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Original Article

Evaluation of Early-Stage Viability of Small Farm Projects: Case of Smallholdings Initiated by Trained Young Farmers in the West Region of Cameroon

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Abstract: *The Cameroonian agricultural sector employs about 70 percent of the active population, accounting for some 20 percent of its Gross Domestic Product (GDP). It still has enormous potential for the intake of a significant number of youths, thereby contributing to their employment. However, Cameroonian youth tend to be reluctant to embrace agriculture as a lifelong occupation, arguing that drudgery and minimal financial returns characterize the sector and are suitable for the least educated in society. The government created a support program for the renovation of agricultural training in the country, aiming to train and fund the socio-professional integration of young farmers through the creation and growth of small farm projects. Since 2015, this scheme has been launched, and no study has been conducted to ascertain the sustainability of small farm projects created by young farmers. This study aims to evaluate the early-stage viability of the young farmers' projects in the West Region of Cameroon to determine their potential sustainability. An exploratory sequential mixed methods study was conducted in the territories of 5 Training Centres, involving 358 participants. The study found that 70% of the young farmers had small farm projects that were technically and economically viable, pointing to their potential sustainability. The study recommends that similar research be conducted in other regions of the country to inform policymakers of the need to pursue and consolidate the strategy.*

Keywords: *Efficiency, Performance, Small Farm Projects, Sustainability, Viability, Young Farmers.*

I. INTRODUCTION

Following the global economic crisis that hit African countries in the 1980s, there has been a decade of relatively high rates of economic growth, but this has really not contributed to solving the problems of unemployment and underemployment of youths, which is increasingly perceived as the central issue of the development challenges of the continent (Schwebel et al., 2021). Unemployment and underemployment among young people in Africa continue to grow despite the increased investment in education and their growing expectations for decent work associated with increased access to education (Geza et al., 2021). According to UNDESA (2022), the poverty rate in Cameroon is estimated at about 50% in the rural areas and 22% in the urban centres. Rising urbanization fuelled by increasing rates of migration, especially youths from rural to urban areas, has accounted for the growth in the proportion of the urban population from 20.3% in 1970 to about 58.4% in 2010 (Hall et al., 2017). It is projected to reach 71.0% in 2030 and 79.9% in 2050 (FAO, 2023).

Conversely, the proportion of the rural population, which stood at 79.1% in 1970, dropped to 41.6% in 2010 and is expected to continue dropping to a projected 29.0% in 2030 and 20.1% in 2050. (UNDESA, 2022). It can, therefore, be concluded that in most rural areas of Cameroon, elderly persons are generally left behind by dynamic and able-bodied youths to carry out agricultural activities, which are expected to feed the ever-rising populations of youths migrating to urban areas (Selod & Shilpi, 2021).

The rural sector in Cameroon occupies a central position in the country's development, considering that the bulk of agricultural commodities produced in the rural areas accounts for the country's food self-sufficiency and food security, the creation of wealth and jobs (AGRA, 2020). According to the (MINEPAT, 2010), the agricultural sector in the country employs about 70% of the active population and accounts for about 20% of its Gross Domestic Product (GDP), and still has enormous potential for the intake of a significant number of youths thereby contributing to their employment, further development and the development of their local communities. This explains why, after decades of neglect, there are significant advances by the government, development agencies and the private sector in the training and settlement of youths in agriculture in Cameroon (Ngwene & Tangko, 2020; AFOP, 2023). The persistence and increasing effects of rural poverty and the rising sense of urgency to redress the problem of employment for young people have also probably contributed to impel policymakers and development professionals to take a renewed interest in agriculture and to look up to it for solutions to the crisis in youth employment, food

self-sufficiency and food security of the rapidly rising populations (Sosale & Majgaard, 2016; Mkong et al., 2021).

Past efforts to encourage Cameroonian youth to embrace agriculture as a lifelong occupation led to mixed results because of the perception by these youths that activities in the primary production sector (agriculture and natural resources) are characterized by drudgery, minimal financial returns and therefore meant for the least educated in society (Vitung, 2023). In a bid to reverse these trends, the Support Program for the Renovation of Professional Training in the Agriculture, Livestock and Fisheries sectors (AFOP) developed a strategy to ease some of the major barriers to initial entry by trained young farmers into agriculture and to let diverse success stories attract other youths towards the sector. The program put in place a strategy to backstop the young farmers to progressively develop small family farms, providing them gainful employment and income for their livelihoods (AFOP, 2012). Some of the major barriers that the program attempted to lift include the improvement of the professional qualification of youths through initial vocational training, the resolution of the problem of access to land by making the availability of a plot of land a prerequisite for entry into the training program, and the provision of a non-refundable financial grant to help trained youths to fund the start-up phase of their farm projects. During their training, the focus is on practical, hands-on rather than theoretical training. Such a strategy would only produce the expected results if the pioneer young farmers develop sustainable farm projects, eventually contributing to their socio-professional integration, settlement and stabilization in their respective communities, where they grow to be respected economic actors.

This study seeks to evaluate the early-stage viability of small farm projects implemented by young farmers who are trained in Young Farmers' Training Centres in the West Region of Cameroon and provided the necessary grants to set up their farms. The central premise of the study is that viable and sustainable farm projects implemented by young farmers would contribute to their social integration, the growth and consolidation of their economic and financial well-being, a strengthening of their resilience to shocks, their autonomy and social reproduction in their respective communities (Sosale & Majgaard, 2016). This would, in turn, lead to their recognition by society and an evolution in the perception of farming as a lowly occupation. In this way, more youths would be increasingly attracted towards the agricultural training programs provided. They will also be motivated to move to or stay in rural areas where they would, by their own volition, settle down to agriculture, create jobs for themselves and other youths, create wealth and contribute to the overall development of their local communities, particularly the country.

A) Statement of the Problem

The professional settlement of young farmers trained in Young Farmers' Training Centres, which received AFOP Program support since 2008, was launched in 2015. Since then, some 7000 young farmers have been successfully settled nationwide. Berges (2015) reported that very early in their farm project development, these youths started generating impressive results with respect to the quantities of crops and animals produced and marketed, leading to their social recognition in their respective communities. However, the progressiveness and trajectories of their farm projects over the next few years and their sustainability have not been determined.

A rapid appraisal in 2017 of some 2037 settled young farmers indicated that 956 (64.2%) of their projects were good, 561 (37.0%) were fairly good, 266 projects (17.9%) were in difficulty but could be recuperated, 114 of them (7.7%) were failed projects while 140 (9.4%) had been abandoned over the period from September 2014 to December 2017. However, the assessment of farm projects on a scale ranging from good to abandoned is a highly subjective, hardly reliable and somewhat irrelevant approach, given that it is the long-term sustainability that will be the ultimate metric for the evaluation of the action undertaken by AFOP program with respect to the training, socio-professional integration and settlement of youths. No detailed study has been carried out to evaluate the performance and progressiveness of the small farm projects initiated by these trained young farmers and the strategies that have to be deployed by training centres and institutions that support them to ensure that the smallholdings that they set up grow into highly performing farm enterprises.

B) Purpose and Objectives of the Study

The purpose of this study is to evaluate the early-stage viability of small farm projects initiated by trained Young Farmers in the West Region of Cameroon and their potential to grow into sustainable farm enterprises and to draw lessons from them that can be applied to the other regions of the country. To attain this, the following research objectives were set:

The study's main objective is to assess the early-stage viability of small farm projects created and managed by trained young farmers in the West Region of Cameroon to determine the potential sustainability of the farm projects.

To achieve this objective, the specific objectives set are to:

i) Verify the effectiveness and efficiency of implementation of farm projects initiated by young farmers trained by AFOP-supported training centres in the West Region of Cameroon;
ii) Evaluate the effects of production systems adopted by the young farmers on the performance of their farm projects;

iii) Identify viability indicators that point to the potential continuity and sustainability of the farm projects.

C) Research Questions

To achieve these objectives, the following research questions were formulated:

i) What is the effectiveness and efficiency of implementing farm projects initiated by young farmers trained by AFOP-supported training centres in the West Region of Cameroon?
ii) What are the effects of the production systems adopted by the young farmers on the performance of their farm projects?
iii) What viability indicators point to the potential continuity and sustainability of the farm projects?

D) Research Hypothesis

The null hypothesis that is tested in line with the relevant research question is the following:

H_{01}: The production systems used by the young farmers have no effects on the performance of their farm projects.

II. LITERATURE REVIEW

A) Conceptual Review

a. Factor productivity

APO (2015) defines productivity as a ratio of a volume measure of output to a volume measure of input (or the factor) used. At its most fundamental level, factor productivity measures the amount produced, given a set of resources and inputs. It is, therefore, feasible to measure productivity for a single entity, such as a commodity, a farm or a group of farms, at any geographical scale. Comparisons at the farm level require micro-measures, while those at regional, national and sub-regional levels require macro-measures to reflect the ultimate purpose for which the measurements are done (Barral et al., 2012). Ball et al. (2015) argue that while the desired purpose can vary, the measurement issues associated with deriving the different indicators are the same. Suppose indicators that need to be informed are quite simple (such as labour productivity of maize farms or land productivity of a tomato plot). In that case, only basic information on output and input quantities used will be required. A single statistic or indicator does not tell the entire story about the performance of a farm. They need to be multiple and aggregated so policymakers and analysts can prescribe the best policies without ambiguity (APO, 2015). When such an aggregation is done, the prices of outputs and inputs must be integrated into the assessment framework (Thahir et al., 2022).

b. Inverse farm productivity

Over the years, the debate on farm size and productivity relationship intensified when Sen (1962) observed an inverse relationship between farm size and output per hectare in Indian agriculture, suggesting that small farms are more productive compared to large ones. However, some researchers challenged their findings by using approaches based on disaggregated data relating to individual holdings and established results that contradicted the hypothesis that yield per hectare falls as farm size increases (Mondal & Sen, 2024). Fan et al. (2013) argued that this theory was particularly disconcerting to policymakers because of its controversial implication for land reform, given that if small farms are intrinsically more productive than larger farms, land redistribution would not only shift the distribution of wealth but would also increase overall land productivity. Secondly, Deininger et al. (2017) pointed out that this relationship implies that smaller plots would be more productive within a household farm than larger plots, indicating that land fragmentation or subdivision into smaller plots would conversely contribute to increasing productivity. They concluded that the inverse productivity relation reported in many instances could have been due essentially to missing or imperfect land, labour, credit or insurance markets.

There is growing evidence that if smallholdings are sustainably managed, they could significantly result in increased food production when compared to large holdings that depend on intensive use of machines, inorganic fertilizers and pesticides, among others. According to Snapp and Fisher (2015), large farms may appear more productive because they focus on a single commodity and yield more per hectare, but the other products absent here are obtained by the smallholder from his farm. Smallholder farms generate a greater total agricultural output per unit area when all of these are put together than larger farms.

c. Technical efficiency

According to Zewdie et al. (2021), the technical efficiency of a farm is the effectiveness with which a given set of inputs is used to produce an output on that farm. The farm is technically efficient if it produces the maximum output from the minimum quantity of inputs, such as land, labour, capital, and technology. Agricultural productivity is usually considered to represent the efficiency of the production process. However, as APO (2015) argues, this is true only if the farm is technically efficient. It should be noted that agricultural productivity depends on two components, including the type and quality of the inputs used in the production process (production technology) on the one hand and how well these inputs are combined (technical efficiency) on the other. When a combination of inputs generates maximum attainable output, this output is referred to as the production frontier and the farm is said to have attained technical efficiency (FAO, 2017).

d. Economic efficiency

According to Chetroiu and Calin (2013), an agricultural holding reaches economic efficiency when the marginal value of the inputs is equal to their respective unit costs. This means that if the marginal value exceeds the respective unit costs, the holding can earn higher profits by producing more to become more efficient. If, on the other hand, the marginal value is lower than the unit costs, the farm should reduce its production in order to increase its profits. As inputs are added, yields will rise, though decreasingly, in response to the law of diminishing returns (FAO, 2017). However, up to a certain point, using additional inputs will not impact yields and will only result in higher costs. In practice, a technically efficient farm can be economically inefficient. This is often the case in developing countries where farmers are faced with very difficult market conditions as the market can either be simply absent or very lean, and either there is unavailability or difficult access to inputs coupled with very high transaction costs (Degefa et al., 2017).

B) Theoretical Review

a. Agricultural change and intensification theory

Agricultural change theory informs the change that occurs daily in agriculture as farmers make decisions about what, where, and how to cultivate (FAO, 2017). The importance of the topic goes well beyond how much food is produced, how much money is made, and how the environment is affected. Agriculture is intimately linked to many institutions in every society and the population. Agricultural change theory takes its rise from the argument advanced by Ester Boserup that production is intensified and additional technology adopted mainly when forced by population growth (APO, 2015). Stone (2001) postulated that when rising population density forces farmers to shorten fallow cycles, production concentration or agricultural output per unit of area and time must rise. As the benefits of following are sacrificed, total labour costs tend to rise while efficiency drops. Achieving higher production concentration at the cost of more work at lower efficiency is described as agricultural intensification. The key to the model is that the labour costs of intensification are both necessary and sufficient to raise production concentration. They are necessary because higher production requires proportionately more work and is sufficient in that the proportionate increase in work succeeds in raising output.

b. The viable systems theory/model

The viable systems theory or model was propounded by Beer (1985), who posited that the management systems of a viable organization are constituted of a set of management functions that are necessary and sufficient conditions for the organization's viability. This model holds that an organization is viable only if it has a dovetailed structure of management units whose functions and inter-relationships are precisely specified. Beer modelled a viable system in which each connecting node is a system, and all nodes constitute a cohesive and purposeful structure. According to him, such a system comprises the operational units directly responsible for implementing the organizational purpose, the environment to which the organization is coupled and with which it co-evolves and the managerial and technical support unit required to coordinate the operational units and provide them with the resources, technology and knowledge to implement their tasks effectively. Barral et al. (2012) build on this model to analyze the functioning of smallholder family farms, which they consider to be a combination of sub-systems that are dovetailed and operate together to produce results that the individual units working separately would not produce.

C) Empirical Review

Scholars and researchers are generally unanimous that the reluctance of young people to take up agriculture as a full-time occupation is due largely to different entry barriers such as difficult access to productive land, lack of initial capital, labour unavailability, low productivity in agriculture and difficult marketing contexts. Sanginga et al. (2015) point out that the key condition for young people entering agriculture is that farming should allow them to sustainably generate a stable and adequate income, especially as young farmers desire to farm under value-driven conditions.

The aggregate technical performances of farms cannot be measured using physical metrics (kilogrammes or tonnes, for example), as it does not make sense to aggregate these measures for totally different commodities. Ball et al. (2015) recommend that it is simpler to convert quantities or volumes to monetary values to perform the aggregation. Similarly, aggregating different inputs is generally done using their monetary values. Barral et al. (2012) also argue in favour of the necessity of referring to the monetary values, converting the volume produced into a gross output measure per hectare or man-day of work, for example. Using this approach, it becomes possible to measure the economic performance of farms that combine multiple sub-systems.

III. RESEARCH METHODS

This cross-sectional study was conducted from January to March 2023 to assess the performance of small farm projects initiated and managed by trained young farmers in the West Region of Cameroon. Follow-up reports for the period of activity were accessed and used as secondary data sources. Five (5) out of 10 Training centres were purposively sampled from the 5 main typologies, including Public centres of the Ministry of Agriculture and Rural Development (MINADER) [2], Public centres of the Ministry of Livestock, Fisheries and Animal Industries (MINEPIA) [1], Faith-based Private Centres [1], Local Council

Centres [1], and Lay Private Centres [5]. The Training Centres selected included: Rural Training Centre Bafoussam (MINADER); Livestock Development and Training Centre – Kounden (MINEPIA); CEFAN Foumban (Faith-based Private Centre); CEFORCO Bafou (Local Council Centre) & EFA Baleveng (Lay Private Centre). For the qualitative phase of the study, 8 young farmers (4 males and 4 females) settled in the territories covered by the centres concerned with the study were randomly sampled and interviewed until saturation was attained (Corbin & Strauss, 2008). In the quantitative phase that followed, semi-structured interview questionnaires were administered to 385 young farmers who had been operating for at least 2 years. The study's dependent variable is the measure of farm performance calculated as Agricultural Revenue (see farm performance analysis framework below).

A) Research Design

The research design employed was the sequential exploratory mixed methods design that started with the qualitative strand for an in-depth understanding of the study phenomenon and was then followed by the quantitative component. The data generated from the first phase informed the second phase of the study, which targeted collecting data from a larger population, aiming at developing a broad view of the effects of production systems adopted by young farmers on the performance of their farm projects. The underlying paradigm of the study is pragmatism, which assumes that knowledge is the product of the person and the environment, so it is both constructed and based on mind-independent reality (Creswell & Creswell, 2018).

Initially, in-depth interviews were conducted with respondents using an interview guide focused on key issues. Responses to the questions were followed by further probing to obtain greater details as perceived by each participant. The data collected was analyzed using the thematic framework, which culminated in the emergence of themes. The quantitative strand that followed involved recording data either from observations, respondents' farm records or responses to questions in the tool used. Using the EXCEL package, summary statistics were calculated and then used to estimate the performances of the young farmers' farms. Where relevant, data was submitted to the INSTAT computer package for Analysis of Variance (ANOVA) to determine whether there were any statistically significant differences between the means of the variables being studied.

Where significant differences were found, the Least Significant Difference (LSD) test was employed to compute the smallest significant difference (LSD) between pairs of means. The combination of the qualitative and quantitative approaches in the study permitted the triangulation of the information provided by the respondents, thereby improving the precision, validity, reliability, credibility, trustworthiness and transferability of the findings (Creswell, 2015).

B) Farm Performance Analysis Framework

To enable the evaluation of the productivity and efficiency of the young farmers' farms, key metrics, including Gross Output (GO), Gross Value Added (GVA), Net Value Added (NVA) and Agricultural Revenue (AR), were estimated based on the model propounded by (Barral et al., 2012) using the following formulae:

i) Gross Value Added (GVA)

The Gross Value Added (GVA) was estimated using the model:

$$\mathbf{GVA = GO - IC\ldots\ldots\ldots\ldots\ (i)}$$

Where GO = Gross output, and IC = Intermediate Consumptions

These metrics were estimated as follows:

ii) Gross Output (GO), sometimes referred to as Gross Product (GP)

$$\mathbf{GO = [\Sigma Q_1P_1 + Q_2P_2 + Q_3P_3 + \ldots + Q_nP_n]\ldots\ldots\ldots\ (ii)}$$

Where: Q1, Q2, Q3 … Qn = Quantities of products 1, 2, 3 .. n produced in the year considered,

While P1, P2, P3 … Pn = the respective prices of the different products.

The Quantities of products include those sold, consumed at home, given out as gifts, used to pay for work done or saved as seed for the next season or production cycle, while the prices are the farm gate prices, local or urban markets prices, as the case may be.

iii) Intermediate consumptions (IC)

$$\mathbf{IC = [\Sigma I_1P_1 + I_2P_2 + I_3P_3 + \ldots + I_nP_n]\ldots\ldots\ldots\ (iii)}$$

Where I1, I2, I3 … In = Quantities of inputs 1, 2, 3 … n used up during the production cycle,

While P1, P2, P3 … Pn = Prices of the respective inputs used up.

It should be noted that these inputs include seeds, fertilizers, herbicides, honoraria, young stocks, animal feeds, drugs, etc., and that they are completely used up during the production cycle.

iv) Net Value Added (NVA)

NVA = GVA – Depreciation (calculated based on the straight line method**) …. (iv)**

v) Agricultural Revenue (AR)

AR = NVA – (Redistributions) … …. (v)

Redistributions include taxes or fees paid, rents for equipment, materials, infrastructure, etc., and interest on loans and salaries paid to permanent workers; redistributions are a part of the farmers' earnings that are injected into the locality's economy where they operate their farm business. They, therefore, contribute significantly to their successful socio-professional integration.

vi) Productivity of the farms

Having estimated the Gross Value Added, productivity is simply obtained using the formula:

Productivity = GVA / Unit of input used

Using this approach, the productivity of land and labour is then estimated as follows:

Productivity of land (P_L = GVA / Ha of land used) and;

Productivity of labour (P_{Lb} = GVA / number of active workers providing the work or man-days of work put in).

IV. RESULTS AND DISCUSSION OF FINDINGS

A) Key Socio-Cognitive Characteristics of Young Farmers

a. Sex

The study revealed that 40% of the trained young farmers implementing small farm projects were females, while 60% were males, indicating that more males than females were interested in taking the 2-year training and settling down as young farmers.

b. Age

Study data indicated that the young farmers settled by the AFOP program and who had been implementing their farm projects for at least 3 to 6 years were aged between 26 and 45 years. Whereas none of them were in the age range of 20 to 25 years, 25% of them were aged 26 to 30 years. The majority of them (42.5%) were aged 31 to 35 years, while those whose ages ranged between 36 and 40 years accounted for some 22.5%. It also showed that 10.0% of the young farmers were between 41 and 45 years old. None of them was older than 45 years.

c. Marital status and family size

It was found that 32.5% of the young farmers were single, 62.5% were married, and 5.0% of them were separated from their spouses, though not actually divorced. With respect to the size of their families, study data indicated that the majority of the young farmers (22.5%) had 2 children, followed by those who had only 1 child (20.0%). On the other hand, only 5.0% of the participants had as many as 6 children. Some 15.0% of them had 3 children as against 10.0% who had 4 children. An estimated 12.5% of the young farmers had no child.

d. Level of education prior to enrolment in the Young Farmers' Training Program

Regarding their level of education prior to enrolling for the agro-pastoral training, the majority (40.0%) of the young farmers had attended primary school and had earned the 'Certificat d'Etudes Primaires' [First School Leaving Certificate (FSLC)], while 27.5% of them were college dropouts. Virtually all of them who had dropped out of college did so for reasons ranging from early pregnancies for girls to lack of financial resources to continue school as a result of the death of a parent, usually the father. It further came out from the study that 7.5% of the young farmers were holders of the 'Probatoire' [GCE Ordinary level]. In comparison, 25% of them were holders of the 'Baccalaureate' [GCE Advanced level] or higher qualifications. None of them had dropped out of high school prior to their agro-pastoral training.

e. Level of motivation and satisfaction with the agro-pastoral training

On a scale from very lowly to highly motivated, the study revealed that all the young farmers were motivated to go in for agro-pastoral training in the different centres in the study area. Their levels of motivation ranged from averagely motivated (12.5%), highly motivated (57.5%), to very highly motivated (30.0%). Regarding their satisfaction with the training, 15% indicated that they were satisfied, and 67.5% of the young farmers said they were highly satisfied. In comparison, 17.5% said they were highly satisfied with the training as they had acquired the necessary capacities to create and manage their small farm projects and grow them into thriving agricultural microenterprises.

B) Young Farmers' Practices and Farm Performance

a. Typologies of production systems developed

The study showed that all young farmers mounted farm projects based on the systems approach, which combines crop and animal production and eventually may integrate some non-farm activities. None of the young farmers had a farm project based entirely on a single commodity. An estimated 32.5% had farm projects that combined pigs and maize production,

whereas 20.0% of them were into broiler and maize production. Some 12.5% of the young farmers had farm projects that combined pigs, maize and beans, whilst 10% of them were promoters of farm projects combining the brooding of chicks and the cultivation of maize. Young farmers who combined pig production and gardening, as well as pig rearing and yam cultivation, accounted for 5.0%, respectively. Other combinations, including goats and maize, layers and popcorn, layers, maize and beans, potatoes and brooding of chicks, and sheep and maize, accounted for 2.5% each (see Table 1 below).

Table 1. Typologies of production systems developed and implemented by young farmers in their farm projects

Production systems developed	Count	Percentage (%)
Pigs/maize	125	32.5
Broilers/maize	77	20.0
Pigs/maize/beans	48	12.5
Brooding / maize	39	10.0
Pigs/gardening	19	5.0
Pigs/yams	19	5.0
Gardening/pigs	10	2.5
Goats/maize	10	2.5
Layers/popcorn	10	2.5
Layers/maize/soybeans	10	2.5
Potatoes/brooding	9	2.5
Sheep/maize	9	2.5
Total	385	100.0

Source: *Field data*

b. Technical performances of some strategic crops

Data analysis indicated that the young farmers started their crop production activities on relatively small pieces of land and progressively increased the area cultivated as they gained experience. With regards to maize production, which is a very important crop in the study area, it came out that the young farmers had collectively cultivated 154 ha of land per year over the first 3 years of project implementation, giving an annual average of 0.4 ha of maize cultivated per young farmer per year. The cumulated production of maize on the land area cultivated was estimated at some 338.8 tons, giving a per-farmer annual production of 0.9 tons and an estimated average yield of 2.2 tons/ha.

As for beans, the average land area cultivated per farmer per year was estimated at 0.4 ha, with an average annual production of 0.4 tons per young farmer, leading to average annual yields of 1.2 tons of beans per hectare.

Potato performances were estimated at some 0.4 ha of land cultivated per year by those young farmers who had the crop as the core component of their projects, giving an average annual production for each young farmer of 1.3 tons per year, thereby accounting for an average annual yield of 3.4 tons of potatoes per hectare.

On the other hand, yam performances were estimated at 0.2 ha of land cultivated annually by each young farmer involved in crop production. This gave an average production of 1.0 tons per farmer per year and average yields of 5.4 tons of yams per hectare of land cultivated.

Regarding livestock rearing, the study revealed that the young farmers with livestock husbandry activities as key components of their farm projects raised an average of 8787 broilers and brooded some 1,225 chicks and some 1,125 layers per year. Those whose farms had pigs, goats and sheep as their core project components raised an average 30 pigs, 8 goats and 6 sheep respectively per year.

c. Economic performances of the farms

It came out of the study that there were very highly significant differences ($p \leq 0.001$) between the average annual agricultural revenues generated by the young farmers, implying very highly significant differences between the performances of their farms. The majority (42.5%) of the farms generated annual farm incomes or agricultural revenues ranging between 0 and 500,000 FCFA, while some 22.5% of the farms yielded annual agricultural revenue between 501,000 and 1,000,000 FCFA. Whereas some 12.5% of the farms generated revenues between 1,001,000 FCFA to 1,500,000 FCFA, 5% of them respectively generated agricultural revenues ranging between 1,501,000 to 2,000,000 FCFA, 2,500,000 to 3,000,000 FCFA and 3,001,000 to 3,500,000 FCFA. On the other hand, 7.5% of the farms studied generated negative revenue values estimated at an average of – 117,303 FCFA, indicating that such project holders ended up rather indebted at the end of each year over the period for which they had been implementing their projects (see table 2 below).

Table 1. Annual farm income or agricultural revenue generated by the young farmers' farm projects

Agricultural revenue		Count	Percentage (%)
Revenue range	**Average revenue**		
< 0	-117303	29	7.5
0 - 500000	251594	164	42.5
501000 - 1000000	724553	87	22.5
1001000 - 1500000	1190855	48	12.5
1501000 - 2000000	1712679	19	5.0
2001000 - 2500000	0	0	0.0
2501000 - 3000000	2903371	19	5.0
3001000 - 3500000	3300667	19	5.0
Total		385	100.0

Source: *Author's computations*

The study also revealed that projects with broiler production as the core component generated the highest amounts of annual average agricultural revenues, estimated at 1,457,336 FCFA, followed by projects driven by layer production, which generated agricultural revenues evaluated at 1,051,937 FCFA. Projects that broode chicks from day old to marketing at 3 weeks old generated an average annual agricultural revenue of 982,647 FCFA. On the other hand, farms with pigs and goats as the main components generated 542,272 and 443,775 FCFA, respectively, while those based on garden crops gave average annual agricultural revenues of 220,858 FCFA. Projects with systems centred on sheep production generated average agricultural revenues of 74,343 FCFA. Potato-based production systems rather generated negative average annual agricultural revenues estimated at some – 17,500 FCFA due essentially to a lack of mastery of the technical itineraries and disease problems in the field and store.

Overall, the study reveals that the majority (70%) of the farms run by trained young farmers in the West Region generate annual farm incomes or agricultural revenues higher than the survival threshold, which is estimated at 250,000 FCA, indicating their economic viability and, hence, their potential sustainability.

When asked to give their perceptions of the determinants of sustainability of their projects, respondents pointed to the following factors in order of importance: crop and animal diseases; motivation, determination and engagement; family support; good management practices; strong social integration in the community; solid knowledge of the project environment; quality of the agro-pastoral professional training; diversification of farm activities; quality of crop seeds and young stocks of animals; careful planning of the progressiveness of the project; mastery of the marketing of farm products; careful savings and plough back of the financial resources generated into the project; personal development through self-training and membership in professional organizations like Common Initiative Groups (CIDs), and Cooperatives (See figure 1 below).

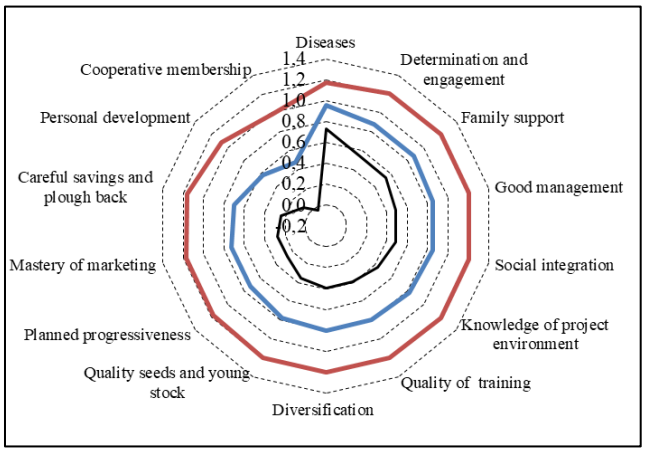

Figure 1. Radar representation of respondent perceptions of the determinants of sustainability of their projects.
Source: *Field data*

The study findings reveal that all of the trained young farmers who received funds to finance their small projects are effectively carrying out the projects. They generally employ the systems approach in their projects, characterized by a combination of factors of production (land, labour, capital) to put different combinations of cropping and livestock systems in place. According to Barral et al. (2012), a key strength of the systems approach is that the different sub-systems acting in

synergy produce higher results than when they work independently. Although the young farmers' yields for strategic crops like maize and potatoes are higher than the national references, they fall far short of the maximum attainable yields reported by Ambagna et al. (2012). In addition, although the young farmers' yields for maize (2.2 kg/ha) and potatoes (3.4 tons/ha) are slightly higher than those of the average practising farmers in the study area, their yields for crops like beans and yams fall slightly short of the national reference (FAO, 2018).

The choice of livestock and crop combinations used directly affects the technical and economic performances of the small farm projects. Cropping and livestock rearing systems that have a short cycle and can be repeated in several cycles each year tend to generate more income and are much more preferred by young farmers than long-cycle species. This concurs with the findings of (Fan et al., 2013), who concluded that for smallholder farmers to make their activities profitable, they must move from subsistence agriculture to combinations of systems that make their production activities more commercial and profitable.

V. CONCLUSION AND RECOMMENDATIONS

A) Conclusion

The study revealed that young people can be trained and motivated to take up agriculture as gainful employment. Their age, marital status, and level of responsibility in terms of their family size seem to directly influence their motivations to enroll in agro-pastoral training, go through it, mount small farm projects, and succeed in their implementation. If they have access to the necessary factors of production, including land, labour, and capital and manage them well, they can start up small farms and grow them into viable projects that eventually become sustainable. Technical, financial, social and environmental factors are key determinants to the sustainability of small farm projects promoted by young farmers, and these factors need to be given close attention if youths are to be attracted to agriculture where there are still huge employment opportunities.

B) Recommendations

The study recommends that the training and support of young farmers in the different training centres spread throughout Cameroon should continue and even be strengthened and consolidated. In addition, the strategy to provide some financial assistance to the trained young farmers to cover their initial investments and working capital should be pursued.

C) Contribution to Knowledge

The study contributes to the body of knowledge in the area of assessing early-stage sustainability of small farm projects by using viability indicators, which previous studies did not do.

The study found that the viability of small farm projects depends on a number of key factors that need to be taken into consideration during the design of these projects.

D) Suggestions for Further Research

Similar studies should be carried out in other regions of the country to evaluate the viability and potential sustainability of trained young farmers' farm projects in these localities. The studies should be pushed further to compare the performances of farm projects initiated by trained and untrained young farmers. This will permit officials of the training centres and the Ministry of Agriculture to make informed decisions about the continuity and improvement of the young farmer training program.

It is important to evaluate the level of mastery of the young farmers of financial management and to design specific financial literacy training programs that will help them mobilize savings from the income they generate to use it to further develop their farm enterprises.

E) Conflict of interests

The author declares that there is no conflict of interest concerning the publishing of this paper.

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