured and was also included in the questionnaire consent letter. The study adopted a cross-sectional survey design which is limited in establishing causal effect between variables when compared to longitudinal study. Due to time constrains and inadequate financial resource it was imperatively impossible to opt for longitudinal study. Another limitation of the study is that it did not cover all the national territory since the focus was only on the Mbororo community that lives in the western highland of Cameroon.

3.11 Conclusion

The econometric models have been specified for all the objectives, as well as measurability and definition of variables used in each of the model. The model estimation techniques that were used for estimating the parameters in objective one to three were maximum likelihood of structural equation modelling and the ordinary least square estimation techniques. The study adopted cross sectional survey research design. The study also adopted the cluster and purposive sampling methods and adopted sample size was 475.

CHAPTER IV:

RESULTS

4.1 Descriptive Statistics

Both descriptive statistics and inferential statistics were used in analysing the data.

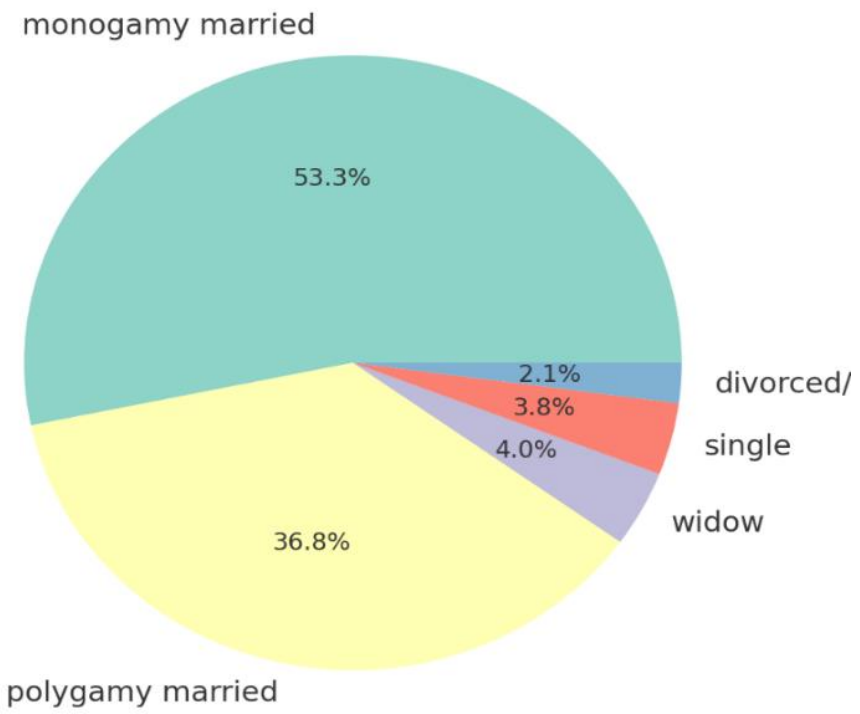

Figure 4.1: Distribution of Marital Status in the Study
Source: Field Survey, 2024

Figure 4.1 shows that 53.3% of the respondents were into monogamy married, 36.8% were into polygamy married, 3.8% were single, 4% widow while 2.1% were divorced. In total, 90.1% of the sample respondents were married. The high proportion of married individuals within the Mbororo community suggests a cultural emphasis on institution of marriage. The presence of both monogamy and polygamous marriages enhances the interdependency among family members. In addition, it reinforces solidarity and mutual support contributing to resilient community structure.

Marital status is an important socio-demographic consideration that shows the level of social cohesion among the Mbororo community in the western highland of Cameroon. The finding indicates high level of social stability and responsibility among the Mbororo community in the western highland of Cameroon. It also indicates low rates of divorce among the households despite their low level of education and access to necessity.

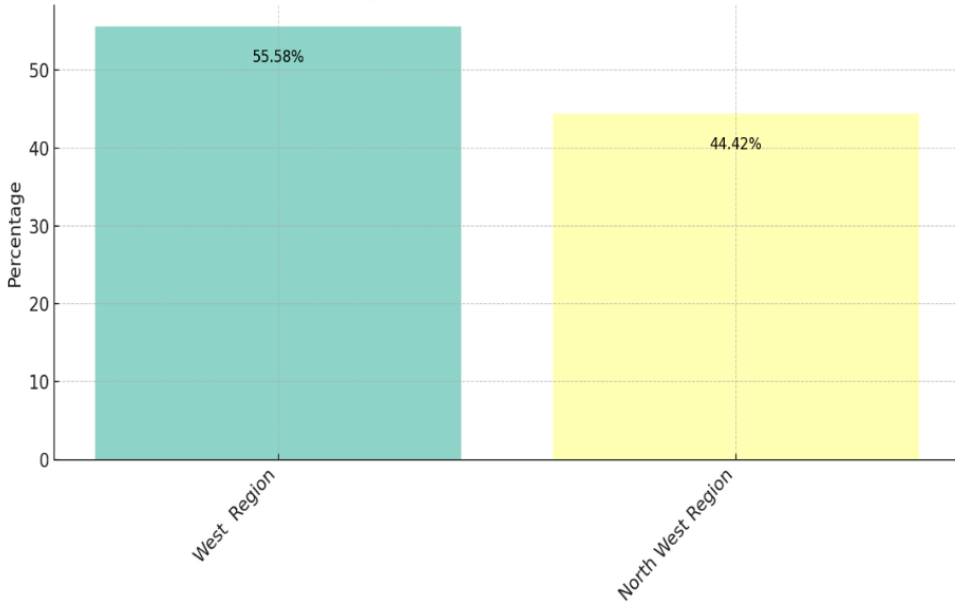

Figure 4.2: Distribution of Region in the Study
Source: Field Survey, 2024

The study population was categorized into two regions out of the 10 regions in Cameroon. The choice of the regions North West and Western regions reflect the geo-political linguistic bilingual nature of Cameroon. North West represent the English part of Cameroon while Western region represent the French speaking part of Cameroon. Another reason was because of the proportion of the Mbororo community that reside in the region as well as proximity to one another. Figure 4.2 shows that 55.58% of the population were selected in the West Region while 44.42% were from the North West Region of Cameroon. The regional distribution of the population in the sample is also important for policies and resources allocation towards improving on the welfare of the Mbororo community in the regions.

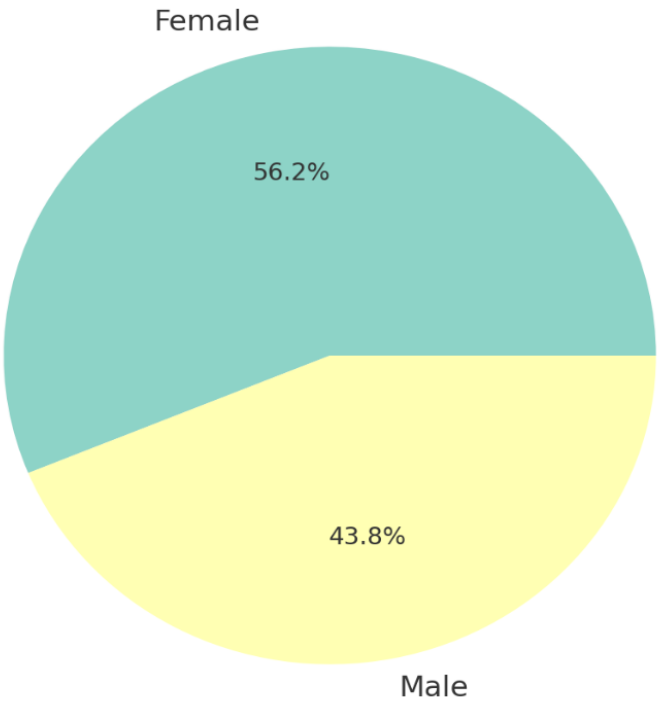

Figure 4.3: Gender Distribution in the Study
Source: Field Survey, 2024

Figure 4.3 indicates that 56.2% of the population in the study were females while 43.8% were males. The finding indicate gender balance in the study as both opinions are important. The representation of both males and females in the study give an insight on balance opinion, which has stronger implications on inclusive policies for community development. In addition, gender balance enhances the reliability and generalizability of the findings.

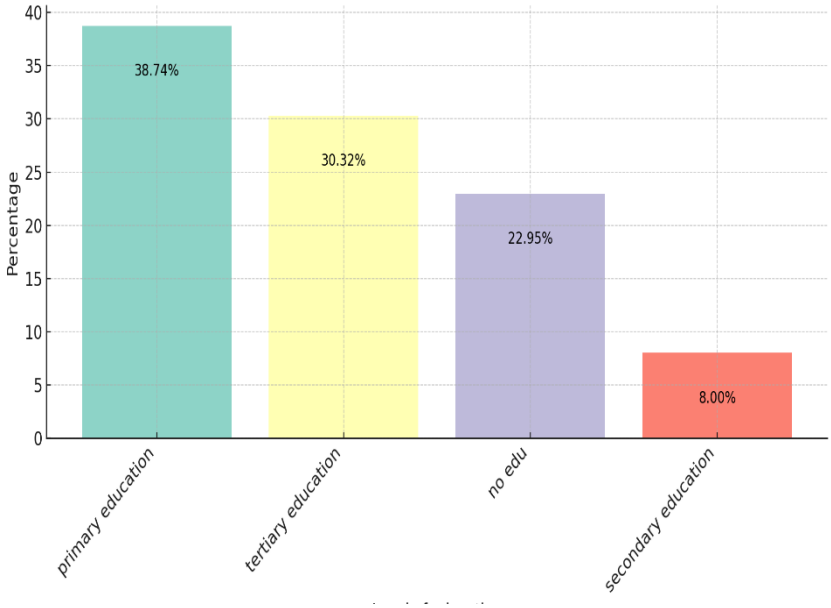

Figure 4.4: Level of Education Distribution in the Study
Source: Field Survey, 2024

Education level is an important socio-demographic factor in most social studies. Level of education of the household members contributes to the capability of the household's members to earned better as well as to implement agricultural transformative efforts in their community. Figure 4.4 shows that majority of the respondents have only attended primary education (38.74%). 30.32% of respondents indicated that they have attended tertiary education while 8% have attended secondary education. Meanwhile 22.95% of respondents have not attended any formal education. The results revealed that the level of education of the Mbororo community in the western highland of Cameroon is low. The implication of the finding is that the Mbororo community which lives in the rural setting in the western highland of Cameroon may not be able to access high paying jobs and thus trap in

low income earning. With capacity building and agricultural transformative training, the course of the Mbororo community may be better-off.

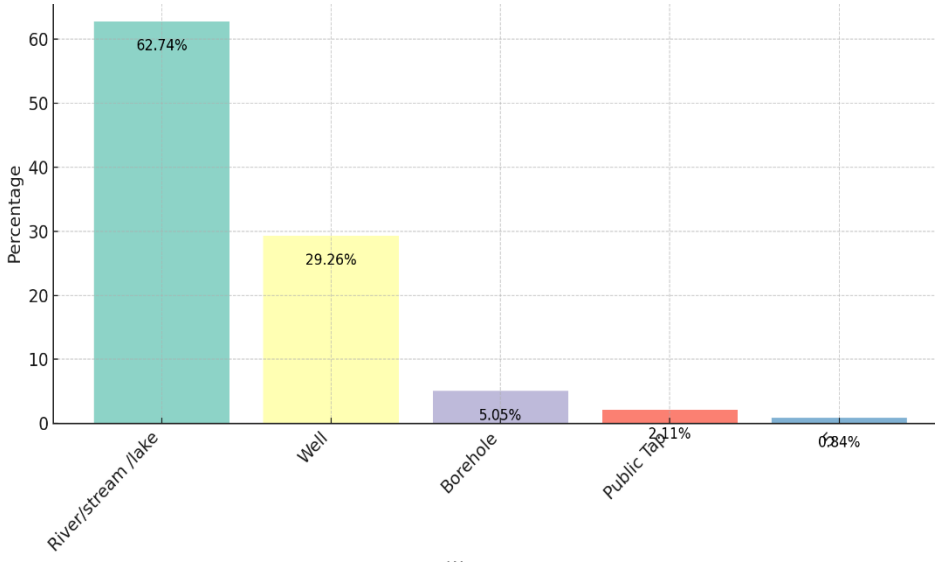

Figure 4.5: Water Sources Distribution in the Study
Source: Field Survey, 2024

Water resources is an indispensable source of energy that can spurred rural development. Access to water resource would contributes in the transformation of both agriculture and industrial productions. Lack of access to water resources is a major risk factor to poverty. Figure 4.5 indicates that the major source of water resources to the Mbororo community in the regions in the sample is river/stream. As 62.74% of the respondents in the sample indicated stream, rivers and lake as their major source of water resources. 29.26% and 5.05% of respondents indicated well and boreholes. Based on the finding access to clean water sources is a major

impediment as only less than 3% of the respondents have access to public tap. Access to stream, rivers and lake seems to suggest that the cost of rehabilitation or provision of water resources to the Mbororo community for drinking and irrigation purpose can be less expensive.

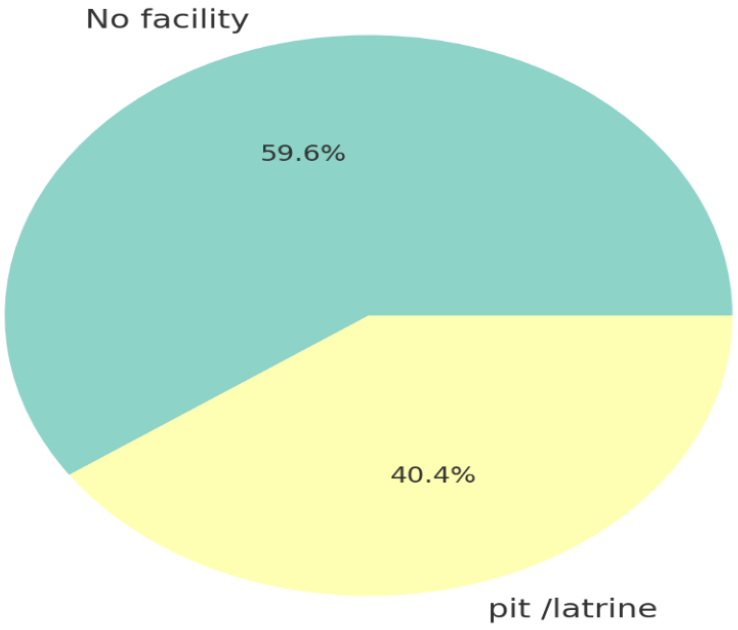

Figure 4.6: Sanitation Distribution in the Study
Source: Field Survey, 2024

Figure 4.6 shows that access to proper sanitation facilities is a major concern among the Mbororo community as 59.62% of the respondents revealed that they are not sanitation facilities in homes. Meanwhile, 40.38% of respondents are of the view that they use pit latrine to dispose their waste in their home. The implication of the finding

is that the Mbororo community in the western highland of Cameroon are expose to public health challenges. This is because poor sanitation is associated with higher diseases rates and poor health. Improvision of water resources and building the capacity of the households in the community would pathway for infrastructural intervention in the area of sanitation.

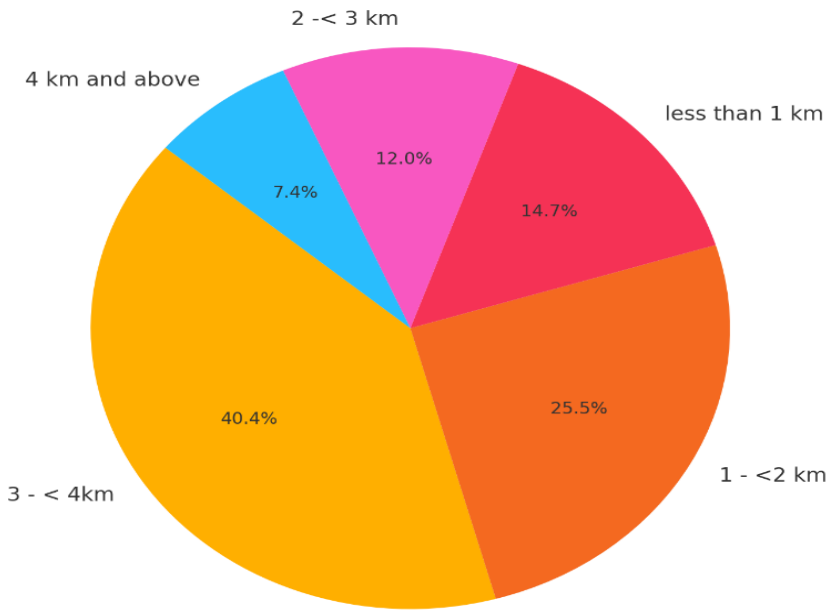

Figure 4.7: Distance to the nearest Agriculture Distribution in the Study
Source: Field Survey, 2024

Figure 4.7 presents the distribution of distance to the nearest agriculture centre in kilometres. Most of the respondents indicated that they covered between 3 to less than 4km (40.4%). 25.5% of the respondents covered between 1 to less than 2 km while 7.4 covered 4 km and above. 14.7% of respondents covered less than 1 km. Considering that agricultural is the major source of earnings and sustainability,

proximity to the centre suggests easier access to agricultural resources and extension supports services. Addressing the distances barrier between the Mbororo community and agricultural resources centre may boast local productivity and food security.

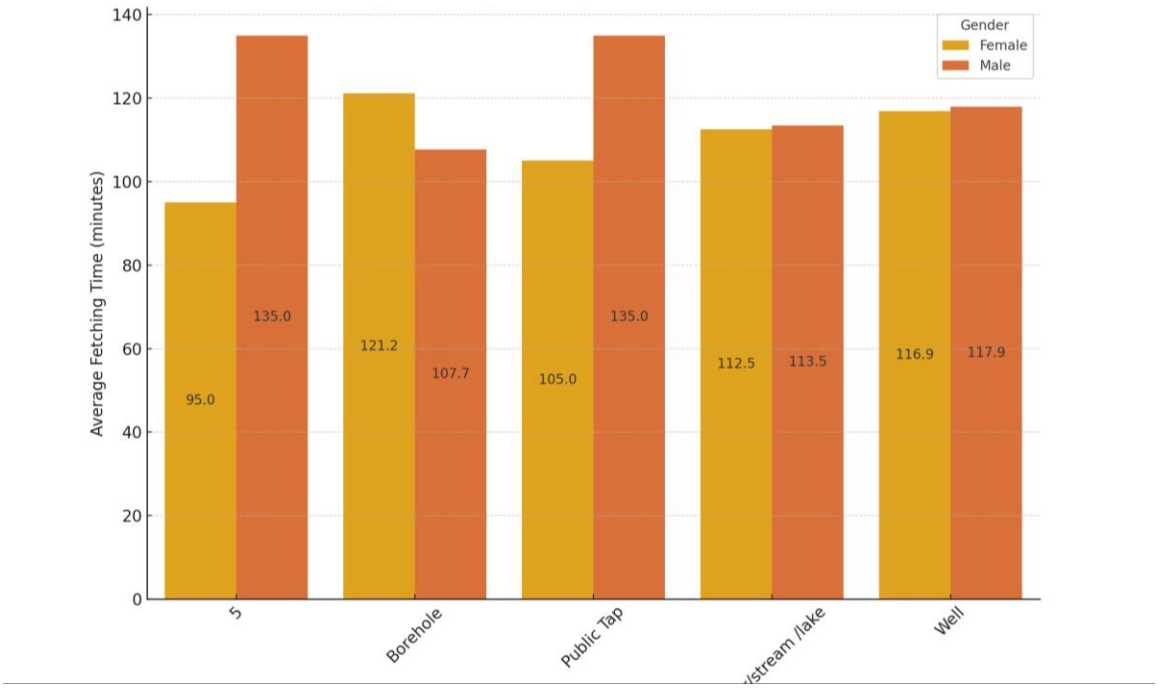

Figure 4.8: Average Fetching Time by Water Source and Gender
Source: Field Survey, 2024

Figure 4.8 shows that well, river and lake water sources have higher average fetching time suggesting longer distances and accessibility issues. Meanwhile Public Tap, and Boreholes have shorter fetching time suggesting the sources are easily accessible by the Mbororo community. Fetching times differ for both males and females. Females

have slightly higher fetching times than males across all sources. The finding suggests enhancement of water supply schemes and targeted support for reducing gender gap in water collection among the Mbororo community in the western highland of Cameroon.

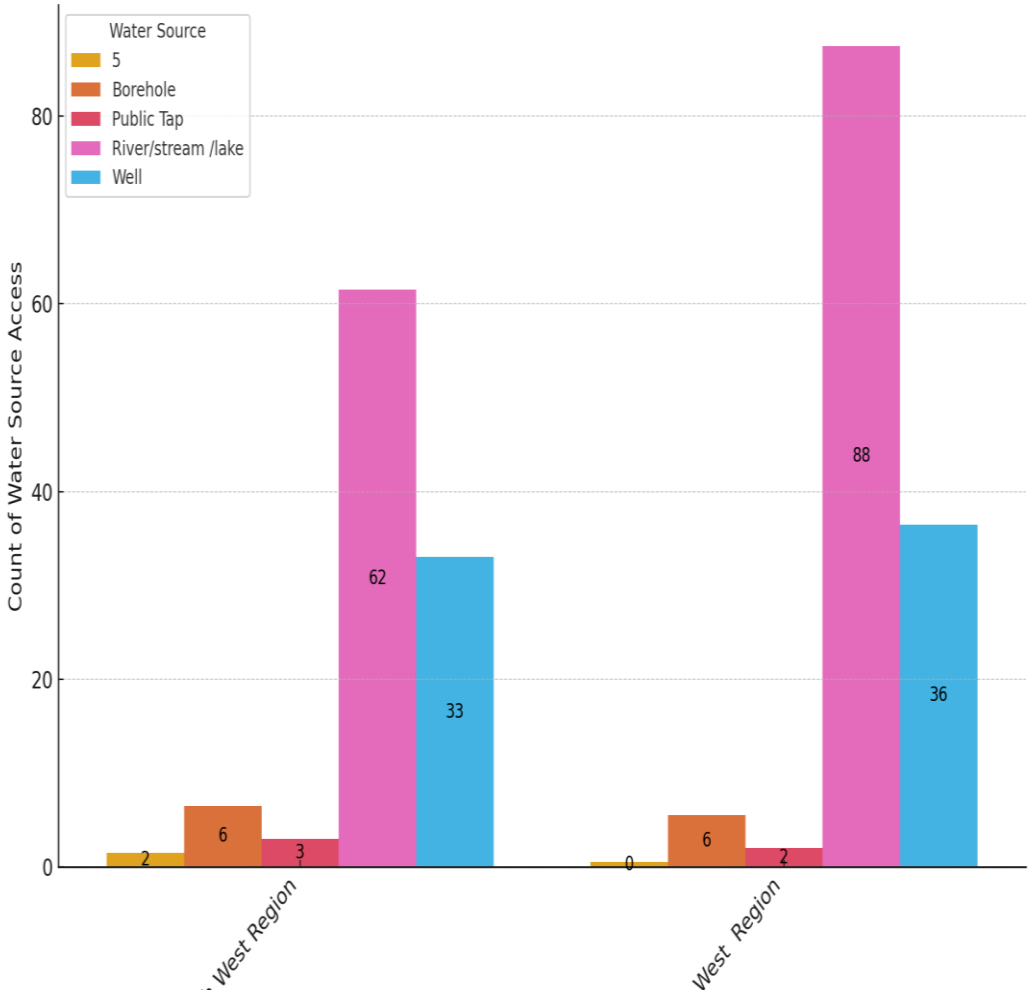

Figure 4.9: Water Source Access by Region and Gender
Source: Field Survey, 2024

Figure 4.9 shows the distribution of different water sources accessible by males and females in north west and west region of Cameroon. The result shows that both males and females in the north west region depends heavily on rivers, streams and lake for water supply. Meanwhile in the west region, high number of females rely on the same sources. The most common source of water supply in the west region is wells. Boreholes and public taps are less common in both regions. In the north west region boreholes is relative more common compare to boreholes in the west region. This distribution depicts variations in water infrastructure or natural resources available.

4.1 Research Question One

Table 4.1.1: *Descriptive Statistics*

Variable	Mean	Std. Dev.	Min	Max
pa n	.701	.231	0	1
wsc n	.674	.232	0	1
noedu	.224	.418	0	1
pedu	.21	.408	0	1
sedu	.08	.272	0	1
tedu	.486	.5	0	1

farming	.608	.489	0	1
married	.902	.297	0	1
time 30 60 minutes	.019	.135	0	1
time 60 90 minutes	.315	.465	0	1
time 90 180 minutes	.652	.477	0	1
time above180 minu~s	.014	.119	0	1
dist 1 less than 2km	.144	.351	0	1
dist 2 less than 3km	.253	.435	0	1
dist 3 less than 4km	.119	.325	0	1
dist 4kmabove	.412	.493	0	1

dist agtc5	.072	.259	0	1
age hh	28.506	10.503	19	70
Source: Computed using STATA version 14, 2024				

Table 4.1.1 shows descriptive statistics for objective one in the study. The variables water supply scheme, and agripreneurship were normalized between 0 to 1. The variables were normalized to get rid of the negative values that poses interpretation difficulties. By normalizing the variables interpretation becomes easier. The variable agripreneurship has a mean value of 0.701 for indicates that on average, the agripreneurship index in the study is 0.701 and the standard deviation of 0.231. The finding suggests that there is moderate variability in the variable agripreneurship and therefore suitable for further analysis in the study.

Table 4.1.1 equally indicates that water supply scheme has a mean of 0.674 and standard deviation of 0.232 suggesting that the value of the water supply oscillate between 0.906 and 0.442 of the maximum possible value of 1. The findings also indicate sufficient evidence in the variability of the water supply scheme.

The variable informal education has a mean of 0.224 and a standard deviation of 0.418. Primary and secondary education have a mean of 0.21 and 0.08 respectively

while tertiary education has a mean 0.48 and standard deviation of 0.5. The control variables farming, married, time to fetch water, educational level, and distance covered were all treaded as binary variables as observed in Table 4.1. The variable age was continuous and ranges between 19 and 70 years. The choice of the age range of the respondents was in accordance with Cameroon Labour code for working age. The results below present the correlation between the variables used in objective one.

Table 4.1.2: *Pairwise correlations*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) pa_n	1.000		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
(2) wsc_n	0.455*	1.000			--	--	--	--	--	--	--	--	--	--	--	--	--	--
(3) noedu	-0.101*	-0.069	1.000		--	--	--	--	--	--	--	--	--	--	--	--	--	--
(4) pedu	0.145*	0.105*	-0.277*	1.000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
(5) sedu	-0.207*	-0.110*	-0.159*	-0.152*	1.000	--	--	--	--	--	--	--	--	--	--	--	--	--
(6) tedu	0.079	0.032	-0.522*	-0.501*	-0.287*	1.000	--	--	--	--	--	--	--	--	--	--	--	--
(7) farming	-0.041	-0.187*	0.018	-0.052	0.114*	-0.035	1.000	--	--	--	--	--	--	--	--	--	--	--
(8) married	-0.083	-0.071	0.024	-0.071	0.046	0.013	0.130*	1.000	--	--	--	--	--	--	--	--	--	--
(9) time_30_60minutes	-0.135*	-0.136*	0.255*	-0.071	-0.041	-0.133*	0.111*	-0.012	1.000	--	--	--	--	--	--	--	--	--
(10) time_60_90_mi~s	-0.067	-0.030	0.039	-0.164*	-0.086	0.148*	-0.008	0.029	-0.093*	1.000	--	--	--	--	--	--	--	--
(11) time_90_180_m~s	0.082	0.058	-0.094*	0.196*	0.104*	-0.138*	-0.039	-0.035	-0.188*	-0.928*	1.000	--	--	--	--	--	--	--
(12) time_above180~s	0.082	0.038	-0.065	-0.062	-0.036	0.124*	0.062	0.040	-0.017	-0.082	-0.166*	1.000	--	--	--	--	--	--
(13) dist_1_less_t~m	-0.188*	0.011	0.679*	-0.211*	0.008	-0.399*	-0.127*	0.035	-0.056	0.025	0.004	-0.050	1.000	--	--	--	--	--
(14) dist_2_less_t~m	0.072	0.044	-0.279*	0.885*	-0.172*	-0.395*	-0.027	-0.050	0.025	-0.099*	0.107*	-0.070	-0.239*	1.000	--	--	--	--
(15) dist_3_less_t~m	-0.175*	-0.021	-0.107*	-0.190*	0.522*	-0.040	0.089	0.032	0.232*	0.010	-0.064	-0.045	-0.151*	-0.214*	1.000	--	--	--
(16) dist_4kmabove	0.179*	0.042	-0.440*	-0.431*	-0.155*	0.802*	-0.011	0.007	-0.115*	0.036	-0.039	0.145*	-0.343*	-0.487*	-0.308*	1.000	--	--
(17) dist_agtc5	0.012	-0.141*	0.518*	-0.144*	-0.082	-0.271*	0.127*	-0.016	-0.038	0.051	-0.031	-0.034	-0.114*	-0.162*	-0.103*	-0.233*	1.000	
(18) age_hh	-0.014	0.023	-0.127*	-0.107*	0.041	0.171*	-0.091*	0.001	0.043	-0.058	-0.004	0.193*	-0.115*	-0.081	0.157*	0.088	-0.073	1.000

**** p<0.01, ** p<0.05, * p<0.1*

Source: Computed using STATA version 14, 2024

Table 4.1.2 shows the result of the correlation between the variables in the model in objective one of the study. The results revealed a significant positive relationship between water supply scheme and pro-agripreneurship. The positive correlation coefficient of 0.455 suggests that as the water supply scheme increases, the level of agripreneurship also tends to increase, and vice versa. In other words, improvements in the water supply scheme can be associated with higher levels of agripreneurship. Also, the correlation coefficient indicates a moderate strength of the relationship between the two variables. This means that the water supply scheme and agripreneurship are moderately associated. The strong positive correlation between water supply schemes and pro-agripreneurship indicates that many people will be willing to venture into agricultural food sector and this have the tendency of addressing the issues of food insecurity and extreme hunger. In addition provision of water supply will permit the farmers to cultivate around the year thereby increasing food supply.

The results also revealed that non formal and secondary education has a significant negative association with pro agripreneurship among the Mbororo community in the western highlands of Cameroon. Primary and tertiary educations were positively correlated with pro agripreneurship. Farming and married were also negatively associated with pro agripreneurship. The was no evidence to suspect the model of the problem of multicollinearity as the correlation coefficient was well below 0.6 cu-off criteria which most studies considered as moderate.

***Table 4.1.3**: RESULTS of Objective One*

VARIABLES	ML-SEM pa_n	(OLS) pa_n
wsc_n	0.388***	0.397***
	(0.058)	(0.0424)
pedu	-0.339**	-0.315***
	(0.170)	(0.116)
sedu	-0.456***	-0.415***
	(0.059)	(0.0807)
tedu	-0.472***	-0.435***
	(0.110)	(0.107)
farming	0.012	0.0123
	(0.014)	(0.0176)
married	-0.040***	-0.0373*
	(0.013)	(0.0212)
time_60_90_minutes	-0.138***	0.472***
	(0.041)	(0.107)
time_90_180_minutes	-0.105***	0.492***
	(0.040)	(0.111)
time_above180_minutes	na	0.584***
		(0.116)
dist_1_less_than_2km	-0.093***	-0.125***
	(0.016)	(0.0424)
dist_2_less_than_3km	0.332**	0.300**
	(0.165)	(0.117)

dist_3_less_than_4km	0.312***	0.269***
	(0.072)	(0.1000)
dist_4kmabove	0.461***	0.420***
	(0.104)	(0.109)
age_hh	-0.001	-0.000266
	(0.001)	(0.000844)
female	0.004	0.00967
	(0.013)	(0.0183)
Constant		0.0315
	--	(0.113)
Observations	475	475
R-squared	0.347	0.347

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Computed using STATA version 14, 2024
Note: ML-SEM stands for maximum likelihood of structural equation modelling.

The results in Table 4.1.3 show that water supply schemes have a significant positive effect on pro agripreneurship among the Mbororo community in the study. Technically, the maximum likelihood estimation results in column 1 of Table 4.1.3 shows that a unit changes in standardized value of water supply scheme will lead to a 0.388 increase on pro agripreneurship. The significant of the effect of water supply scheme on pro agripreneurship permit us to reject the null hypothesis one in the study which state that water supply schemes do not have a significant effect of pro agripreneurship. The ordinary least square (OLS) estimation technique was used to test for the robustness of the findings using the ML of structural equation modelling. The test of the robustness shows strong evidence of consistency in the findings.

The results also indicated that the control variable level of education is one of the significant determinants of pro agripreneurship, though it was found to be negative. The implication of the negative effect of level of education on pro agripreneurship can be attributed to the fact that more years into formal education reduces the time allocated for farming activities and thus the benefits of agripreneurship not being understood. The control variable time to fetch water also affected agripreneurship negatively. Age of the household head and gender were not significant though they were positive as expected. The R-squared value of 0.347 indicates that the model explains approximately 35% of the total variation in pro agripreneurship in Cameroon.

4.2 Research Question Two

***Table 4.2.1**: Descriptive Statistics*

Variable	Mean	Std. Dev.	Min	Max
pa n	.701	.231	0	1
ccb n	.7	.259	0	1
Noedu	.224	.418	0	1
Pedu	.21	.408	0	1
Sedu	.08	.272	0	1
Tedu	.486	.5	0	1
Farming	.608	.489	0	1
Married	.902	.297	0	1
time 30 60 minutes	.019	.135	0	1
time 60 90 minutes	.315	.465	0	1
time 90 180 minutes	.652	.477	0	1
time above180 minu~s	.014	.119	0	1
dist 1 less than 2km	.144	.351	0	1
dist 2 less than 3km	.253	.435	0	1
dist 3 less than 4km	.119	.325	0	1
dist 4kmabove	.412	.493	0	1
dist agtc5	.072	.259	0	1
age hh	28.506	10.503	19	70

Source: Computed using STATA version 14, 2024

Table 4.2.1 shows statistics for water supply scheme, and agripreneurship that have been normalized to a range of 0 to 1. Agripreneurship has mean value of 0.701 indicates that on average, the agripreneurship index in the study is 70.1%. while the standard deviation of 0.231 suggests that there is moderate variability in the agripreneurship index among the observations in the study. This means that the agripreneurship values tend to be spread out over a range of approximately 0.231 around the mean of 0.701. Moreover, the mean value of 0.700 for the agricultural community capacity building index suggests that on average, the agricultural capacity building in the study area is at 70% of the maximum possible value of 1. The standard deviation of 0.259 indicates a slightly higher level of variability in the agricultural community capacity building index compared to the agripreneurship index. This means that the agricultural community capacity building values tend to be spread out over a range of approximately 0.259 around the mean of 0.700.

The relatively high mean values for both agripreneurship (0.701) and agricultural community capacity building (0.700) suggest that, on average, these factors are at moderately high levels in the study area. The slightly higher standard deviation for agricultural community capacity building (0.259) compared to agripreneurship (0.231) indicates that there is more variability in the values of the agricultural capacity building factor across the observations. More so, variations in the socioeconomic status, education levels, and demographic characteristics of the communities can influence their engagement and participation in agripreneurship and

agricultural capacity building activities. The effectiveness and coordination of policies, regulations, and programs supporting agripreneurship and agricultural community capacity building can vary across different regions or communities. Also, differences in cultural norms, traditional farming practices, and entrepreneurial mindsets within the communities can shape their engagement in agripreneurship and agricultural capacity building.

***Table 4.2.2**: Pairwise correlations*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) pa_n	1.000																	
(2) ccb_n	0.488*	1.000																
	(0.000)																	
(3) noedu	-0.101*	-0.060	1.000															
	(0.025)	(0.187)																
(4) pedu	0.145*	0.152*	-0.277*	1.000														
	(0.001)	(0.001)	(0.000)															
(5) sedu	-0.207*	-0.140*	-0.159*	-0.152*	1.000													
	(0.000)	(0.002)	(0.000)	(0.001)														
(6) tedu	0.079	0.003	-0.522*	-0.501*	-0.287*	1.000												
	(0.082)	(0.951)	(0.000)	(0.000)	(0.000)													
(7) farming	-0.041	-0.118*	0.018	-0.052	0.114*	-0.035	1.000											
	(0.370)	(0.010)	(0.692)	(0.257)	(0.012)	(0.441)												
(8) married	-0.083	-0.051	0.024	-0.071	0.046	0.013	0.130*	1.000										
	(0.068)	(0.267)	(0.597)	(0.118)	(0.311)	(0.779)	(0.005)											
(9) time_30_60_min~s	-0.135*	-0.300*	0.255*	-0.071	-0.041	-0.133*	0.111*	-0.012	1.000									
	(0.003)	(0.000)	(0.000)	(0.119)	(0.372)	(0.003)	(0.015)	(0.792)										
(10) time_60_90_mi~s	-0.067	0.032	0.039	-0.164*	-0.086	0.148*	-0.008	0.029	-0.093*	1.000								
	(0.143)	(0.486)	(0.389)	(0.000)	(0.058)	(0.001)	(0.854)	(0.528)	(0.040)									
(11) time_90_180_m~s	0.082	0.066	-0.094*	0.196*	0.104*	-0.138*	-0.039	-0.035	-0.188*	-0.928*	1.000							
	(0.069)	(0.145)	(0.038)	(0.000)	(0.021)	(0.002)	(0.390)	(0.444)	(0.000)	(0.000)								
(12) time_above180~s	0.082	-0.048	-0.065	-0.062	-0.036	0.124*	0.062	0.040	-0.017	-0.082	-0.166*	1.000						
	(0.070)	(0.287)	(0.152)	(0.170)	(0.432)	(0.006)	(0.174)	(0.382)	(0.715)	(0.071)	(0.000)							
(13) dist_1_less_t~m	-0.188*	-0.074	0.679*	-0.211*	0.008	-0.399*	-0.127*	0.035	-0.056	0.025	0.004	-0.050	1.000					
	(0.000)	(0.104)	(0.000)	(0.000)	(0.856)	(0.000)	(0.005)	(0.450)	(0.215)	(0.586)	(0.926)	(0.275)						
(14) dist_2_less_t~m	0.072	0.090*	-0.279*	0.885*	-0.172*	-0.395*	-0.027	-0.050	0.025	-0.099*	0.107*	-0.070	-0.239*	1.000				
	(0.110)	(0.046)	(0.000)	(0.000)	(0.000)	(0.000)	(0.560)	(0.274)	(0.577)	(0.029)	(0.018)	(0.121)	(0.000)					
(15) dist_3_less_t~m	-0.175*	-0.063	-0.107*	-0.190*	0.522*	-0.040	0.089	0.032	0.232*	0.010	-0.064	-0.045	-0.151*	-0.214*	1.000			
	(0.000)	(0.162)	(0.019)	(0.000)	(0.000)	(0.377)	(0.053)	(0.485)	(0.000)	(0.824)	(0.156)	(0.328)	(0.001)	(0.000)				
(16) dist_4kmabove	0.179*	-0.012	-0.440*	-0.431*	-0.155*	0.802*	-0.011	0.007	-0.115*	0.036	-0.039	0.145*	-0.343*	-0.487*	-0.308*	1.000		
	(0.000)	(0.791)	(0.000)	(0.000)	(0.001)	(0.000)	(0.812)	(0.876)	(0.011)	(0.424)	(0.390)	(0.001)	(0.000)	(0.000)	(0.000)			
(17) dist_agtc5	0.012	0.051	0.518*	-0.144*	-0.082	-0.271*	0.127*	-0.016	-0.038	0.051	-0.031	-0.034	-0.114*	-0.162*	-0.103*	-0.233*	1.000	
	(0.793)	(0.264)	(0.000)	(0.002)	(0.070)	(0.000)	(0.005)	(0.729)	(0.400)	(0.261)	(0.501)	(0.459)	(0.012)	(0.000)	(0.024)	(0.000)		
(18) age_hh	-0.014	-0.005	-0.127*	-0.107*	0.041	0.171*	-0.091*	0.001	0.043	-0.058	-0.004	0.193*	-0.115*	-0.081	0.157*	0.088	-0.073	1.000
	(0.762)	(0.910)	(0.005)	(0.018)	(0.372)	(0.000)	(0.047)	(0.983)	(0.346)	(0.205)	(0.925)	(0.000)	(0.011)	(0.073)	(0.001)	(0.052)	(0.110)	

**** p<0.01, ** p<0.05, * p<0.1*

Source: Computed by Author using STATA Version 14, 2024

The result in Table 4.2.2 shows the level association between the pro agripreneurship and the covariates. The result revealed that agricultural community capacity building is positively and significantly associated with pro agripreneurship. The positive correlation coefficient of 0.488 indicates that as the agricultural community capacity building increases, the level of agripreneurship also tends to increase, and vice versa. This suggests a complementary relationship between the two variables. The correlation coefficient of 0.488 represents a moderate strength of the relationship between agricultural community capacity building and agripreneurship. This means that the two variables are moderately associated. The correlation coefficient of 0.488 is statistically significant at the 10% level. The interpretation of these results is that investments and efforts to enhance agricultural community capacity building, such as providing training, access to resources, and strengthening community organizations, can have a positive influence on the development of agripreneurship in the study.

The results equally revealed that level of education, married and distance to fetch water were as found to be significantly associated with pro agripreneurship among the Mbororo community in Cameroon. There is strong evidence of moderate correlation between the between the variables in the model in Objective. There is no reason as for now to suspect for the problem of multicollinearity between the variables.

Table 4.2.3: *Results of Objective Two*

VARIABLES	ML-SEM pa_n	(OLS) pa_n
ccb_n	0.352***	0.382***
	(0.100)	(0.0704)
pedu	-0.312	-0.292**
	(0.189)	(0.115)
sedu	-0.417***	-0.385***
	(0.085)	(0.0825)
tedu	-0.444***	-0.415***
	(0.136)	(0.105)
farming	0.0001	0.00270
	(0.014)	(0.0173)
married	-0.044***	-0.0429**
	(0.018)	(0.0215)
time_60_90_minutes	0.327***	0.322**
	(0.169)	(0.159)
time_90_180_minutes	0.365***	0.351**
	(0.176)	(0.162)
time_above180_minutes	0.532**	0.507***
	(0.149)	(0.171)
dist_1_less_than_2km	-0.029***	-0.0430

	(0.013)	(0.0306)
dist_2_less_than_3km	0.351*	0.328***
	(0.184)	(0.115)
dist_3_less_than_4km	0.338***	0.305***
	(0.095)	(0.0939)
dist_4kmabove	0.493***	0.464***
	(0.128)	(0.105)
age_hh	-0.001	-0.000361
	(0.001)	(0.000871)
Constant	--	0.132
		(0.144)
Observations	475	475
R-squared	0.360	0.360

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: The Values in the parentheses are the standard errors

The results of objective two revealed in column one and two shows that agricultural community capacity building has a significant positive effect on pro agripreneurship among Mbororo community in Cameroon using maximum likelihood estimation technique of structural equation model and the ordinary least square estimation technique. Technically, if agricultural community capacity building goes up by 1 unit, pro agripreneurship will go up by 0.352 units. The implication of this finding is that improvements on the capacity building of the households have the tendency on enhancing their skills towards agricultural transformative activities. The significant of the effect of agricultural community capacity building on pro agripreneurship permit us to reject the null hypothesis two in the study which states that agricultural community capacity building has no significant effect on pro agripreneurship.

The results also indicated that secondary and tertiary level of education were among the significant predictor of pro agripreneurship, thought it was found to be negative. The results shows that a unit changes in the level of primary education, secondary and tertiary education will induce a fall in the level of agripreneurship by 31.2%, 41.7% and 44.4% respectively.

The OLS was used to check the robustness of the finding using ML of structural equation. The result shows evidence of robustness as the direction did not change but the magnitude of the estimated coefficient vary. The model fit indices r-squared indicated that all the variables in the model explain 36% of the total variation in agripreneurship among the Mbororo households in Cameroon.

4.3 Research Question Three

Table 4.3.1: *Results of Objective Three*

VARIABLES	ML-SEM pa_n	OLS pa_n
ccb_nc	0.350***	0.348***
	(0.090)	(0.0865)
wsc_nc	0.359***	0.357***
	(0.129)	(0.0922)
linter	-0.130	-0.126
	(0.327)	(0.260)
pedu	-0.219	-0.220**
	(0.157)	(0.109)
sedu	-0.256***	-0.261***
	(0.081)	(0.0912)
tedu	-0.303***	-0.308***
	(0.125)	(0.108)
farming	0.023	0.0226
	(0.015)	(0.0160)
married	-0.029*	-0.0307
	(0.016)	(0.0196)
time_60_90_minutes	0.171	0.173
	(0.146)	(0.147)

time_90_180_minutes	0.194	0.194
	(0.151)	(0.151)
time_above180_minutes	0.317***	0.310*
	(0.134)	(0.162)
dist_1_less_than_2km	-0.090***	-0.0912***
	(0.016)	(0.0317)
dist_2_less_than_3km	0.211	0.214**
	(0.157)	(0.108)
dist_3_less_than_4km	0.148*	0.151
	(0.086)	(0.102)
dist_4kmabove	0.317***	0.322***
	(0.117)	(0.108)
age_hh	-0.0001	-0.000355
	(0.001)	(0.000819)
Constant		0.573***
		(0.158)
Observations	475	475
R-squared	0.453	0.453

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The findings show that agricultural community capacity building has a significant positive effect on pro agripreneurship. Technically, the regression coefficient for agricultural community capacity building is 0.348, and it is statistically significant at the 1% significant level. This suggests that a unit increase in agricultural community capacity building will lead to an increase in pro agripreneurship by 0.348. Water supply schemes was also found to be significant and having a positive effect on pro agripreneurship among the Mbororo community in the western highlands of Cameroon.

The results revealed that agricultural community capacity building can instead weaken the nexus between water supply scheme and pro agripreneurship among the households in Cameroon. However, the moderating role of agricultural community capacity building was not significant.

Based on this finding, we accept the null hypothesis three in the study which states that agricultural community capacity building does not moderate the linkage between water supply scheme and community capacity building. The findings also indicated that distance to agricultural research centre has as significant positive effect on pro agripreneurship. This implies that proximity to the centre would mean access to hybrid seedlings and agricultural transformative training or capacity.

All level of education were also found to be significant at 1% significance level except for primary education using the maximum likelihood estimation technique.

However, the level of education was instead found to be negatively associated with pro agripreneurship suggesting that formal education skills does not translate into specific skills in agricultural transformation.

The farming experience was found to be non-significant. Even though it was not significant it has a positive effect on pro agripreneurship among the Mbororo community in the western highland of Cameroon.

The model explained 45.3% of the total variation in pro agripreneurship among the Mbororo community. The model does not suffer from the problem of multicollinearity and heteroscedastic.

4.4 Research Objective Four

Table 4.4.1: *Test of Homogeneity of Variances*

Levene Statistic	df1	df2	Sig.
3.488	1	484	.062

Source: Computed using SPSS Version 21, 2024

Table 4.4.1 shows the results of the test of homogeneity of variance. It is one of the pre-tests before subjecting the variables in objective four for one way analysis of variance since the objective is to compare the mean score for males and females households with respect to pro agripreneurship among the Mbororo community in

the Western highland of Cameroon. The Levene test for Homogeneity of Variances used tests whether the variance in scores is the same for each of the group. Based on the finding there is strong evidence for equality of variance between the two group as the probability value is above the cut-off criteria of greater than 0.05 (P-Value =0.062, Levene Stat=3.488). The model has not violated the assumption of Homogeneity of Variances.

***Table 4.4.2**: Results of the One-Way ANOVA*

	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	0.1	1	0.1	1.876	0.171
Within Groups	25.689	484	0.053		
Total	25.788	485			

Source: Computed using SPSS Version 21, 2024

The ANOVA results in Table 4.4.2 indicate no significant mean difference in pro agripreneurship scores between male and female participants ($F(1, 484) = 1.876$, $P > 0.05$). Since the p-value exceeds the 0.05 threshold, the null hypothesis four in the study which state that there is no mean difference in pro agripreneurship between the males and the females is accepted. This outcome suggests that gender does not play a role in shaping individuals' perspective on agripreneurship within this study

population. Consequently, agripreneurship initiatives may benefit from beign designed as gender-neutral, supporting both men and women without discrimination.

Table 4.4.3: *Descriptive Statistics*

	Mean	**Std. Deviation**	**Std. Error**	**95% Confidence Interval for Mean**	
				Lower Bound	Upper Bound
Female	0.7157	0.215	0.0138	0.6884	0.743
Male	0.687	0.2445	0.0156	0.6563	0.7178
Total	0.7012	0.2305	0.0104	0.6807	0.7218

Source: Computed using SPSS Version 21, 2024

The result in Table 4.4.3 shows that the Males (N=245) has a mean of 0.687 and standard deviation of 0.245 while the females headed households (N=241) have a mean of 0.716 and standard deviation of 0.215.

4.5 Summary of Findings

This study analyses the effects of water supply schemes and community capacity building on pro-agripreneurship among Mbororo households in the western highlands of Cameroon. The research addressed four key objectives: (1) assessing the effect of water supply schemes on pro-agripreneurship, (2) exploring the influence of community capacity building on pro-agripreneurship, (3) investigating the

moderating role of community capacity building in the relationship between water supply schemes and pro-agripreneurship, and (4) analysing gender differences in pro-agripreneurship among Mbororo households.

Firstly, the study found a significant positive effect of water supply schemes on pro-agripreneurship among Mbororo households ($\beta = 0.388$, $p < 0.01$). This result was consistent with maximum likelihood structural equation modelling (ML-SEM) and ordinary least squares (OLS) regression analyses. The findings suggest that improvements in water supply schemes are associated with increased levels of pro-agripreneurship.

Secondly, the results equally revealed that agricultural community capacity building is a significant positive predictor of pro-agripreneurship ($\beta = 0.352$, $p < 0.01$). This finding was robust using both ML-SEM and OLS analyses. The implication of the finding is that enhancing community capacity building initiatives can contribute to increased pro-agripreneurship among Mbororo households in the western highland of Cameroon.

Thirdly, in investigating the moderating role of community capacity building in the relationship between water supply schemes and pro-agripreneurship among the Mbororo households in the western highland of Cameroon, it was found that there is no significant moderating effect of agricultural community capacity building on the relationship between water supply schemes and pro-agripreneurship ($\beta = -0.130$, $p >$

0.05). Meanwhile both water supply schemes and agricultural community capacity building independently influence pro-agripreneurship.

Fourthly, the last objective was to analysing gender differences in pro-agripreneurship among Mbororo households. This objective was achieved using one-way analysis of variance. The one-way ANOVA results revealed no statistically significant difference in pro-agripreneurship between male-headed and female-headed Mbororo households ($F(1, 484) = 1.876$, $p > 0.05$). Although female-headed households showed a slightly higher mean pro-agripreneurship score ($M = 0.7157$, $SD = 0.2150$) compared to male-headed households ($M = 0.6870$, $SD = 0.2445$), this difference was not statistically significant. The finding suggests that women are important equally partner in promoting agripreneurship initiative among the Mbororo community. Involvement of women into the capacity building program will enhance the agrifood sectors and addresses some of the issue of household food costs in the Western highlands of Cameroon.

4.6 Conclusion

These findings provide valuable insights on how to improve on pro-agripreneurship among Mbororo households in the western highlands of Cameroon through water supply schemes and community capacity building initiatives in fostering agricultural entrepreneurship. the results also underscore the complexity of factors influencing pro-agripreneurship, including the unexpected negative relationship with formal

education levels and the non-significant gender differences in Pro-agripreneurship activities. The insignificant of formal education in contributing to pro-agripreneurship suggests that there is need for vocational education that should be tailored towards entrepreneurship.

CHAPTER V:

DISCUSSION

5.1 Discussion of Results

The discussion of the results is according to the research questions in the study.

5.2 Discussion of Research Question One

The standardized coefficients of 0.388 obtained using maximum likelihood estimation technique of structural equation modelling and 0.397 obtained using ordinary least square estimation technique indicate a moderate positive relationship between water supply schemes and pro-agripreneurship. This suggests that improvements in water supply infrastructure are associated with increased engagement in agricultural entrepreneurship activities among Mbororo households. The consistency of these results was tested using the OLS estimation technique as recommended by Aguinis et al., (2019; Dzidic and Green, 2012; Roerink et al., 1997;). The finding supports the view that water supply scheme contributes to social development (Perret, 2002; Prokopy,2005, Opare). It is also in line with the argument that operational irrigation is efficient in empowering the rural community especially during the dry season (Knox et al., 2012).

In addition, the finding of positive significant effect of water supply scheme on pro agripreneurship in this study aligns with the broader literature on infrastructure development and rural entrepreneurship (Alvarez & Busenitz, 2001). Khandker et al. (2014) found that improved water access in rural Bangladesh led to increased

agricultural productivity and diversification of economic activities. In another study, Hope et al. (2020) demonstrated that enhanced water infrastructure in rural Kenya was associated with greater engagement in small-scale agriculture and entrepreneurship.

However, the negative significant effect of formal education and pro-agripreneurship was contrary to the expectation. This finding contradicts much of the existing literature on education and entrepreneurship, which generally suggests a positive relationship (Valerio et al., 2014; Ács et al., 2018). The negative significant effect between formal levels of education on pro agripreneurship may be attributed to the opportunity cost of education in rural settings, where time spent in formal schooling reduces time allocated for involvement in agricultural activities. The explanation is in line with the work of Bezu and Holden (2014), as they argued that higher education levels in rural Ethiopia contribute to the shift-away from agriculture towards non-farm activities. In similar study, Foster and Rosenzweig (2004) argued that education can accelerate the transition out of agriculture in rural areas, potentially explaining the observed negative relationship in this study.

The results suggest that policies aimed at promoting rural development should adopt an integrated approach that addresses both infrastructural and human capital needs. Policymakers should consider how investments in water supply schemes can be leveraged to support agricultural entrepreneurship, while also reevaluating educational policies to ensure they align with the realities and opportunities of rural

agricultural contexts (Banerjee & Duflo, 2011). The study is in line with the view water supply schemes is imperative for community sustainability (Carter et al., 1999). The results of this study provide strong evidence in support of the hypothesis that water supply schemes have a significant positive effect on pro-agripreneurship among Mbororo households in the Western Highlands of Cameroon. The consistency of the findings across both maximum likelihood structural equation modelling (ML-SEM) and ordinary least squares (OLS) estimation techniques lend robustness to this conclusion. The findings is also consistent with broader arguments in the literature that construct water systems in developing nations via the concept of public-private partnerships can have tremendous effects on the level of agripreneurship.

5.3 Discussion of Research Question Two

The objective was to analyses the effect of agriculture community capacity building on pro agripreneurship among the Mbororo households in the western highlands of Cameroon. The results show a significant positive effect of agricultural community capacity building on pro-agripreneurship, with a standardized coefficient of 0.352. Technically, this finding indicates that for every one-unit change in agriculture community capacity building, there will be corresponding increase of 0.352 in pro-agripreneurship. This finding suggests that enhancing the capacity and skills of Mbororo households can have a substantial positive impact on their engagement in agricultural transformative activities.

This finding is in line with the study of Nwibo et al. (2016) who posited that capacity building initiatives significantly improved agricultural entrepreneurship among smallholder farmers in Kenya. Similarly, Knickel et al. (2018) also pointed out in their study that building social and human capital is crucial for enhancing agricultural innovation and entrepreneurship in rural Europe.

The finding is also in line with the theory of human capital by Becker (1964) and the theory of social capital developed by Coleman in 1988, as they argued that investment in knowledge, skills, and social networks enhance individual capabilities leading to improve economic outcomes. In addition, Chambers (2014) argues that building the capabilities of rural communities is crucial for sustainable development, while Christoplos (2010) emphasizes the importance of capacity building in agricultural extension services for enhancing rural livelihoods.

The finding also supports the argument that provision of capacity development to smallholder farmers in developing nations enhances their lives via increased productivity and food security (Swanson et al., 2008; Mgendi et al., 2022; Yang et al., 2021). The positive linkage between community capacity building and pro agripreneurship was also in lined with the view of Chapman and Kirk (2001), which suggest that community capacity building plays a crucial role in facilitating the sustained growth of any community. The is a strong argument in the literature that Sub-Saharan Africa countries are characterized suboptimal agricultural performance

despites the numerous reforms adopted in recent years. Balgah et al., (2023) further argued that enhancement of agricultural training have the potential to accelerate agricultural production.

5.4 Discussion of Research Question Three

The results of this research question indicate individually water supply schemes and agricultural community capacity building have a significant positive effect on pro-agripreneurship, their interaction does not support the hypothesized moderating effect of community capacity building on the nexus between water supply schemes and pro-agripreneurship. The non-significant interaction term between community capacity building and water supply schemes refutes the hypothesis that community capacity building moderates the relationship between water supply schemes and pro-agripreneurship.

The finding suggests that while both factors independently contribute to pro-agripreneurship, their combined effect is not synergistic as hypothesized. This finding contrasts with some existing literature that suggests complementarity between water supply schemes and capacity building in rural development contexts (Chambers, 2014; Christoplos, 2010).

However, the result also resonates with the growing literature on the complexity of rural development processes. According to Ramalingam (2013), development

outcomes often emerge from complex, non-linear interactions between multiple factors. The findings is not in line with the study carry out by Rosenzweig et al.(2004), in investigating water resources for agriculture in a changing climate. The study argued that the interaction between water supply and community capacity building on agripreneurship is very challenging in the phase of climate change and the hydrologic cycle. They further argued that climate change and the hydrologic cycle are the significant constraints farmers face regarding water availability for irrigation.

The model's relatively high explanatory power ($R^2 = 0.453$) indicates that water supply schemes and community capacity building, along with other control variables, account for a substantial portion of the variation in pro-agripreneurship among Mbororo households. This robust explanatory power enhances the credibility of the findings and suggests that the model captures key determinants of pro-agripreneurship in this context.

5.5 Discussion of Research Question Four

The results of this study revealed an interesting relationship between gender and pro-agripreneurship among Mbororo households in the Western Highlands of Cameroon. The findings indicate no significant mean difference in pro-agripreneurship levels between female-headed and male-headed households. This outcome is contrary to the

assumptions about gender disparities in agricultural entrepreneurship in most of the studies in the literature of gender studies.

The one-way ANOVA results ($F(1, 484) = 1.876$, $p = 0.171$) revealed that there is no statistically significant mean difference in pro-agripreneurship between male-headed and female-headed households. This finding refutes the hypothesis that there would be a significant mean difference in pro-agripreneurship between these two groups. The slight difference in mean scores (female-headed: 0.716, male-headed: 0.687) is not substantial enough to conclude any meaningful gender-based disparity in pro-agripreneurship within this community.

This result is in line with the reports on gender gaps in agricultural productivity and entrepreneurship in developing countries (Quisumbing et al., 2014). The lack of a significant difference suggests that, at least in terms of pro-agripreneurship attitudes, Mbororo women are on par with their male counterparts.

The finding is contrary to the study of Malapit et al. (2020) who found a significant gender gaps in agricultural productivity across six African countries, and attributed it to differences in access to resources and opportunities. The finding is also contrary to the study of Akter et al. (2017) on gender disparities in agricultural entrepreneurship in Southeast Asia.

The finding shows that women are equal partners for agricultural entrepreneurship among the Mbororo household in the western highlands of Cameroon.

Chapter VI:

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

6.1 Summary

The main objective of the study was to analyse the effect of water supply schemes, community capacity building and pro-agripreneurship among Mbororo households in the Western highlands of Cameroon. Data used in the study was elicited through the questionnaire that was administered to 475 households among the Mbororo community in the western highlands of Cameroon. Principle component analyse was used to generate an index for water supply schemes, agriculture community capacity building, and pro agripreneurship using the items on the questionnaires. The constructions and normalizations of the indexes was conducted using STATA version 14. The results of the findings in the study was achieve using the maximum likelihood estimation technique of structural equation modelling and ordinary least square estimation for robust checked of the fitted models.

The results of objective one shows that water supply schemes has a significant positive effect on pro-agripreneurship among Mbororo households in the Western highlands of Cameroon at 1% significant level. Technically, a unit improvement in water supply schemes will lead to 38.8% and 39.7% raised in the level of pro agripreneurship using the maximum likelihood estimation and the ordinary least square estimation technique respectively.

The results also show that agricultural community capacity building has a significant positive effect on pro-agripreneurship among the Mbororo households in Cameroon at 1% significant level. The result of the third objective shows community capacity building does not moderate the effect of water supply schemes on pro agripreneurship among the Mbororo households in the western highlands of Cameroon. The results did not also show any evidence of gender disparity between males headed households and females headed household among the Mbororo households in the western highlands of Cameroon.

6.2 Implications

The results of objective one in the study suggest that policymakers should consider investments in water supply schemes because it can boast agricultural entrepreneurship and permit the indigenous group who lives around the rural setting to farm all year round, whilst also revaluating educational policies to ensure they align with the realities and opportunities of agripreneurship in the rural setting in Cameroon. Based on the results of objective two in the stud, policymakers should aimed at promoting rural agripreneurship development by adopting an integrated approach that addresses both infrastructural and human capital needs through agriculture community capacity building programs. In other words, the finding highlights the crucial roles of community capacity building in promoting agro entrepreneurship in Cameroon. For meaningful development, policymakers should consider community capacity building initiatives programs.

The third objective also contributes to the theoretical discourse on enhancing agriculture entrepreneurship in the rural setting for inclusive development in Cameroon. The findings in the third objective suggest that policymakers should focus on the independent implementation of water supply schemes initiatives and community capacity building rather than simultaneous implementation of these interventions' initiatives. In other words, policymaker should prioritise independent approach in promoting pro agripreneurship in Cameroon.

The results of the fourth objective suggest that men and women are equal partners to agripreneurship development. The implication of this finding is that policymakers should focus on barriers to agripreneurship that affect gender equally.

6.3 Recommendations for Future Research

Future research should employ longitudinal designs to analyse the inter linkages between water supply schemes, community capacity building and pro agripreneurship among Mbororo community in the rest of the region in Cameroon. The study can also be replicated to the pygmies who lives around the eco-centric zone and the buffer zone of Dja Biosphere reserve in the east region of Cameroon. The pygmies and the Mbororo community are indigenous groups with share low access to schools, electricity, network, water resources, and road. The future research can adopt another method of data analysis such as the control function, propensity matching and Heckman selection estimation techniques to document the nexus between water supply schemes, community capacity building and pro

agripreneurship. The study is limited within the western highlands of Cameroon. The future research should consider extending the areas of study to other indigenous group in the North, Far North, East and Central region of Cameroon.

6.4 Conclusion

The main objective of the study was to analyses the effect of water supply schemes, community capacity building, and pro agripreneurship among the Mbororo household in the western highlands of Cameroon. The findings revealed the importance of water infrastructure development and skill enhancement in fostering agricultural entrepreneurship in rural communities as both water supply schemes and agricultural community capacity building has a significant positive effect on pro-agripreneurship among Mbororo households. The implication is that improved access to water resources can reduce the time and effort required for water collection, thereby creating up time for entrepreneurial activities and hence, agricultural productivity. The finding shows a significant positive effect between agriculture community capacity building and pro-agripreneurship among the Mbororo community in the western highland of Cameroon. This finding suggests that community capacity building and provision of water supply schemes are essential elements to foster sustainability in rural areas. On the other hand, the study also identified a significant positive linked between water supply schemes and pro-agripreneurship.

The third objective of the study shows no evidence of a significant moderating effect of community capacity building on the relationship between water supply schemes and pro-agripreneurship was another finding. This finding suggests that while water supply schemes and community capacity building independently contribute to pro-agripreneurship, their combined effect is not synergistic as hypothesized. The finding in this objective suggests a complementarity between water supply schemes and capacity building in spurring agripreneurship in the rural.

Lastly, the fourth objective in the study shows no evidence of gender differences in pro-agripreneurship levels among Mbororo households. The findings suggest strong needs for independent policies on water supply schemes and community capacity building on enhancing pro agripreneurship. Women should be considered as equal partners in the agripreneurship among the Mbororo households in the Northwest and West Region of Cameroon.

Building the capacity of the Mbororo Community in the western highland of Cameroon as well as provisions of the water supply catchment will contribute tremendously in improving on the livelihood of the community not only in terms of access to food through agripreneurship but also in the context of inclusive development and unemployment challenges.

REFERENCES

Ács, Z.J., Szerb, L., Lafuente, E., Lloyd, A., Ács, Z.J., Szerb, L., Lafuente, E. and Lloyd, A., 2018. The entrepreneurial ecosystem. *Global entrepreneurship and development index 2018*, pp.1-9.

Addo, L. K. (2018). Factors influencing agripreneurship and their role in agripreneurship performance among young graduate agripreneurs. *International Journal of Environment, Agriculture and Biotechnology, 3*(6).

Adeyanju, D., Mburu, J., Gituro, W., Chumo, C., Mignouna, D., Mulinganya, N., & Ashagidigbi, W. (2023). Can young agripreneurs improve their skills through agripreneurship empowerment programmes? Evidence from Africa. *Heliyon, 9*(1).

Adeyanju, D.,, J., Mburu, and D. Mignouna. " Youth agricultural entrepreneurship: Assessing the impact of agricultural training programmes on performance." *Sustainability* 13, no. 4 (2023): 16 -97.

Afroz, S., Singh, R., Nain, M. S., & Mishra, J. R. (2022). Determinants for agripreneurship development under agriclinics and agribusiness centers (ACABC) scheme. *Indian Journal of Agricultural Sciences*, *92*(2), 258-62.

Aguinis, H., Ramani, R.S. and Alabduljader, N., 2018. What you see is what you get? Enhancing methodological transparency in management research. *Academy of Management Annals*, *12*(1), pp.83-110.

Akter, S., Rutsaert, P., Luis, J., Htwe, N.M., San, S.S., Raharjo, B. and Pustika, A., 2017. Women's empowerment and gender equity in agriculture: A different perspective from Southeast Asia. *Food policy*, *69*, pp.270-279.

Alvarez, S.A. and Busenitz, L.W., 2001. The entrepreneurship of resource-based theory. *Journal of management*, *27*(6), pp.755-775.

Anarah Samuel, E., Osuafor Ogonna, O., Umeh Onyebuchi, J., & Meludu Nkiru, T. (2020). International Journal of Agriculture and Biosciences. *Int J Agri Biosci*, *10*(1), 1-5.

Anderson, Edward, Paolo De Renzio, and Stephanie Levy. *The role of public investment*
in poverty reduction: theories, evidence and methods. Vol. 111. London: Overseas Development Institute, 2006.

Andrew Ako Ako. "Access to potable water and sanitation in Cameroon within the context of Millennium Development Goals (MDGS)" , Water Science & Technology, 03/2010

Akrong, R., & Kotu, B. H. (2022). Economic analysis of youth participation in agripreneurship in Benin. Heliyon, 8(1).

Ameyaw, E. E., & Chan, A. P. (2015). Evaluation and ranking of risk factors in public–private partnership water supply projects in developing countries using fuzzy

synthetic evaluation approach. Expert Systems with Applications, 42(12), 5102-5116.

Balgah, R. A., Benjamin, E. O., Kimengsi, J. N., & Buchenrieder, G. (2023). World Development Perspectives. World Development, 31, 100523.

Barau, A. A., & Adesiji, G. B. (2017). Socioeconomic determinants influencing the willingness of agriculture undergraduates to participate in agripreneurship in Northwest Nigeria. *International Journal of Agricultural Management and Development (IJAMAD)*, *8*(1), 25-34.

Bamfo, B. A., Asiedu-Appiah, F., & Oppong-Boakye, P. K. (2015). Capacity building for entrepreneurship development in Ghana: The perspectives of owner managers. *International Journal of Arts & Sciences*, *8*(5), 481.

Banerjee, A., 2011. Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty. PublicAffairs.

Becker, G.S., 2009. Human capital: A theoretical and empirical analysis, with special reference to education. University of Chicago press.

Bezu, S. and Holden, S., 2014. Are rural youth in Ethiopia abandoning agriculture?. World Development, 64, pp.259-272.

Birchall, J., & Simmons, R. (2009). Co-operatives and poverty reduction. *Manchester: Co-op College*, *13*(1), 1-60.

Brikké, F., Bredero, M., Supply, W., & Network, M. (2003). Linking technology choice with operation and maintenance in the context of community water supply and sanitation: A reference document for planners and project staff.

Blundell, R., Dearden, L., Meghir, C., & Sianesi, B. (1999). Human capital investment: the returns from education and training to the individual, the firm and the economy. *Fiscal studies*, *20*(1), 1-23.

Bourdieu, P. (2005). *The social structures of the economy*. Polity.

Carter, R. C., Tyrrel, S. F., & Howsam, P. (1999). The impact and sustainability of community water supply and sanitation programmes in developing countries. *Water and Environment Journal*, *13*(4), 292-296.

Chant, S. (2013). Cities, slums and gender in the Global South: Towards a feminised urban future. Routledge.

Chambers, R., 2014. Rural development: Putting the last first. Routledge

Chapman, M., & Kirk, K. (2001). *Lessons for community capacity building: a summary of research evidence*. Edinburgh: Scottish Homes.

Coleman, J. S. (1988) Social capital in the creation of human capital. American Journal of Sociology, 94, S95-120.

Crook, T. R., Todd, S. Y., Combs, J. G., Woehr, D. J., & Ketchen, D. J. (2011). Does human capital matter? A meta-analysis of the relationship between human capital and firm performance. Journal of Applied Psychology, 96(3), 443-456.

Diab, A. M., Yacoub, M., & AbdelAal, M. H. (2020). An overview of the agricultural extension system in Egypt: The history, structure, modes of operation and the future directions. *Sustainable Agriculture Research*, *9*(4), 30-42.

Doss, C. (2013). Intrahousehold bargaining and resource allocation in developing countries. World Bank Research Observer, 28(1), 52-78.

Djomo, J. M. N., & Sikod, F. (2012). The effects of human capital on agricultural productivity and farmer's income in Cameroon. *International Business Research*, *5*(4), 134.

Dzidic, P., & Green, M. (2012). Outdoing the Joneses: Understanding community acceptance of an alternative water supply scheme and sustainable urban design. *Landscape and Urban Planning*, *105*(3), 266-273.

Erieme, S. (2006). Capacity building in agricultural extension: The World Bank experience in Nigeria. *Journal of agricultural Extension*, *9*.

FAO (2011). The state of food and agriculture 2010-2011: Women in agriculture: Closing the gender gap for development. Food and Agriculture Organization of the United Nations.

Foster, A.D. and Rosenzweig, M.R., 2004. Agricultural productivity growth, rural economic diversity, and economic reforms: India, 1970–2000. Economic Development and Cultural Change, 52(3), pp.509-542.

Freeman, R. B. (1986). Demand for education. *Handbook of labour economics*, *1*, 357-386.

Gintis, H. (2006). The foundations of behaviour: The beliefs, preferences, and constraints model. *Biological Theory*, *1*, 123-127.

Goodman, R. M., Speers, M. A., McLeroy, K., Fawcett, S., Kegler, M., Parker, E., ... & Wallerstein, N. (1998). Identifying and defining the dimensions of community capacity to provide a basis for measurement. *Health education & behaviour*, *25*(3), 258-278.

Guimarães, E. F., Malheiros, T. F., & Marques, R. C. (2016). Inclusive governance: New concept of water supply and sanitation services in social vulnerability areas. *Utilities Policy*, *43*, 124-129.

Gyenfie, G.N., 2014. *Linking Programme Planning Approaches to Livelihood Outcomes of Farmers: A Case Study of Agricultural Extension Services in Ghana* (Doctoral dissertation, University of Ghana).

Halim, Abdul, and M. Mozahar Ali. "Training and professional development." (1997).

Hanushek, E., & Woessmann, L. (2008). The role of cognitive skills in economic development. Journal of Economic Literature, 46, 607-668.

Hays, S. (1994). Structure and agency and the sticky problem of culture. *Sociological theory*, 57-72.

Hope, R., Thomson, P., Koehler, J. and Foster, T., 2020. Rethinking the economics of rural water in Africa. *Oxford Review of Economic Policy*, *36*(1), pp.171-190.

Issa, F. O. (2013). Building the capacity of agricultural extension personnel for effective implementation of agricultural transformation agenda in Nigeria. *Journal of Agricultural Extension*, *17*(1), 78-88.

IFAD (2014). Rural development report 2014: Family farming and the role of women in agriculture. International Fund for Agricultural Development.

Ikebuaku, K., & Dinbabo, M. (2023). Exploring the Dynamics of Agripreneurship Perception and Intention among the Nigerian Youth. *International Journal of Management, Entrepreneurship, Social Science and Humanities*, *6*(2), 94-115.

Jackson, M. W. (1988). The Return of Grand Theory in the Human Sciences.

Kahan, D. (2013). *Market-oriented farming: An overview*. Food and Agriculture Organization of the United Nations.

Khandker, S.R., Bakht, Z. and Koolwal, G.B., 2009. The poverty impact of rural roads: Evidence from Bangladesh. Economic development and cultural change, 57(4), pp.685-722.

Knickel, K., Brunori, G., Rand, S. and Proost, J., (2009). Towards a better conceptual framework for innovation processes in agriculture and rural development: from linear

models to systemic approaches. Journal of agricultural education and extension, 15(2), pp.131-146.

Knox, J. W., Kay, M. G., & Weatherhead, E. K. (2012). Water regulation, crop production, and agricultural water management—Understanding farmer perspectives on irrigation efficiency. *Agricultural water management*, *108*, 3-8.

Li, H. (2007). Hierarchical risk assessment of water supply systems.

Mankiw, N. G., Romer, D., & Weil, D. (1992). A contribution to the empirics of economic growth. Quarterly Journal of Economics, 107(2), 407-437.

Montreal and Kingston: McGill-Queen's University Press.

Mahmud, A., & Dirawan, G. D. (2016). Effectiveness of Training Model Capacity Building for Entrepreneurship Women Based Empowerment Community. *International Education Studies*, *9*(11), 142-150.

Mahmoud, A. E. (2018). Addressing Challenges and Seizing opportunities in Agripreneurship: Successful Stories of Women in East Region in Cameroon. *Alexandria Science Exchange Journal*, *39*(July-September), 444-449.

Mamman, A. (2014). Effect of entrepreneurship education on capacity building in small and medium scale enterprises (SMEs) in Nigeria. International Journal of Social Sciences and Entrepreneurship, 1 (11), 224-235.

Mgendi, G., Mao, S., & Qiao, F. (2022). Does agricultural training and demonstration matter in technology adoption? The empirical evidence from small rice farmers in Tanzania. *Technology in Society*, *70*, 102024.

Mkpado, M. (2013). The status of African agriculture and capacity development challenges for sustainable resilience from global economic shocks. *Journal of Sustainable Development Studies*, *3*(1).

Mkpado, M., & Mbadiwe, I. E. (2013). Developing the capacity and improving access of small-scale farmers to low-cost artificial substrate mushroom cultivation in South-Eastern Nigeria.

Mwamakimbula, A.M., 2014. *Assessment of the factors impacting agricultural extension training programs in Tanzania: a descriptive study* (master's thesis, Iowa State University).

Nagler, P., & Naudé, W. (2014). Non-farm entrepreneurship in rural Africa: Patterns and determinants.

Ndlela, S., & Worth, S. (2021). Creating self-reliance and sustainable livelihoods amongst small-scale sugarcane farmers. *The Journal of Agricultural Education and Extension*, *27*(3), 325-339.

Nwazor, J. C. (2012). Capacity building, entrepreneurship and sustainable development. *Journal of Emerging Trends in Educational Research and Policy Studies*, *3*(1), 51-54.

Nwibo, S. U., Mbam, B. N., & Biam, C. K. (2016). Determinants of agripreneurship among the rural households of Ishielu local government area of Ebonyi state. *Journal of Biology, Agriculture and Healthcare*, *6*(13), 3-10.

Opare, S. (2011). Sustaining water supply through a phased community management approach: lessons from Ghana's "oats" water supply scheme. *Environment, Development and sustainability*, *13*, 1021-1042.

Oluwakemi, O. A. (2021). *Impact of the media on sustainable environment, as sustainable development goal [SDG] 8 in Kwara State, Nigeria* (Vol. 18). MC/HND.

Oliveira, I. The role of RAS for inclusive agripreneurship. GFRAS. https://www.g-fras.org/en/agripreneurship.html#:~:text=Agripreneurship%20refers%20to%20entrepreneurship%20in,business%E2%80%9D%20(Reynolds%20et%20al.

Otache, I. (2017). Agripreneurship development: a strategy for revamping Nigeria's economy from recession. *African Journal of Economic and Management Studies*, *8*(4), 474-483.

Perry, Chris, Pasquale Steduto, and Fawzi Karajeh (2017). "Does improved irrigation technology save water? A review of the evidence." *Food and Agriculture Organization of the United Nations, Cairo*.

Perret, S. R. (2002). Water policies and smallholding irrigation schemes in South Africa: A history and new institutional challenges. *Water policy*, *4*(3), 283-300.

Prokopy, L. S. (2005). The relationship between participation and project outcomes: Evidence from rural water supply projects in India. *World development*, *33*(11), 1801-1819.

Reynolds, P. D., Hay, M., & Camp, S. M. (1999). Global entrepreneurship monitor. *Kansas City, Missouri: Kauffman Center for Entrepreneurial Leadership*.

Poulton, C., & Macartney, J. (2012). Can public–private partnerships leverage private investment in agricultural value chains in Africa? A preliminary review. *World Development*, *40*(1), 96-109.

Putnam, R. D. (1993). Making democracy work: Civic traditions in modern Italy. Princeton University Press.

Quisumbing, A.R., Meinzen-Dick, R., Raney, T.L., Croppenstedt, A., Behrman, J.A. and Peterman, A., 2014. Closing the knowledge gap on gender in agriculture. Gender in agriculture: Closing the knowledge gap, pp.3-27.

Roerink, G. J., Bastiaanssen, W. G., Chambouleyron, J., & Menenti, M. (1997). Relating crop water consumption to irrigation water supply by remote sensing. *Water Resources Management*, *11*(6), 445-465.

Riddell, W. C. (2007). The Impact of Education on Economic and Social Outcomes: An Overview of Recent Advances in Economics. In G. Picot, R. Saunders & A. Sweetman (Eds.), Fulfilling Potential, Creating Success: Perspectives on Human Capital Development.

Rosenzweig, C., Strzepek, K. M., Major, D. C., Iglesias, A., Yates, D. N., McCluskey, A., & Hillel, D. (2004). Water resources for agriculture in a changing climate: international case studies. *Global Environmental Change*, *14*(4), 345-360.

Ryman, R. M. (1984). Investment in capacity to supply water for irrigated agriculture from underground water storage. *Agricultural Administration*, *16*(4), 249-261.

Sancho, F. (2010). Agricultural and rural entrepreneurship: concepts for modeling development. *Comuniica Magazine*, *2010*.

Sutherland, C., Scott, D., & Hordijk, M. (2015). Urban water governance for more inclusive development: A reflection on the 'waterscapes' of Durban, South Africa. *The European Journal of Development Research*, *27*, 488-504.

Swanson, B. E. (2008). *Global review of good agricultural extension and advisory service practices* (Vol. 82). Rome: Food and Agriculture Organization of the United Nations.

Tan, H., Bashir, S., & Tanaka, N. (2016). Skill use, skill deficits, and firm performance in formal sector enterprises: evidence from the Tanzania enterprise skills survey, 2015. *World Bank Policy Research Working Paper*, (7672).

Tedson, R.N., 2018. Capacity Building Interventions on Smallholder Farmers and Food Security In Siaya County, KENYA (Doctoral dissertation, JKUAT-COHRED).

Tripathi, R., & Agarwal, S. (2015). Rural development through Agripreneurship: A study of farmers in Uttar Pradesh. *Global Journal of Advanced Research*, *2*(2), 534-542.

Umeh, Nwabueze Gibson, et al. "Socio-economic determinants of agripreneurship choice
among youths in Ebonyi State, Nigeria." *Journal of Agricultural Extension* 24.1 (2020): 24-33.

Van der Bruggen, B., Borghgraef, K., & Vinckier, C. (2010). Causes of water supply problems in urbanised regions in developing countries. *Water resources management*, *24*, 1885-1902.

Wonde, K. M., Tsehay, A. S., & Lemma, S. E. (2022). Training at farmers training centers and its impact on crop productivity and households' income in Ethiopia: A propensity score matching (PSM) analysis. *Heliyon*, *8*(7).

World Bank (2012). World development report 2012: Gender equality and development. World Bank.

Wongtschowski, M., Belt, J., Heemskerk, W., & Kahan, D. (2013). The business of agricultural business services. *Working with smallholders in Africa*.

Yang, Q., Zhu, Y., & Wang, F. (2021). Exploring mediating factors between agricultural training and farmers' adoption of drip fertigation system: Evidence from banana farmers in China. *Water, 13*(10), 1364.

Zecevic, M., Pezo, L., Bodroza-Solarov, M., Brlek, T., Krulj, J., Kojić, J., & Marić, B. (2019). A business model in agricultural production in Serbia, developing towards sustainability. *Економика пољопривреде, 66*(2), 437-456.

APPENDIX A

SURVEY COVER LETTER

Dear Respondents,

My Name is Mohtangongho David Njewoh and I am post graduate student pursuing a Doctorate in Business Administration at the Swiss School of Business and Management Geneva. I am conducting research on **Water Supply Schemes, Community Capacity Building, and Pro-Agriprenuership among the Mbororo Households in Western Highland of Cameroon** as part of my program's requirements. The information obtained will be used solely for the research purposes and will remain confidential. The results of the study will be shared with the policy makers for policy adoption and after the approval of the University.

Thank you in advance for taking part in this survey

APPENDIX B

INFORMED CONSENT

Mohtangongho David Njewoh
NW Region -Cameroon.
(+237) 653 414 841
Mile 5, Nkwen
July 04, 2024

To
The Delegate of Agriculture
Northwest and West Region of Cameroon

Subject: Authorization/Consent Letter for Data Collections

I hope this letter finds you well. My name is Mohtangongho David Njewoh, a Doctorate student of Swiss School of Business and Management Geneva. I am writing to express our intention of visiting some quarters in Tubah subdivision with a team of 8 researchers for an important data collection process. I am working on the topic Water Supply Schemes, Community Capacity Building, and Pro-agriprenuership among Mbororo households in Western Highland of Cameroon.

After the authorization from the school I deem it necessary to inform you of our coming into your area. The study will be carried out in the North West and west region of Cameroon. The focus is on the indigenous Mbororo community. I believe that engaging with different regions and districts will greatly enhance our findings.

I assure you that our team is equipped with the necessary expertise and professionalism required to conduct this research in the most respectful and ethical manner. I shall be very much obliged if you grant us the permit to interact with some of the Mbororo household's head in these regions. Thank you for taking the time to consider our request. We truly hope for the opportunity to collaborate with you and your team. Should you have any questions or require further information, please do not hesitate to contact us. We eagerly await your response.

Warm regards,
Mr. Mohtangongho David Njewoh

APPENDIX C

QUESTIONNAIRE

SECTION A: INSTITUTIONAL CHARACTERISTICS

Instructions: Kindly respond to the following questions by selecting only one response option per question.

1. Martial Status of respondents a) single b) Monogamy Married c) Polygamy Married d) Widow e) Divorce/Seperated
2. Areas : a) Bafole b) Mataket c) Mambain d) Mancha Bani e) Galim f) Mefony g) Bamendjing h) Didango i) Foumbou j) Bambui k) Sabga l)Kejom Ketinguh m) Bambili n) Santa o) Sop
   p) Ntubew q) Fedong
3. Region a) NWR b) WR
4. Gender a) Male b) Female
5. Do you consider yourself literate in English? a) No b) Yes
6. Household Size ……
7. Are you into agricultural farming? a) No b) Yes
8. How long have you been farming in
   years?……
9. Your age ……..
10. Education a) non formal education b) primary education c) secondary education d) tertiary education

11. Household main access to drinking water sources a) public tap b) Borehole c) Well d) River/Stream
12. Major use of water resources a) irrigation b) consumption c) fish farming d) others
13. Household access to sanitation facility a) no facility b) pit/Latrine
14. Time spent to fetch drinking water in minutes ----------(in minutes).
15. Distance to the nearest agricultural training center in KM……..(km).

Section B: The questions under this section are soley on different aspects of Community capacity building[CCB]. Please tick only pne of the response options in the box following your assertions about community capacity building on a five-point likert scale ranging from strong disagree to strongly agree. The response options are: 5= strongly Agree[SA], 4=Agree[A], 3=Neutral [N], 2=Disagree [D] 1=strongly Disagree [SD].

s/n	Code	Item	SD	D	N	A	SA
16	CCB1	Acquisition of skills in agricultural practices is indispensable for community development					
17	CCB2	Skills in the usage of improved seed are critical farm on improving farm outputs					
18	CCB3	Building skills in post-harvest management will improve farm storage and reduce food losses					

19	CCB4	Capacity Knowledge on planting one seed per hold is critical for improving yield					
20	CCB5	Developing skills through supporting the group's planning and evaluation of action, activities, and engagement will lead to an increase in the social welfare of the community					
21	CCB6	Learning monitoring from more experienced field coordinators working in the community is very important					
22	CCB7	Organizing opportunities for sharing and networking with other groups are relevant capacity building skills					
23	CCB8	There is a need for the community to voluntarily develop their community					
24	CCB9	Skills in decision-making are an essential element of community capacity-building					
25	CCB10	Efficient and effective utilisation of community resources can be achieved easily if the community is trained					
26	CCB11	Training will build the confidence of the households towards innovative initiatives					

27	CCB12	Community capacity building can make the community more responsible and accountable					
28	CCB13	The community can develop the spirit of team involvement in the management of local resources					
29	CCB14	Knowledge of effective farm practices can easily be learned through knowledge- sharing grouping					
30	CCB15	The communities will equally learn some of the methods to support their community by working jointly with other community, government and organisations					

Section C: The questions under this section are soley on different aspects of pro agripreneurship [PA]. Please tick only pne of the response options in the box following your assertions about pro agripreneurship on a five-point likert scale ranging from strong disagree to strongly agree. The response options are: 5= strongly Agree[SA], 4=Agree[A], 3=Neutral [N], 2=Disagree [D] 1=strongly Disagree [SD].

s/n	Code	Item	SD	D	N	A	SA
31	PA1	Transformation of agricultural outputs into supply chain can enhance national strategy for sustainable agriculture					
32	PA2	Valorisation of agricultural products through technological innovation will create more opportunities					
33	PA3	Agro-entrepreneurial skills can help the household					
34	PA4	Promotion of agricultural transformative empowerment program for the community will promote agripreneurship					
35	PA5	Adoption of smart farming practices will lead to an increase in farm outputs and hence pro-agriprenuership practices					
36	PA6	Provision of farming inputs to farmer by government of Cameroon encourages agriprenuership					
37	PA7	Financing innovation in agriculture by both domestic and international community is very important for sustainable pro-agriprenuership					

Section D: The questions under this section are soley on different aspects of water supply scheme [WSC]. Please tick only pne of the response options in the box following your assertions about pro water supply schemes on a five-point likert scale ranging from strong disagree to strongly agree. The response options are: 5= strongly Agree[SA], 4=Agree[A], 3=Neutral [N], 2=Disagree [D] 1=strongly Disagree [SD].

s/n	Code	Item	SD	D	N	A	SA
38	WSC38	Water supply scheme can improved on the welfare of community					
39	WSC39	Irrigation plan is an important aspect of water supply that can help farmers in our community					
40	WSC40	Provision of clean drinking water improve on the health wellbeing					
41	WSC41	Provision of Water supply scheme reduces the time in searching of water					

Thank you.