

Small-Scale Agriculture and Poverty Alleviation in the Upper-Nyong Division, East Region (Cameroon)

¹Ngwogeh Valery, ²OjukuTiafack
¹Ph.D Student, ²Associate Professor,
 Department of Geography,
 The University of Yaoundé 1,
 P.O Box 755, Yaounde – Cameroon

Abstract:- Small-scale agriculture which according to the World Bank (2002), employs three out of four poor people in rural areas of developing countries has significantly increased agricultural production over the years resulting in more income per capita. Its contribution to poverty alleviation, however, is still minimal in Cameroon in general and Upper Nyong Division in the East region in particular as the benefits derived have still not eradicated poverty to the barest minimum. It is in furtherance to this that this study examines the role of small scale agriculture as a tool of poverty alleviation in the Upper Nyong division in the East Region of Cameroon. The study used secondary and primary data (published and unpublished) as well as grey data on aspects related to small-scale agriculture and livelihood enhancement. Primary data were collected through field observations, administration of questionnaires to 444 households in 14 sampled Sub-Divisions, focus group discussions, interviews guides and on-the-spot appraisals. The findings revealed that small-scale agriculture has not contributed substantially in livelihood enhancement in most rural households of the Upper-Nyong Division. This could be accounted for by the fact that peasant farmers in this region still use rudimentary agricultural tools (90%), physical constraints related to climate change and variability (44%), limited knowledge on improved agricultural techniques (15%), inadequate capital (25%), deviation of agricultural labour to other sectors of the economy (15%), and inadequate/poor farm to market roads (19%). Despite these stalemates, field work revealed that apart from the secondary sector which employs 10% of the population of the Upper Nyong division, small-scale agriculture remains the main economic activity of the people (90%). These findings thus canvass the need for the state to double efforts in ensuring that challenges linked to small scale agriculture be dismantled and neutralized through intensive sensitization and provision of modern agricultural techniques and equipment, construction of farm to market roads, provision of loans to farmers to improve on their production.

Keywords:- Small-scale agriculture, poverty alleviation and Upper-Nyong Division.

I. INTRODUCTION

Agriculture, the art or science of cultivating the ground, including the harvesting of crops, rearing and management of livestock (Ngwogeh *et al.*, 2022) is the main source of livelihood in developing countries due to limited progress in the secondary and tertiary sectors (Dixon *et al.*, 2001). Agriculture has become the back-bone behind the reduction of unemployment and poverty alleviation in most rural communities as approximately 2.5 billion people in the world earn their living directly from small-scale farming, either as full or part-time farmers or as members of farming households that support farming activities (FAO, 2008). Agriculture is by far the most important of the world's economic activity as it uses 1/3 of the total land surface and employs over 55% of the working population (Bamiduro and Rotimi, 2011). Persistent increase in global population is an indication of more persons in need of food security (Fan and Chan, 2005). The essence of peasant's involvement in small-scale agricultural activity is for food production and the desire to meet up with basic needs such as clothing, medication, nutrition and provision of household requirements (HLPE, 2013). Agriculture in developed countries is more mechanized and advanced with a small proportion of the population (2 to 5%) capable to provide food for the whole world, as compared with the local and subsistence farming practices in less economically developed third world countries (Mgbenka *et al.*, 2015).

The global mobilization behind the Millennium Development Goals has produced the most successful anti-poverty movement in history. The landmark commitment arrived at by world leaders in the year 2000 was geared at; "sparing no effort to free men, women and children from the abject and dehumanizing conditions of extreme poverty". This was translated into an inspiring framework of eight goals accompanied by wide-ranging practical steps that have enabled people across the world to improve their lives and their future prospects. In overcoming goal 1 which aims at fighting poverty and hunger, the Cameroon government has given preference to its agricultural sector and ensures that agricultural extension agents both private and public should be involved in activities geared at alleviating poverty through transformation of the agricultural sector from subsistence to mechanized agriculture. This is through a wide range of efforts such as the provision of financial assistance, material and technical incentives and sensitization of the rural populace in view of enhancing living conditions. In the Upper-Nyong Division, crops such as rice, coffee, cocoa, cotton, oil palm, rubber, maize, cassava, cocoyam, yams,

plantain, Irish potatoes, beans, groundnuts, potatoes, spices, vegetable, banana and fruits crops are cultivated. Different agricultural types such as; dairy farming, viticulture, ranching, mixed farming, dry farming, pastoral nomadism, plantation agriculture, shifting cultivation, bush fallowing, transhumance and mixed cropping are practiced in small-scale. The research thus aims at valorizing the practice of small-scale agriculture by analysing the contributions of perennial plants, food crops and cash crops production to socio-economic development and in a bid to craft sustainable strategies that focus on improving livelihood via poverty alleviation in Upper-Nyong Division, East region of Cameroon.

II. THE STUDY AREA

The Upper Nyong Division was created by presidential decree No. 92/187 of 01/09/1992. It lies between longitude 12°28'30" and 14°11'0" East of the Greenwich meridian and latitude 2° 31' 0" and 4° 33' 0" North of the Equator (Figure 1). The division has a surface area of 36384 Km² (Divisional delegation of agriculture Upper Nyong, 2022). It is bordered in the North East by the Lom-Djerem Division, to the extreme North West by the Upper Sanaga Division, in the West by Nyong-et- Mfoumou Division, in the South West by the Dja-et-Lobo Division, in the South by the Republic of Congo, South East by Boumba et Ngoko Division and to the East by Kader Division. It is divided into fourteen sub administrative including; Abong-Mbang, Angossas, Atok, Dimako, Doumaintaing, Dja, Doume, Lomie, Mboma, Messamena, MESSOK, Mindourou, Ngoyla, and Nguemendouka. According to the 2005 population and household census results in Cameroon, the Upper Nyong division had a population of 216768 inhabitants, with a population density of 6 inhabitants/km², with an urbanization rate of 41.6%. Upper-Nyong is linked to its borders by seasonal earth roads almost impassable during the rainy season.

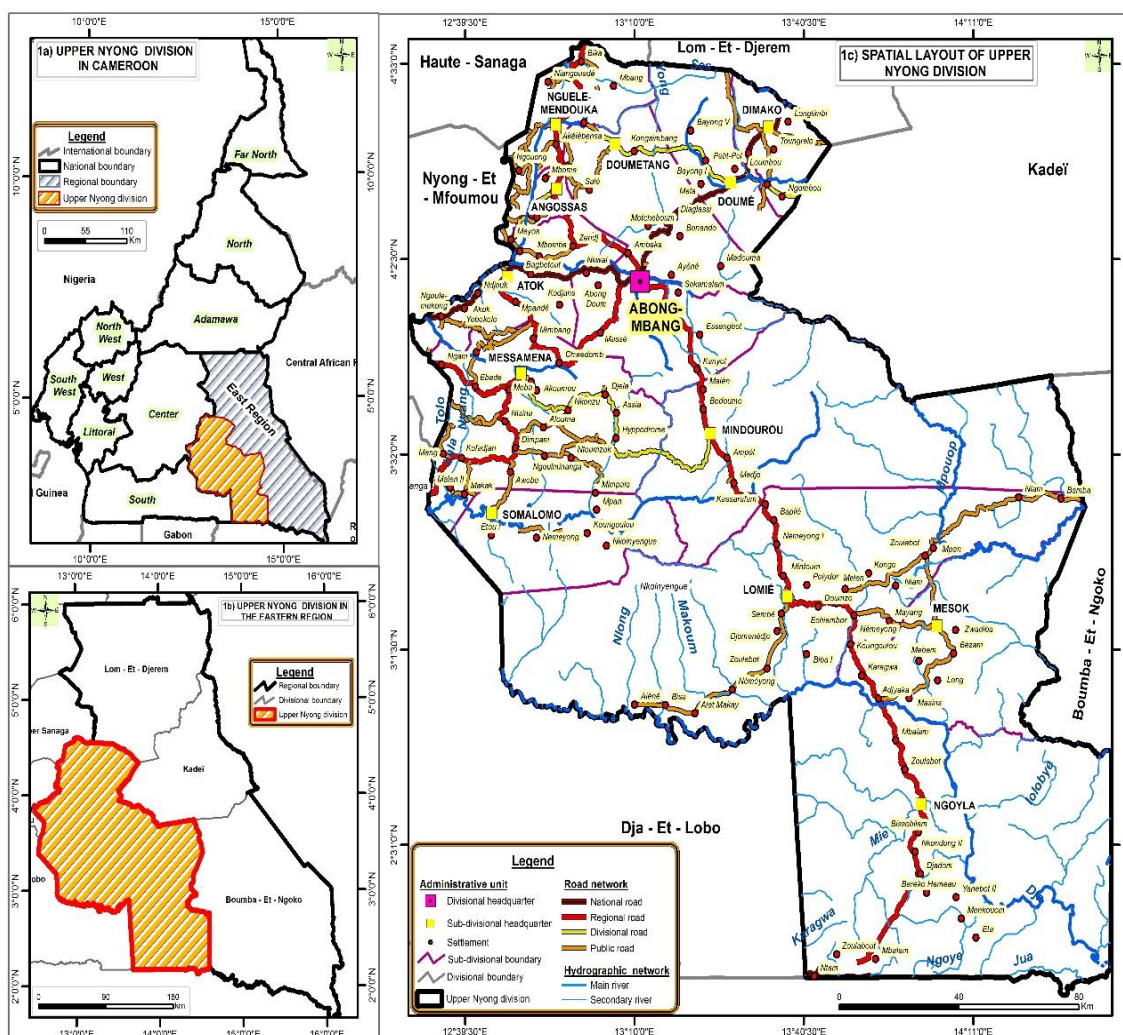


Fig. 1: Location of the study area

Source: National Institute of Cartography and fieldwork, 2022

III. MATERIALS AND METHODS

The study made use of mixed research method (qualitative and quantitative data sourcing) which constituted data from both primary and secondary sources. Secondary data was obtained from the exploration of documents such as articles, dissertations and websites dealing with small-scale agriculture and livelihood enhancement. Primary data was obtained from a random administration of questionnaires to small scale farmers at the level of household to apprehend the different livelihood goals achieved through their agricultural practices. Focus was on the annual output food crops/fruits and the amount of revenue generated from small scale agriculture in the Upper Nyong division. A total of 444 questionnaires were randomly administered. Semi-structural and nonstructural interviews were granted to some resource personnel in the divisional delegation of the Ministry of Agriculture and Rural Development (MINADER) as well as agricultural extension agents operating in the private sector of the Upper Nyong Division for a wider insight and appreciation of the state of small-scale agriculture. Besides questionnaires, ten focus group discussions were conducted with women and men in adjacent communities to have an insight on small-scale agricultural practices and its role in alleviation. The cultivation process involved in different crops were observed and different farm sizes track using GPS. The data obtained were spatialized on shape file maps of the Upper Nyong Division to determine and justify if the agriculture carried out was actually on a small-scale. Descriptive data was processed through coding (Straus method, 1987 and Cope 2003), whereby categories of responses were identified, assigned, classified and then recorded on a prepared sheet as per each research question and objective of the study. Data collected from field survey were input into cartographic software for specialization which were further detailed with literature based on observed field realities.

IV. RESULTS AND DISCUSSIONS

A. *The state of small-scale farming in Upper-Nyong Division*

a) Different farming system contributions to food security in Upper-Nyong

The several distinct farming systems identified in the Upper-Nyong Division are; arable farming, mixed farming, subsistence farming, shifting cultivation, plantation farming, pastoral/livestock farming, nomadic farming and intensive farming. Most farms in the Upper-Nyong Division are less than 10 hectares and by international standards (Mgbenka et al., 2015), are classified as small-scale farms. The farming systems are a mix of different farm enterprises such as crop, livestock, aquaculture, agroforestry and fruits crops. Family allocates its resources to manage the existing environment to efficiently attain family goals (Zanna, 2012).

b) Main agricultural products in Upper-Nyong from 2019, 2020-2021

Traditionally, farming has always been and still remains the primary source of livelihood improvement for the people of the area. The crops cultivated directly relate to the soil potential of the area. Data on table 5, associated with facts assembled through questionnaire proves that food crops like maize, groundnut, okro and cash crops like plantains and rice are more predominant in the area because the relief and soil fertility favor its cultivation. Different crops are cultivated in different areas for various reasons favoring their growth (topography, soil fertility and crop type cultivated). Some are cultivated around water points to ease irrigation (rice) while others do well in highland areas (beans, tomatoes and water-melon).

Crops	Cultivated surface area (Ha)			total	Quantity produced in tons, bags, klg		
	2019	2020	2021		2019	2020	2021
years	2019	2020	2021	total	2019	2020	2021
pineapple	432	232	274	938	8208	4408	5206
Groundnut	84728	12832	12885	110445	6862968	1039421	1043714
Banana	69.93	80.325	71.82	222.075	629	722.925	646
plantain	16537	17585	17695	51818	190181	202237	203497
cocoa	31460	31809	29060	92330	15730	15904	14530
Coffee	6417	5007	5007	16433	4492	3505	3505
Concumber	669	627	758	2054	0	0	0
Okro	34	42	61	137	0	0	0
Haricot	43	69	40	153	0	0	0
Oil palm	756	765	765	2287	9079	9183	9183
Yam	99	140	158	397	0	0	0
Macabo/Taro	12834	19888	31060	63782	282348	437554	683321
Maize	10040	6345	6947	23333	15060	9517	10421
Manioc	9869	10138	10010	30018	182576	187565	185201
Water-melon	116	117	120	353	0	0	0
potatoes	186	209	237	632	0	0	0
peper	302	313	335	950	0	0	0
Irish-potatoes	23	30	26	79	0	0	0
Rice	19	33	51	103	0	0	0
Tomatoes	103	162	175	440	0	0	0
total	174790	106428	115741	396910	68297571273	1910021	2159229

Table 1: Main agricultural products in Upper-Nyong Division from 2019-2021

Source: Compiled from the Divisional Delegation of MINADER Upper-Nyong, field work, 2022. From table 5, the total surface area cultivated has decreased from 2019 to 2021 from 174790km² to 115741km². Quantity produce has dropped from 68297571273 tons to 2159229 tons respectively from 2019 to 2021. This indicates that small-scale agriculture has not effectively contributed to food security in the study area for the mentioned years since the quantity produced registered a decrease of about 66138344tons.

V. CONTRIBUTIONS OF SMALL-SCALE AGRICULTURE TO SOCIO-ECONOMIC DEVELOPMENT OF UPPER-NYONG DIVISION

A. Economic growth

Small scale agriculture in the Upper Nyong Division of the East region of Cameroon has played an important role in

alleviating poverty within the rural masses involved in its practice. According to Table 3, 313 (70%) of sampled crop producers noted positive returns from small-scale agriculture. Such benefits obtained is used to sponsor their off springs and provide household needs which are basic assets for social welfare.

No	VILLAGES	Effective respondents	Farmers opinion on agricultural returns		
			Lucrative	Not profitable	Uncertain
1	Abong-Mbang	60	45	5	10
2	Angossas	15	10	1	4
3	Atok	20	15	0	5
4	Dimako	50	42	1	7
5	Doumaintaing	35	28	1	6
6	Doume	45	35	2	8
7	Lomie	55	43	1	11
8	Mboma	25	19	0	6
9	Messamena	45	36	3	6
10	Messok	15	12	0	3
11	Mindourou	10	8	0	2
12	Ngoyla	15	10	1	4
13	Nguelemendouka	40	6	1	33
14	Somalomo	14	4	0	10
Total		444	313	16	115

Table 2: Respondent's opinion on profitability/lucrativity of agriculture

Source: Field work, 2022

On the contrary, 16(3.6%) farmers sampled were of the opinion that small scale agriculture is not profitable owing to high cost of farm inputs, pressure on farmers from family dependence, and losses incurred due to climate change/variability (prolong droughts, wind destruction of crops and periodic floods). Capital inadequacy thus limits increase in farm sizes, forcing farmers to practice agriculture only in small-scale which minimizes the profitability of the sector in improving their standard of living. 115 (29%) respondents were, however, uncertain about returns from small-scale farming and outcomes on their livelihood.

B. Small-scale agriculture as a source of employment in Upper-Nyong Division

Small-scale agriculture is an indispensable source of employment to over 70% of farmers in Upper Nyong Division (Table 4). Despite this, some are, however, still involved in other economic activities such as logging and mining (6%) and trade (12%) mainly as a backup strategy in case of losses incurred from one sector. Disdainful of the instigations slowing down farmer's source of living, findings revealed that the populace were much more satisfied and hopeful as they consider small-scale farming as a paramount source in livelihood improvement.

Villages	Number of Respondents	Sources of employment in Upper-Nyong Division				
		Agriculture	Building	Civil service	Logging/mining	Trade
AbongMbang	60	41	2	5	2	10
Angosssa	15	8	1	1	2	3
Atok	20	13	2	2	1	2
Dimako	50	43	1	2	1	3
Doumaintaing	35	33	0	1	0	1
Doume	45	18	5	7	5	10
Lomie	55	33	0	7	5	10
Mboma	25	17	0	3	2	3
Messamena	45	40	0	2	1	2
Messok	15	9	2	1	2	2
Mindourou	10	7	0	1	1	1
Nguelemendouka	15	11	1	1	1	1
Ngoyla	40	33	1	3	1	2
Somalomo	14	9	0	2	1	2
Total	444	314	15	38	25	52
%	100%	70%	3%	9%	6%	12%

Table 3: Respondent's views on the primary source of employment in Upper-Nyong Division

Source: Field work, 2021

C. Small-scale agriculture: a source of household income

Upper-Nyong farmers are no exception to the fact that millions of people worldwide in rural areas depend mostly on the sale of agricultural products to meet consumption and income needs (World Bank, 2010). Farmers affirmed that money raised from the sale of agricultural products stabilizes their incomes throughout the year especially during harvest season. The markets for agricultural products

are more accessible as traders go right to the doorstep of farmers in search of products. The sale of agricultural products provides additional source of income not only to farmers but to those involved in commercialization of agricultural products. From field findings, money generated from the sale of agricultural goods is used to purchase bikes, pay fees, buy clothes and goods, reserve for health related challenges and unforeseen circumstances.

Types of crops	Total expenditure in FCFA	Total revenue in FCFA	Average profit in FCFA
Tomatoes	18.000	27.000	9.000
Vegetables	52.000	80.000	14.000
Cocoyam	10.000	15.000	5.000
Maize	14.000	20.000	6000
Cassava	20.000	35.000	15.000
Total	1,14,000	1,77,000	49,000

Table 4: Average total revenue made by farmers per crop in Upper-Nyong Division

Source: Field interview, July 2022

Although farmers experienced reduction in agricultural income which adversely affects livelihood, agriculture remains a primary source of income for farmers in Upper-Nyong Division and its adjacent communities as a

farmer earns on average 49,000 francs CFA from the sale of crops sold (Table 6).

D. Contributions of small-scale agriculture to farmer's social welfare

Small-scale agriculture in Upper-Nyong Division has significantly contributed in enhancing livelihood especially food security, nutrition, social welfare and other economic activities like trade. The goal of every human being is to eradicate poverty and improve social status in the society. Therefore, services rendered or work done should in return be able to feed, clothes, provide shelter and income which are basic human needs. It is prudent therefore to envisage that to ensure food security in Upper-Nyong Division, especially at the household level, farmers need to rethink the way they produce and distribute crops. The empowerment and support of small-scale farmers must thus be a priority. This includes improved and more inclusive agricultural extension services as well as the use of modern technology in communicating agricultural advice or climatic

information. The adoption of new agricultural practices is more important now than it was in the past. When small-scale farmers adopt and improved crop varieties, agricultural income is increase and poverty is reduced, thereby increasing local food security (New Partnership for Africa's Development 2013).

E. The contribution of small-scale farming to saving investment

Field survey revealed the significant role of women in savings as small weekly contributions "njangi". This is meant not only for the purpose of saving money but equally for group farming. Group work is common in the area as it was notice that after working in each other's farm, they organized meetings where they save money which is then divided amongst themselves at the end of the year.

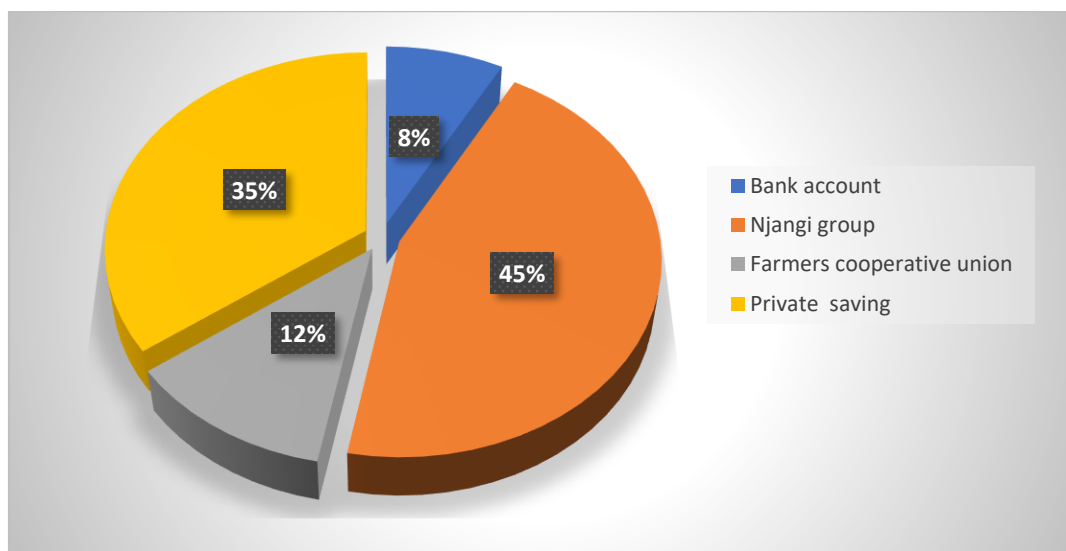


Fig. 2: Means of saving income by farmers in Upper-Nyong Division

Source: Field interview, August 2022

According to Figure 2, 45% of respondents save income derive from small scale agriculture income in njangi groups. The communal lifestyle of the pygmy's gatherers impact this sector as they live together in clusters, work together and carry out socio-economic activities in groups, hence justifying the dominance of this mode of saving. Private saving which implies money is preserved either through direct investment on an asset or held in hand as a liability was asserted by 35% of the respondents. Such a mode of saving was justified by the presence of limited banks in villages. The practice of this mode of saving is further justified by the fact that leaders of some common initiative groups have in some cases disappeared with their savings. Respondents (12%), of existing cooperative societies in a focus group discussion attested saving money in a cooperative society as it facilitates the process loan contraction Cooperative gives interest to members after savings which are all motivating factors. 8% of sampled farmers in the urban centers of the division (8%) confirmed to have account in banks in which they save their surplus revenues generated from the sale of their farm produce.

F. Small-scale farming as a source of raw-material for firms and the development of the secondary sector

Agro-based industries in the urban centers of Upper-Nyong depend on agricultural products as raw materials. Sugar-cane is used by the SOSUCAM industry for the produce sugar. Agro-based industries such as DIAMAOL transform groundnut to consumable refined groundnut oil. Cassava is manually process by peasants to produce flour as well as garri and flour used as food in most households. Palm nuts derived from oil palm is processed to produce red oil as well as animal feed. In the course of field work, agents of the OLAM company were seen buying maize, coffee, cocoa and other commodities to be processed in their industries. Maize is bought and preserved in ware houses and transformed to alcoholic drinks such as beer. Besides, maize is fermented locally to produce local drinks commonly referred to as "kank". Equally, sugar cane is used locally to produce strong alcoholic drinks commonly referred to as "Ngbotoro" while Coffee and cocoa constitutes the main raw-material to tea and chocolate factories.

VI. CHALLENGES OF SMALL-SCALE AGRICULTURE IN UPPER-NYONG DIVISION

A. Physical impediments

Smallholder farmers face several problems in the production process (Mcguire et al., 2015). Physical challenges weighed most on Upper-Nyong peasants because of difficulties to check the situation. Physical characteristics provides both merits and demerits on small-scale agriculture. While acting favorably in increasing small-scale agricultural production, these same physical attributes (rainfall, sunshine

and soil fertility) has constrained farming in some localities as they at times caused farm problems such as erosion, diseases and prolong drought. Considering that most of the physical obstacles procreate from climate change adverse conditions, its effects are widely envisaged in the area, such that livestock rearers were not in better condition as grazing field decreased dramatically because of little or no pasture due to harsh dry conditions that diminished pastures. If climate and economic conditions do not change, farmers risk being liable for future food deficiency (Ikerd, 2011).

No	Villages	Effective respondents	Farmers opinion on main agricultural difficulty		
			Physical	Human	Both
1	Abong-Mbang	60	46	4	10
2	Angossas	15	11	1	3
3	Atok	20	17	1	2
4	Dimako	50	9	2	39
5	Doumaintaing	35	7	1	27
6	Doume	45	41	1	3
7	Lomie	55	47	2	6
8	Mboma	25	18	2	5
9	Messamena	45	37	6	2
10	Messok	15	10	3	2
11	Mindourou	10	6	1	3
12	Ngoyla	15	12	1	2
13	Nguelemendouka	40	33	2	5
14	Somalomo	14	8	3	3
	Total	444	302	30	112
	Percentage respondent	100%	68%	6.8%	25.2%

Table 5: Farmers perception on the main challenge of small-scale agriculture

Source: Field survey, 2022

a) Climate change and adverse effect on agricultural production
 Unpredictable variation in climatic conditions cripples small-scale agricultural productivity in Upper-Nyong Division. The sector depends on natural resource base and thus faces risks such as rising temperatures, prolong sunshine, changing rainfall patterns and exacerbating decline in agricultural production (Smith et al., 2001). The incidence of

drought has led to water scarcity for irrigation during the dry season. Debate from focus group discussion revealed that climate change is at the origin of rainfall variation, erosion, wind, pest and diseases which are the main physical difficulties which brings fluctuations in small-scale agricultural production. Figure 6 present farmer's opinion on the effects of climate change on farming activities.

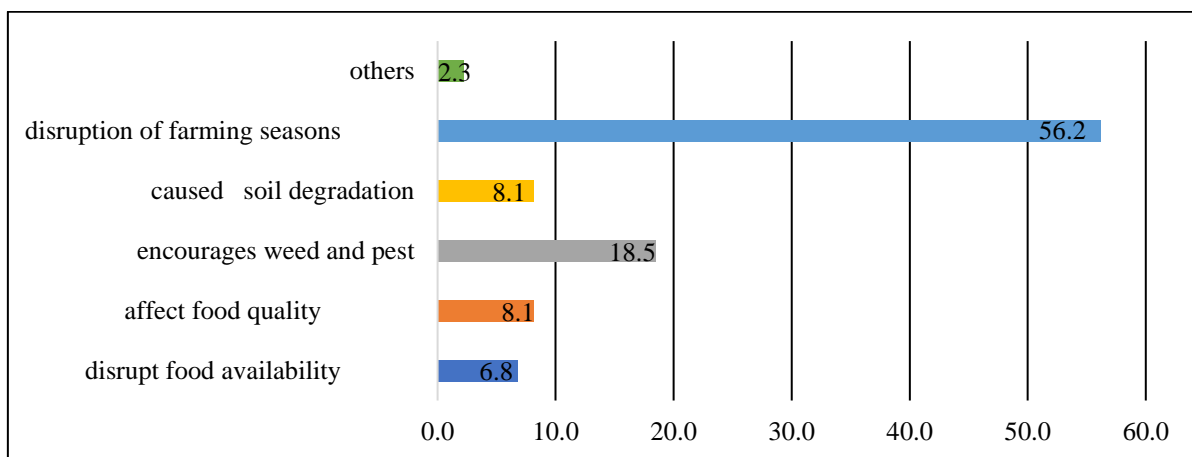


Fig. 3: Impact of climatic variability on farming activities

Source: Field work, 2022

From figure 3, 56.2% of respondents were of the opinion that disruption of farming season is the most outstanding unfavorable effect of long-term change in the earth's climatic system. To them, the farming season has been modified and complicated as they do not respect tilling, planting and harvest periods. *In past years, the rainy season was believed to begin around the 15th of March and end in early October, while the dry season takes from October to late February. This belief in recent times has been undulating, making it difficult to predict and confidently engage in farming (an old farmer in Elanjo village, Dja Sub-Division).* Pest amongst which is *njejelele*, as referred to by theindigenes was a constraint to 8.1% of farmers. The heavy downpours that leached topsoil nutrients and prolonged sunshine resulting from climatic variability renders soil moisture less, causing soil degradation to 8% of farmers. Droughts affect everyone differently as respondents believed that prolonged dryness was the primary physical challenge. Many cases of bushfires ravage crops on farms whenever the dry season prolonged. Drought caused streams dry-off which makes irrigation difficult during the dry season especially for crops cultivated on highland. Crops wither and dry up hence reduces its production capacity.

- b) Heavy rainfall and implication on farming activities
Rainfall is by far the most crucial element of climate change scenario. Its impact can be measured by its effects on crop growth, availability of soil water, soil erosion, pests and diseases, sea-level rise, and decrease in soil fertility. Variation in rainfall patterns has not only put small-scale farmers in a dilemma but destroyed crops at times when it's violent (storming torrential rain). Rainfall is variably affecting small farmers engaged in rainfed farming, particularly cereal production. Rainfall accounts for close to 70% of the physical inputs in the agricultural system (Hazell, et al.,2010). Farmers perceive rainfall as a blessing as well as a challenge. The performance of the agricultural sector has been decreasing in past years in Upper-Nyong due to unpredictable rainfall

variability and farmer's inability to control its trend. Farmers attested facing severe water deficits in the whole Division partly due to decreased availability of underground and surface water resources due to overuse. Water availability is mainly from precipitation and supports production in traditional rained farming systems and so is of serious threat to farmers with its associated climate dynamics. Changing and erratic rainfall patterns make it difficult for farmers to plan their operations, reduce the cropping season and lead to low germination, reduced yield and crop failure. Storms cause road wash-outs, making it challenging to access farms and market with products. Wind does not only blow down crops but erodes the surface and reduces the capacity of the soil to store nutrients (Ngwa, 2006). Sampled respondents confirmed that wind is a threat to farming as it carries crops off and there is need to replant or bear the cost of the damage.

VII. ANTHROPOGENIC IMPEDIMENTS/OR OFF-FARM CHALLENGES TO AGRICULTURE IN UPPER-NYONG

Agricultural productivity in developing countries is low because knowledge dissemination through agricultural extension services is inferior. Another main reason is the mismanagement of available resources and inadequate conservation units. Although there have been considerable efforts made in providing farmers with capital, agriculture is not yet mechanized. Crude implements are still widely used in most part of the division. There has been low yield because of little use of capital equipment, this is either fixed capital (machinery) or current capital (loan and money in cash). Capital needed to set up large farms such as plantations and industrial estate is expensive and cannot be afforded by Upper-Nyong majority small farmers. Funds from agricultural financial institutions such as FONADER are grossly inadequate. Even when given to farmer's bad years of harvest persistently increase their debts.

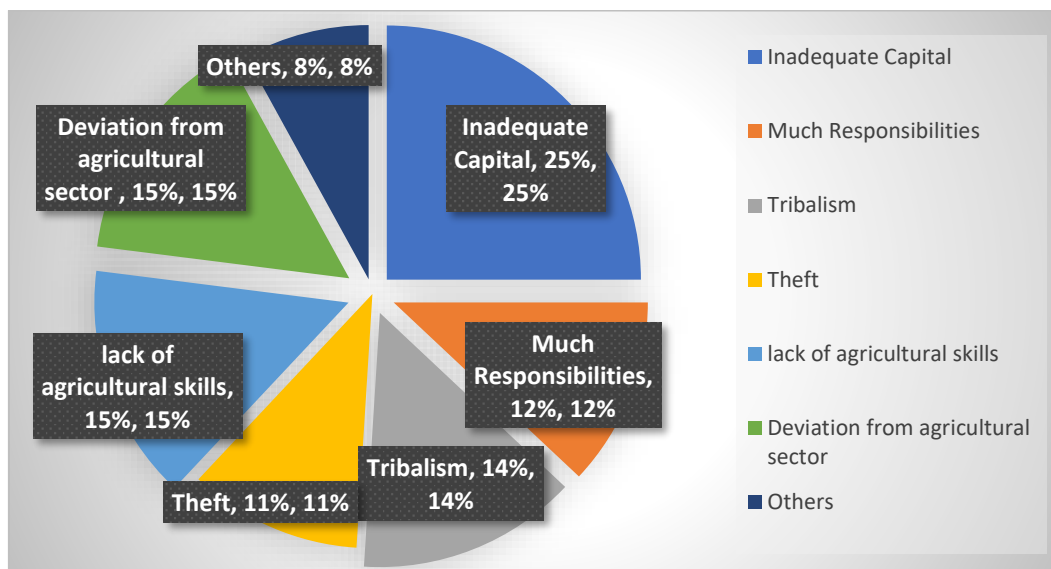


Fig. 4: Reasons for poor performance in the agricultural sector

Source: Field interview, August 2022

Capital Inadequacy remains one of the main hindrance farmers faced, with over 25% respondents attesting. Family responsibility was a prominent obstacle for 12%, according to respondents. The autochthones Maka usually abused outlanders by theft, intimidation and non-respect of farm contracts. This negatively impacted 14% of sampled farmers who were not the original settlers of the study area. Youth deviation from the agricultural sector for instance, motorbike venture and rural exodus were attributed 15% and 8% respectively. Limited farm input explains the use of crude implements like hoes, dig-axes, poor quality seeds and

very little fertilizer which makes farm sizes small with low yields.

A. Inadequate road infrastructures

Throughout the study area, farm to market roads are in poor condition, difficult to access especially during the rainy season due to its sleepy state and numerous pot holes (plate 4). Bad roads consequently caused transportation difficulties as crops are transported by rickshaw, manually and by motorcycles.



Photo 1 A; Bad state of road in Angossa prevent vehicles from evacuating agricultural produce



Photo 1B: A ferry van which is a support to mobility at the entrance to Ngoyla Sub-Division.

Plate 1: Poor state of roads and advert effect on the evacuation of agricultural products

Source: Photos by Ngwogeh, field work 2022, 20/08/2022 at 11:48am

The seasonal nature of roads depicted by plate 3 constitutes a severe hurdle to agriculture. The potholes are often stoppage points for all vehicles to offload passengers and goods before crossing which is a very upsetting process for road users. This situation is critical in the rainy season making accessibility very difficult for both automobiles and pedestrians. The indigenous population's main paths are secondary and footpaths which are manually maintain through participative community development. Road maintenance has always been a call for concern because the local council road maintenance projects are being challenging to implement because of government policy and the slow implementation of decentralization process in Cameroon. As is the case with road network development in most rural areas in Cameroon, Upper-Nyong Division is highly affected because the division has gotten limited tarred road but for its national road N° 10, though the situation is being ameliorated with the construction of roads linking the various Sub-Divisions.

B. Inadequate market force (low demand) for agricultural products

It was noticed throughout field survey, the limited market force for agricultural produce. Plantain, tomatoes, vegetables, banana and fish amongst others were observed getting rotten along roadside due to lack of buyers. As a result of the absence of a well-organized market channel, farmers in the hinterlands transport crops from farms to neighboring villages where crops are assembled along the national roads waiting to be purchase by road users. Limited market force consequently widens the gap between the producer and the consumer hence the chain of supply become elastic thereby reducing farmer's income. Market centers are limited in the hinterlands mostly inhabited by the Baka and this caused agricultural products to get rotten. Plate 5 illustrate hurdles that emerge as a result of the limited buyers.

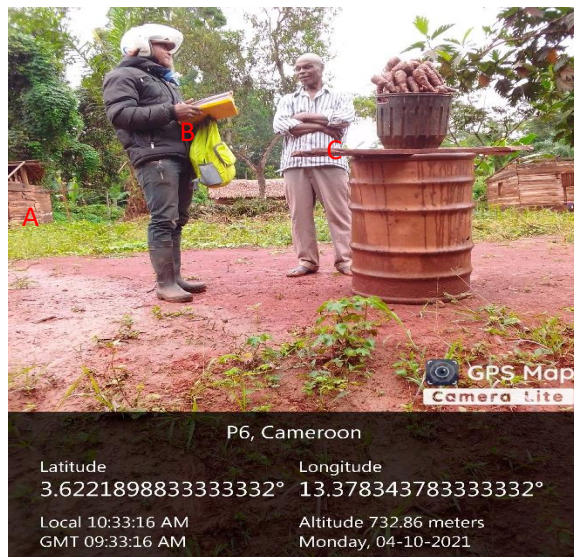


Photo 2 A: Benjamin Makoki a cocoyam farmer sells along the roadside due to no market in the village. **A:** payer, **B:** seller and **C:** sale crop



Photo 2B: Due to limited buyers couple with bad roads preventing vehicles and bikes from accessing into farms, farmers transport crops manually to the far-off roadside.

Plate 2: Farmers encountered difficulties resulting from limited market force

Source: Field work, 2022

C. Reduction of state subsidies and expenditure on agricultural inputs

Before the introduction of the IMF and World Bank structural adjustment programs (SAP) in Cameroon, the government from independent was highly involved in agricultural activities through the creation of agro-industries (CDC and PALMO), providing subsidies for agricultural inputs and research, regulating the marketing of agricultural products through the creation of marketing board. However, with the implementation of SAP with its main policies privatization, reduced government role in agriculture and liberalization of trade, the situation changed as the state gradually withdrew its full attention from agricultural activities. A situation field survey revealed that the action was untimely. Consequently, prices of farm inputs like chemical fertilizers, pesticides and insecticides increased and is still in persistent increase in Upper-Nyong Division. Agricultural input subsidies to small farmer's date as far back as post independent era where subsidies programs were initiated and finance by external agencies like *Fonds European de developpement* (FED) and the United State Agency for International Development (USAID). Field informants confirmed that these external agencies and the state have over the years reduced their efforts and support to the small-scale agricultural sector.

D. Absence of modern storage and processing facilities

One of the limitations of agriculture in improving the living condition of its practitioners, is due to the loss of post-harvest crops caused by the lack of storage and preservation facilities. Due to this challenge, peasants continuous with archaic methods such as firewood drying, bulk (open) storage (keeping loosely farm products in surface structures), baked clay bins, use of mud house (traditional grain storage building), airtight storage (that is

using containers), bamboo bins, and use of cold underground surfaces. The absence of modern post-harvest transformation and preservation facilities (food processing industries), pushed farmers to sell outputs fresh in void of it perishing. Consequently, due to this pressure, peasants are force to sell at the minimal price imposed by the limited buyers.

VIII. SUSTAINABLE COMBAT STRATEGIES TO CHALLENGES OF SMALL-SCALE FARMING IN UPPER-NYONG DIVISION

Over the years, chemical pesticides have been used to control weed and diseases affecting crops production. Paradoxically, the provided solution has generated a more complex problem which is that; the chemicals used contain toxic (poisonous) substances and as such, apart from destroying the pest, indirectly affect the crops cultivated. This further adversely affect the health of consumers especially in the rural communities of Upper-Nyong Division where hygienic conditions are extremely poor. Certain cultural practices which prevent or reduces weed and disease damage on crops cited by Settle et al., 2014 include; destruction of crops remnant or residues, deep plowing, crop rotation, use of organic fertilizer, strip-cropping, irrigation, weeding and scheduled planting operations. Biological control measures assume that predators or parasites are able to suppress pests. However, this measure wherein other macro organisms are used to destroy others, are scarcely seen in small-scale agricultural practices in rural communities of Cameroon but are useful in developed societies. This solution is much more desirable and solicited than chemical pesticides due to its limited harmfulness to human's health. In all solutions, the grower should have enough knowledge to control the pest and

diseases, firstly the pest should be identified and the disease studied and diagnosed to know what kind of damage it causes. This will permit to appropriately allocate the right therapy. There are no perfect solutions, it all depend on the situation, the crop, the knowledge of the growers, even the weather conditions and the stage of development of the crop. There are only advantages of using one over the other (Rosenzweig, 2014).

A. Encouraging the use of indigenous or traditional knowledge

Indigenous development according to Ajuh, 2008 is development from within or development based mainly on local strategies, knowledge, institution and resources. It is a continuous process of healing, adaptation and innovation, starting from within the local community. It aims to strengthen local resources to benefit the local population and enhance the ability to integrate selected elements from outside into local practices. Indigenous knowledge has many expressions and is based on different dynamics, depending on the starting position and characteristics of the local community or ethnic group. Supporting local knowledge is quite a complicated process, which goes much further than conventional development strategies of enhancing certain production technologies, supplying credit and modifying the marketing system. Upper-Nyong peasants have an intimate knowledge of many aspects of their surrounding and daily lives. Over the years, subsistence farmers who cannot afford modern agriculture technological equipment have learned how to grow food and to survive in a sometimes-difficult environment (World Bank, 2000). They know what variety of crops to grow, when to sow and weed, which plants are good or can be used for what purpose, how to cure diseases locally and how to maintain the environment in the state of equilibrium. Local knowledge does not require huge capital investment and can equate to the superior scientific know-how introduced by outsiders. Although not promoted, encouraged and not very spectacular, indigenous knowledge is valuable for rural development if valued by small-scale farmers.

B. Sustainable financial and material support

Inadequate financial support services have proved to be an issue in the contribution of small-scale agriculture in rural poverty alleviation (Gebreselassie et al., 2007). It is recommended that public or private sectors intervene to implement formal financial institutions that will significantly expand banking services in favor of rural communities. This initiative will play an essential role as small-scale farmers will be able to borrow money (loans) to purchase needed products (fertilizers, feeding resources, transport, irrigation facilities) required to sustain farms productivity (Mwalili, 2008). These reform need to be accompanied by increased access to credit for small-scale farmers. Meanwhile agricultural extension agents (ACEFA, IRAD and PNDP) should ensure that increased efficiencies are realized at every step of the agriculture project sponsored to ensure accountability of the fund invested. The government through its decentralized organs should intervene and construct rural-based market which will stabilize post-harvest constraints relative to prize and perishability.

C. Modernization of small-scale agricultural equipment and of farm input

To ensure a good evolution of Upper-Nyong small-scale agricultural sector, there is need to ensure modernize agricultural tools. That is from traditional agriculture (the use of rudimentary tools) to modern agriculture (processing machines and tractors). Looking at the surface area cultivated (less than 10 hectares) specifically with rudimentary tools, they could have produce greater and better with exceptional profit if they were using more sophisticated equipment. Barnett et al., (1995) stated that modernization phenomenon includes a full range of changes and transformations which all traditional societies have to follow to reach the level of being modernized. The modernization process in small-scale agriculture encompasses guidance and motivation for farmers to start using new products, crops and try new marketing skills. Agricultural transformation according to Staatz, 1998 is the processes by which farms shift from highly diversified subsistence-oriented production towards more specialized production, oriented towards the market or other systems of exchange like long-term contracts. Subsequent to the economic reforms (liberalization, tax reduction and free trade) of the past two decades as well as the increase in commercialization and globalization of agricultural products, production systems are inevitably undergoing transformations to meet actual demands. Agricultural intensification is a strategy through which Upper-Nyong farmers can achieve sustainable livelihoods through an increase in the surface area cultivated, range of inputs used coupled with the type of products cultivated. Access to information is an important aspect to be considered in the transformation of the agricultural sector in Upper-Nyong, due to its limited availability because of the remote nature of the area.

In modern monoculture agricultural systems, crops rely on external nutrient inputs such as fertilizers and pesticides to replace interactions that occurred naturally (Kremen, 2012). This reliance on external inputs has several consequences, including climate change, polluted air and water and the degradation of fertile soils. Growing the same crops continually each year results in the emergence of several biotic and abiotic constraints and progressive reduction in yield (Dawson et al., 2016). Therefore, crop diversification is one of the cost effective and simple methods that can be implemented to ensure sustainable and increased agricultural production because many crops are cultivated on farm which increase the natural biological interactions responsible for generating ecosystem services that are essential to agriculture, including soil fertility (nutrient cycling and retention), water holding capacity, pest/disease control and pollination.

IX. DISCUSSION

Agriculture which is the cultivation of crops as well as the rearing of animals is the primary source of livelihood enhancement in Upper-Nyong Division. The main purpose of agriculture is to meet up socio-economic needs such as income, cloths, medicine, and other economic gains. In the developed world, agriculture is much more mechanized and advance, with a small proportion of the population of just about 2 to 5% being able to provide food for the vast majority of its populace (FAO, 2003). Controversially, in the less economically developed countries amongst which is our study site, about 80 percent of its population depends on agriculture and its related activities for livelihood enhancement but are unable to provide food security and alleviate poverty. Agriculture in the world at large is practice in vary forms such as; dairy farming, viticulture, ranching, mixed farming, crafting, dry farming, pastoral nomadism, plantation agriculture, shifting cultivation, bush fallowing, transhumance and mixed cropping. Rural dwellers in Upper-Nyong are unable to developed these farming practices to an extent its can help in poverty eradication. The current world's population is expected to reach 10.5 billion by 2050 (UN estimate, 2013). Further adding up to global food production concerns hence, necessitating an urgent need to develop and change agricultural system across the globe and particularly in Cameroon whose rural economy primarily relay on for life sustainability. Cameroon and Upper-Nyong precisely is a replica of African landscapes with variety crops grown; rice, maize, Bananas, cocoa, cotton, oil palm, rubber, cocoa, coffee, groundnut, cassava, cocoyam, beans, soy beans, yams, irish potatoes, onions, vegetables, tomatoes, watermelon, cabbages pineapples, and other spices. Given these varieties of crops produced, agriculture has become the back bone behind the reduction of unemployment as almost everyone has a small farm for food self-sufficiency. The Cameroon government has made available many agricultural schools and research institutions for the training of agricultural expert to help in the development process of this base of the economy.

The sample case study shows the extent to which small-scale agricultural products can contribute to the growth of the entire economy. The transformation of agricultural products should fully be funded and developed into an agro-processing enterprise. Such a realization will certainly minimize losses incurred by farmers and maximize gains as it contributes to assure food security. Successful agricultural transformation according to the FAO, (2008) can release farmers off poverty through income generated from the sale of transformed food. The dynamics of agricultural transformation start with increasing the income of rural households, higher productivity on farms and greater demand in local markets (World Bank, 2010).

X. CONCLUSION

Findings revealed that the fourteen sampled communities depend on small-scale agriculture for food security, nutrition and income, which empower them to access other needs such as education, health, and household equipment. The components of livelihood (social, economic and cultural) were used to assess the impacts of small-scale farming on its practitioners. Upper-Nyong small-scale farmers remain an ideal target audience due to the increasing farm challenges, combined with the limited impact of this sector on livelihood enhancement. Physical and human challenges reduce the positive effects of small-scale farming on stakeholders' livelihood. It is therefore important that small-scale agriculture in Upper-Nyong Division be given a profuse priority and attention to kindle economic growth and socio-cultural development. This is at a time when there is increasing global focus on the agricultural sector as a sustainable source of poverty alleviation. Horizon 2035 emergence yawn by the Cameroon government necessitate perfect practical ideas to enhance its agricultural sector.

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