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CASSAVA PRODUCTION AND EXTENSION SERVICE DELIVERY IN CAMEROON

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Abstract

This study is designed to assess the effect of extension service delivery on cassava production in Cameroon and to examine the major challenges faced by cassava producers in using extension service delivery. We used a simple random sampling technique to select 150 respondents who were basically cassava farmers through a structured questionnaire and estimate were made through the multiple regression model. Results showed that, extension service delivery is a strong determinant of cassava production in Cameroon. Other variables correlating with cassava production are: farm experience, access to credit, agricultural training, source of labour and nature of support. The analysis of the determinants of extension service delivery shows that farm size, gender, source of labour and marital status are corroborating with extension service delivery. While unavailable services on time, insufficient extension service support, accessibility to cassava chemicals, use of improved cassava seeds, land ownership and access to finances are among the constraints farmers identified. Policy aiming at increasing farmers' access to inputs, cooperative development and access to credits, pest and diseases resistance varieties, developing and improving infrastructure and extension delivery services will go a long way to increasing cassava production in Cameroon.

1. INTRODUCTION

In most poor countries, agriculture is a source of national income and export earnings. Given its dominance in the economy, it is a primary source of growth and means of poverty reduction (OECD, 2006). In Sub-Saharan Africa (SSA), agriculture accounts for 20% of Gross Domestic product (GDP), employs 67% of the total labour force and is the main source of livelihood for poor people (Nkamleu et al., 2003; Medjieu, 2007). Kendi (2002) noted that agriculture remains the mainstay of most economies in Africa. According to Batulu (2008), Cameroon agriculture employs more than 75% of the active population and accounts for over 50% of the total export and agriculture represents close to 30% of GDP generating more than one third of the country's foreign exchange earnings and about 15% of the nation's budget.

Cassava (Manihot esculenta Crants) is a perennial, vegetative propagated shrub grown throughout the lowland tropics. According to Manyong et al (2000) cassava is one of the most important root crops in Africa with Sixty percent of the population of SSA depending on it as a staple food crop. Through its production, marketing and processing, this crop provides a major source of household income, especially for women and poor households. New Partnership for Africa Development (NEPAD, 2004) also identified cassava as a poverty-alleviation crop and has developed a market-oriented strategy for the sub-sector, based on the Global Cassava Development Strategy. This choice depends on the following factors: partly due to the recognized importance of the crop as a famine reserve, its relatively simple production process and it demands low agronomic inputs with little or no fertilization. Other advantages of the crop include: its efficiency in calorie production compared to other crops (accounting for 30% daily calorie intake in Ghana); its flexibility in planting and harvesting time, and drought-resistance. Cassava is reliable as a food source, thus making it a crop of choice in Africa (NEPAD, 2004).

Cassava stores its harvestable portion underground until needed; it is therefore a classic food security crop. These attributes combined with other socio-economic considerations are reasons for International Fund for Agricultural Development to recognize it as a crop that lent itself to a commodity-based approach to poverty alleviation (FAO, 1995). Cassava is an important food crop worldwide, especially in Africa, Asia, and Latin America. It is one of the highest-producing crops in

terms of carbohydrate per hectare, realizing the importance of cassava, the Research Institute for Agricultural Development and other research institutions came up, through research with improved species that produce faster and even in appreciable quantities. Though with the improved species that produce faster, there is a critical need for effective agricultural technology and marketing channels to reduce perishability and improve on cassava life span.

As noted by Fabiyi (2015) an improvement in general agricultural production, productivity and sustainability will depend on farmers' willingness and access to new technology. Agricultural extension and advisory services play an important role in addressing this challenge. Hellin (2012) mentioned that, agricultural extension contributes to improving the welfare of farmers and other people living in rural areas as extension advisory services and programs forges to strengthen the farmer's capacity to innovate by providing access to knowledge and information. FAO (2014) however, noted that the role of extension today goes beyond technology transfer to facilitation, beyond training to learning and includes assisting farmer groups, dealing with marketing issues, addressing public interest issues in rural areas such as resource conservation, health, monitoring of food security and agricultural production, food safety, nutrition, family education and youth development and partnering with a broad range of service providers and other agencies.

Almost all countries in the world deliver some type of extension service to help rural people advance their agricultural production and improve their living standard; extension is responsible for serving about one billion small scale farmers in the world (Aluna, 2014). The improvement of agricultural sciences and technology has brought about dramatic changes in the agricultural sector. This has led to the increased need and opportunity for investigating the effectiveness of agricultural extension services in various parts of the world (Davis et al., 2010). Agricultural extension services are now a major activity and basic element in programmes and projects formulated to bring about agricultural development and improvement in the quality of lives of the rural poor farmers (Francis, 2010). In the same line, Annan (2010) intimated that the provision of extension services can contribute to the reduction of the production differential by increasing the speed of technology transfer and by increasing farmers' knowledge and assisting them in improving farm management practices. He also noted that, access to adequate information is very essential to increased agricultural production and that many developing countries, lack appropriate technological and scientific knowledge application and so limiting agricultural and economic progress.

Further, although much research has been done on cassava production, little is known in the area of adopted services used in production by cassava farmers in Cameroon. This study is necessary by the obvious fact that food is one of the basic necessities of life and agriculture is wholly and entirely concerned with the production, processing and distribution of food for man. Also the fact that schools and extension service are being described as the most important instrument of change in agriculture. Despite the increase in extension services in cassava cultivation in Cameroon, the revenues and the production of the farmers are not following this trend. Based on these issues, this study has as objectives: to examine the extent to which extension service delivery is enhancing cassava production in Cameroon, determine the factors influencing extension services delivered in cassava production as well as challenges faced by the cassava producer in using the extension service delivery.

2. LITERATURE REVIEW

Cassava belongs to the family Euphorbiaceae that can grow in heights of one and three meters depending on the variety. There are over 5,000 distinct varieties of cassava but Palmata is the most important. Cassava is currently the most important carbohydrate food source, after rice, sugarcane and maize for over 500 million people in the developing countries in the tropics and sub-tropics (FAO, 1999). The main value of this crop is in its storage roots where the dry matter contains more than 80% starch. The areal parts, mainly the leaves are also widely consumed as vegetables, supplying proteins, vitamins and essential minerals (Elise et al., 2012, Evenson, 2005). The root crop has gained industrial importance with uses in ethanol production, high-quality cassava flour in bread production and glucose syrup production (Kimaro et al., 2010). Although it is tolerant of infertile soils and drought, continuous cultivation of cassava without efficient management can result in serious nutrient depletion of the soil and a complete crop failure. However, the use of improved varieties following a short but improved fallow is expected to have a positive impact on yields (Ajayi et al., 2013).

Cassava value chain plays an important role in food security in Cameroon. It occupies about 20% of cultivated land and around 46% of national food crop production. Cassava products are components of basic food intake for seven to eight million people in Cameroon, mostly living in the eight southern regions, and cover around 8% of daily nutritional needs. Most of the cassava is produced in small holdings (0.3 to 2 ha) and over 3.9 million tons were produced in 2011 and 4.3 million tons in 2012, topping the list of crop production. Most of the activities of cassava value chain (planting, processing, and selling) are carried out by women. Cassava is eaten in different forms in the country (boiled, gari, fufu, bobolo, miondo, pounded and the leaves as vegetables) (see, Kimaro et al., 2010).

The best cassava soils for its cultivation comprises of light sandy loam of medium fertility, deep friable, well manure and well drained soils. Soil pH ranges from 4 to 9. Cassava does not like water logged condition but there are some varieties that can withstand water logging. Deep cultivation is very essential for root formation. Root formation is delayed with day lengths of about 11-12 hours just like sweet potatoes (Alunas, 2014). Its mainly done by the traditional method of seed bed preparation method in which some farmers plant on mounts, some will make ridges, some on the flat while others in furrows particularly where there are logging problems (see, Kimaro et al., 2010). The main activities for land preparation includes: clearing either manually, mechanically or by the use of chemicals (herbicides), felling and cutting of trees with cutlasses, axes, chain saws. Normal size cuttings should be selected from the middle skinned portion of and/or the greenish portion of the stem. Cutting size should be 25-30cm long with at least four nodes and circumference of 2 - 4cm (AEE, 2007). Selected cuttings should be kept in a cool dry place for at most seven days before planting, within this period; good cutting would have sprouted (Alunas, 2014).

Cassava can be planted twice a year in wet areas (March/April and August/September). In other zones planting starts at the beginning of the raining season. Cassava cuttings can be planted vertically, horizontally and slanting. The best method of planting cuttings is to plant with 2/3 of the length in the soil at an angle of 45° (slanted or vertical). Planting distance should be one meter apart. Horizontal planting favours cuttings multiplication instead of root formation. The best planting method is slanting because it favours roots formation and

eases the process of harvesting. Weeds are a problem in cassava planted fields during the early stages of growth. It is advisable to keep the field clean during the first 3-4 months of growth after which they have provided enough canopies. First weeding should be done when plants are 20cm to 25cm tall that is between four to five weeks after planting. Second weeding should be done one or two months after the first weeding (AEE, 2007).

3. METHODOLOGICAL ANALYSIS

3.1 Presentation of the Study Area

Cameroon, often referred to as "Africa in miniature", is one of the most diversified countries in Sub-Saharan Africa with respect to its agro-ecology: from a semi arid Sudano Saharan north to humid forests in the Centre, South West and East regions. The forests which represent about 40% percent of Cameroon's national territory form an important part of the Congo Basin characterized by a closed canopy moist tropical forest (Besong et al., 2009). The South West and particularly Meme Division is found on this tropical forest characterized by relatively high rainfall (1800mm to 98000mm per annum), average daily temperatures of approximately 230C and high relative humidity of more than 80%. The region being a productive agricultural area of great importance, extremely diverse in soils, climates, markets and people presents a true case study for agricultural practices in Cameroon and most developing countries (Besong et al.,2009 as cited by Oru, 2009). Depending on the particular environment major crops peculiar to most African countries such as rice, wheat, barley, maize, cassava, potatoes, plantains/bananas, yams as well as cocoa and coffee are produced in Cameroon.

Generally, the predominant economic activities are centered on agriculture. Food crops grown are maize, groundnut, cassava, cocoyams and plantains. Major livestock reared are: goats, pigs and poultry. Agriculture is the major occupation of the people as they grow both plantation and arable crops such as cocoa, oil palm, rubber, cassava, yam, rice, cocoyam, maize beans, groundnuts and vegetables. Households also keep livestock such as sheep, goats, poultry and pigs, etc. The farming system is essentially extensive, made of mixed cropping for food crops and semi extensive for some industrial crops such as rubber and large scale oil palm farms. The cocoa plantation occupies more than half of the cultivated land. Many young farmers of the Division are nowadays interested mostly on industrial crops such as oil palm, rubber, and cocoa to the detriment of food crops. This may later create a shortage of foodstuffs which are the essential source of nutrition of the population (MINADER, 2016).

The soils were cassava is grown is essentially clay sandy soils in texture, and "feralitic", with a good level of fertility because they are volcanic in their large proportion. Meme was selected because of the concentration of cassava and the fact that cassava constitutes one of the main staple food crops in this area. The choice of this locality was also based on the fact that it is one of the areas where cassava is principally produced. Favourable condition such as moderate temperatures enables the people to engage not only in cocoa cultivation but also in cassava production. The targeted population was cassava farmers from where a purposeful sample of 150 respondents was interviewed.

3.2 Sources of Data and Sampling Procedure

Data for this study was obtained from both primary and secondary sources. The primary data was collected on the production activities of the cassava producers using structured questionnaires, personal interview and focus group discussion. These data were collected from individuals and groups with regard to cassava production or famers. Before proper administration of questionnaires, a contact visit was made to the cassava famers with extension agents. During this visit ten questionnaires were pre-tested for reliability and validity. Necessary corrections were made before the final version was administered. Copies of which would be administered to the 150 cassava farmers selected for the study in the study area. Primary data was collected from agric extension agents, and farmers using a structured questionnaire, personal interview and group discussion. Secondary data was obtained from published source such as scientific journals, newspapers and scientific documents.

The study took place in two of the five subdivisions of Meme Division in Cameroon. Two strata of individuals were indentified: these include members of Common Initiative Group who are working with extension agents and non members of Common Initiative Group. Finally seven villages were chosen with 40 farmers interviewed in kumba II and in kumba III, 110 were interviewed, this gave a total of 150 farmers who were finally selected and interviewed. These individuals were selected randomly to ensure that the sample was a representative of the cassava farmers studied based on some of their characteristics. The instruments used for the collection of data for the study include: questionnaire which was used mainly for the collection of primary data through face to face interaction and focus group discussion under which facilitated the data collection. During the questionnaire administration, participant observations were also made and the interview guide was used to collect qualitative data. Apart from the questionnaire, the camera was also use to take important images as well as video the focus group discussions.

3.3 Econometric Model Linking Extension Service Delivery to Cassava Production

The econometric model use in this study to link the extension service delivery to cassava production is the ordinary lease squares. This model can be presented as follows:

$$CP_i = \sigma_1 C_i + \lambda_1 ESD + \varepsilon_i$$

Whereby: CP_i= Cassava Production; C_i = other determinant factors believed to be affecting CP apart from extension service delivery such as credit, climate; ESD= Extension service delivery; ε_i = Error term; σ_1 = Parameter of other determinant factors believed to be affecting CP apart from ESD**;** λ_1 = Parameter estimate of extension service delivery**.**

The overall return rate of questionnaires for the study stands at 100%. Out of the 150 questionnaires envisaged for the study, all 150 questionnaires were given out and collected. The high return rate was seen to stem from the great interest of farmers in general.

4. RESULTS AND DISCUSSIONS

This covers the presentation and discussion of results of this study carried out on the assessment of extension services on cassava production in Meme Division transfer. These include the socio-

economic characteristics of the respondents, the effects of the extension services on cassava production.

4.1 Socio -Economic Characteristics Of Cassava Farmers

This study looked at the socio-economic variables such as age, marital status, gender, education, farming experience and household size of the respondents.

As revealed in Table 1, the majority (52%) of the respondents were above 40 years of age implying that they are in their most productive age that is the majority of the cassava farmers in the study area were within productive age range. This age group in agricultural production indicates that farmers still possess enough energy and experiences to carry out the numerous activities that go with the cultivation of food crops such as clearing, burning, hoeing, planting, weeding, harvesting, and post harvest processing activities. Beyond this age, they become Examining the marital status of the actors involved in this activity. It reveals that 94% of them were married. We notice that this activity is contributing surely to the livelihood of the family in terms of food and income. This is further confirmed by the fact that the activity is income generating because it attracts 5.33% of persons who are still single. It is worth noting that this activity attracts responsible persons and thus it's important for the society. This also implies that cassava production activities are more sustainable. Married farmers, who are more involved in cassava production activities are highly motivated with the technology. This means that the level of adoption of agricultural technology transfer in cassava activities is very high among the married farmers as compared to the single who are less involved in cassava production. The result, indicate that marriage is a very important institution among the people of the study area as being together in a marriage union fosters agricultural production and cassava for rural farm families. It presume that food crop production in Cameroon is a family activity and the analysis of marital status can also indicate that the cassava activity is a real and noble business as it attracts people who are socially responsible and who have families they are taking care of by earnings from cassava activities thus, justifying our interest on this crop that is very important for poverty reduction.

As already revealed by Obinne (1991), education is an important factor influencing farmers' innovation uptake. We observed in the field that, only 6 percent of the respondents in the study area have had tertiary education, 52 percent of the respondents ended their education at the primary school level, while 29.33 percent of them ended at secondary school. These results are supported by early report by Ruth et al (2008) who reported that most women in the study had very low levels of formal education. The provision of training and technical support will be necessary to facilitate their participation. Therefore from the analysis, more than half of the respondents have primary education added to the 12.67% of them with non-formal education making a bundle of more than 62% of farmers who should receive extension services separately from the 35.33% of farmers who have a higher level of education. Separate learning environments or extra help for the less educated farmers will enable to reach a better proportion of farmers that can understand and apply the technology.

This is consistent with the earlier results by Maxwell (2001), who reported that 70% of sub-Saharan Africa's labour force and 67% of south Asians are employed by agriculture. It can be noted that the time when these farmers got aware of the new technology was very weak and farmland areas cultivated reduces in sizes. Qamar (2005) reported that young farmers have higher aspiration to accept new technologies than conservative older farmer that always seem to be more satisfied with their traditional methods. Distribution of the actors shows that among the 150 farmers interviewed, 79.33% were females and 18.67% were males. Even though there are no clear distinction as concerns gender activities, the limited number of men in food crop production can be explained by the fact that most men are involved in cash crop production in the study area. Another reason is that most men do not usually get involved in activities which require a lot of post harvest labour such as harvesting, peeling, washing, grating, squeezing, drying and frying of "garri", as well as fermenting and washing into pastes locally called "akpu" used as fufu. They usually consider this as feminine activities or female-dominated activity and prefer an activity that gives them ready cash.

Table 1: Detailed analysis of agricultural extension services on cassava production

Extension service delivery	Frequency	Percent	Cumulative Percent
Gender			
Male	28	18.7	18.7
Female	119	79.3	100
Total	**150**	**100.0**	
Access to credit			
Credit	22	14.67	14.67
No credit	128	85.33	100
Total	**150**	**100**	
Source of labour			
Family	4	2.67	2.67
Hired	117	78.0	80.67
Cooperative	29	19.33	100
Total	**150**	**100**	
Age of Responds			
< 30 years	30	20	20
30– 40 years	42	28	48
>40 years	78	52	100
Total	**150**	**100**	
Nature of support			
Technical support	52	34.7	34.7
Theoretical support	8	5.3	40.0
Material support	74	49.3	89.3
Experience sharing	16	10.7	100.0
Total	**150**	**100**	
Main occupation			
Farming	84	56.0	56.0
Civil servant	21	14.0	70.0
Trading	45	30.0	100.0
Total	**150**	**100.0**	

Source: Authors, from field data

different as well. From the above it is clear that in the 1980 just 1.4% heard about extension services. Around the 1990 the number of people who became aware of the services around production was gradually increasing. It seems that the period after 1990 was a boom in terms of awareness of agricultural technology.

4.2 Determinants of Extension Service Delivery

The analysis of the determinant of extension service delivery around cassava activities will enable us to show the relationship that exists between some variables with respect to extension delivery services. From, our OLS model, the female gender shows that as the number of producers interested in extension service delivery increases, it is important to pay attention to the number of men and women since an inappropriate proportion of both lead to a failure of extension services by 43 percent. Even though the variable is important its standard error is very high meaning that this result may vary from one sample to another though significant at one percent level. Similarly, education, agricultural training and main occupation also affects extension services delivery respectively by 11.6%, 7% and 0.4% at one percent level of significant. Linking this result to that of figure 2 where almost 80% of the producers are women, actions to promote the involvement of men into the activity should be well channel and accompanied with appropriate measures in order not to decrease the existing effect of extension services.

Table 2: Estimate of the determinant of extension delivery services

Variable	Coefficient	Standard deviation	Robust t-statistics
	Extension service delivery		
Farm size	0.504*	0.301	1.675
Household size	-0.132*	0.072	-1.816
Farm experience	0.142**	0.072	1.975
Gender of farmer	0.430***	0.161	2.671
Education	0.116***	0.035	3.330
Access to credit	0.000	0.001	0.377
Source of labour	0.663**	0.311	-2.101
Agric training received	0.070***	0.027	2.612
Nature of support	0.163	0.042	3.907
Main occupation	0.004***	0.001	4.112
Marital status	0.218	0.145	1.507
Constant	0.447**	0.218	2.051
R-square	0.344	n/a	n/a
F-statistics	2[14.00]	n/a	n/a
Total	150		

Source: Author, from field data

Education is significant at 1% with a considerable coefficient. Considering the fact that most of the producers had primary education, extension services should design appropriate materials and better organize the producers so as to maximize on the positive effect that variables can have for the success of service delivered. From table 2, a good number of the producers (44%) have received planting techniques while only 14% of them have been given knowledge on how to transform tubers. An amelioration of the access to this service will improve extension delivery services by 7 percent, thus ameliorating the insufficient knowledge of cutting techniques (3.3%) and cassava multiplication (34.7). For main occupation, even though it's significant at 1% level, its effect on extension services delivery is very weak showing that if extension services is handled by civil servant and traders, they will be lose the impact of extension services by 7 percent.

Extension services will increase with farm experience because it has a positive impact of 14.2 percent with 5 percent level of significance. Most farmers (89.33%) have had a good experience in farming (6 years at least) Analysis of the source of labour shows that hired labour is very important.

4.3 Extension Service Delivery Effect and Cassava Production

To appreciate the effect of extension service delivery on cassava production, we compute a multiple regression where the dependent variable is the quantity of cassava produced and the independent variables are the various components of extension services. In our area of study, we realized based on Table 3 that a one unit improvement in extension service delivery increases cassava production by 42 percent significant at one percent level. Economically, bringing in one unit of input (extension service delivery) for a 42 percent cassava production seems not rational but technically contributive. To verify the quality of the effect of this variable on cassava production, we test its significance using student test, which give us 5.868 that we can interpret using the probability rule to be significant at one percent level. In Table 2 we observed that only 52.7 percent of cassava producers in Cameroon received extension services, implying that much is still to be done so as to capture the 46.7 percent of farmers who have not yet received information from extension service workers. Farm experience increases the probability of cassava production by 19.3 percent significant at one percent level. A detailed analysis of this variable teaches that, 57 percent of these producers have at least 11 years of farm experience added to the 32 percent of those with 6 to 10

years experience. The descriptive statistics shows that farmers in our area of study present an important level of experience (89 percent with at least 6 years).this means that the choice of extension packages in Cameroon should be well design in order not to be rejected by the farmers who already have it.

Table 3: estimate of the effect of agricultural extension service on cassava production

Variable	Coefficient	Standard Deviation	t-statistics
	Cassava Production		
Extension service delivery	0.420***	0.071	5.868
Household size	0.081	0.061	1.342
Farm experience	0.193***	0.064	3.02
Gender of farmer	0.752*	0.411	1.830
Education	0.518	0.816	-0.635
Access to credit	0.854***	0.513	1.665
Source of labor	0.987**	0.501	1.971
Agricultural training received	0.068***	0.011	6.21
Nature of support	-0.773***	0.221	-3.50
Main occupation	-0.020**	0.400	2.05
Marital status	0.757	0.812	0.933
Constant	-0.426	0.894	-1.634
R-square	0.4771	n/a	n/a
F-statistics	14[15,00]	n/a	n/a
Total	150		

Source: Author, from field data. N/B: where *,** and *** represent 10 percent, 5 percent and 1 percent level of significance.

Similarly access to credit, agricultural training and nature of support also impact cassava production by 85.6 percent, 6 percent, and -77.3 percent respectively at one percent level of significance. For access to credit, we realized that 85.3 percent of the producers do not have access to the service implying that extension services should be more oriented in this area. Looking at agricultural training, cassava multiplication is still at 22.7 percent, planting technique at 44 percent, transformation of tubers at 14 percent and cutting techniques at 3.3%. These results show that agricultural training is still highly needed in the cassava sector in Cameroon. The same source also indicate that, famers still need technical support since only 34.7 percent have been touched but this is better than theoretical support which is still at 5.3 percent. The source of labour and main occupation affects respectively cassava production by 98.7 percent and -2 percent at a five percent level of significance. The negative sign of the main occupation implies that, production of cassava changes severely when we move from farmers who represent 56%, to civil servant (14%) and traders (30%). The previous shows that extension packages should be design separately for the three groups considering their characteristics since production changes severely among them. An analysis of the variable gender shows that, production changes seriously from a man to a woman by 0.752(0.411) with a significance level of 10%. This result strengthens the analysis of figure 3 where the majority of producers are women. Extension services should encourage men to go into cassava activities.

To conclude on the effects of agricultural extension services on cassava production, based on the level of significance we can classify variable into three groups: variables that strongly impact cassava production with 1% significant level such as: extension service delivery, farm experience, access to credit, agricultural training and nature of support. The second group consists of variables significant at 5% such as: main occupation and source of labour and the variable gender which is significant at 10%. In addition the R-Square is 87.71% implying that agricultural extension variables have a strong impact on cassava production.

4.4 Challenges Faced By the Cassava Producer in Using the Extension Service Delivery

After looking at the effect of extension service on cassava production and the determinant of extension service delivery, it is opportune to check the challenges faced by these producers in Cameroon. An assessment of the opinion of farmers who have received extension services and belonging to an association who enable us to better appreciate the challenges face by these actors, we observed a great number of difficulties encountered by farmers in the field.

These challenges are summarized in table 4, here; farmers who received extension services complained that their major problem is that the services are not available on time added to the fact that some of them think the support are not enough. For those who never received extension services their main claim was the insufficient delivery even though this opinion may vary if the farmers belongs to a farmers association or not. Generally, insufficient delivery and unavailability of the services on time are the two major elements to tackle on according to the respondents. In addition the number of farmers who received extension services is very high when they belong to a farmers association (see, Table 4).

Table 4: Difficulties encounter by farmers

Extension services			Farmers association		Total
			Yes	no	
Yes	Difficulties Encounter by Farmers	Insufficient delivery	6	1	7
		Unavailable on time	58	0	58
		Source from far distance	2	0	2
		Less extension support	19	3	22
	Total		85	4	89
No	Difficulties Encounter by Farmers	Insufficient delivery	19	33	52
		Unavailable on time	4	0	4
		Source from far distance	0	1	1
		Less extension support	2	1	3
	Total		25	36	61
Total	Difficulties Encounter by Farmers	Insufficient delivery	25	34	59
		Unavailable on time	62	0	62
		Source from far distance	2	1	3
		Less extension support	21	4	25
	Total		110	40	150

Source: Author

As a complement to table 4, we present a proportion matrix showing the respective constraints faced by cassava producers in Cameroon (Table 5). The decision rule here, consists of comparing the frequency of constraints and non constraints for each of the variable and adopts the maximum. Based on this rule, accessibility to cassava chemicals, use of improved cassava seeds, land ownership, constraints of getting required labour, access to farm input such as fertilizers and access to credit/finances are major constraints to the cassava farmers as reveal by the respondents. Comparing Table 4 and 5, the results shows that all the farmers that received extension services noted that they are unavailable on time and inadequate in supply. On the other hand those who did not receive extension services pointed out that their major difficulty is insufficient delivery services. Effectuating the Fisher test, we noticed that the relationship between these major constraints and cassava production is strong.

Table 5: Proportion Matrix showing the Constraints in Cassava production

Variable	Absolute frequency	Constraints	Non constraint	Constraint difference
Accessibility to cassava chemicals	150	0.993(149)	0.006(1)	0.987
Use of improved cassava seeds	150	0.600(90)	0.333(50)	0.267
Land ownership	150	0.726(109)	0.273(41)	0.452
Challenges of cultivating cassava as a main occupation	150	0.440(66)	0.560(84)	-0.120
Constraint of farm size	150	0.273(41)	0.726 (109)	-0.452
Application of training received	150	0.140 (21)	0.860 (129)	-0.720
Constraints of getting required labour	150	0.980 (147)	0.02 (3)	0.960
Access to farm input such fertilizers	150	1 (150)	0 (0)	1
Access to finances	150	0.860 (129)	0.140 (21)	0.720

Source: Author from field data. N/B: values in brackets represent relative frequency of variables. While the difference in constraint is constraint minus non constraint

5. CONCLUSION

This study was designed to assess the extension service delivery on cassava production in the South West Region of Cameroon. The objectives targeted are to: assess the socio-economic characteristics of cassava farmers, examine the effects of extension service delivery on cassava production, identify the determinants of extension services in cassava farmers and examine the major challenges faced by the cassava producers in using extension service delivery. In general terms this piece of work is designed to increase food security through the introduction of improved farming practices in the south west Region of Cameroon. We used a simple random sampling technique to select 150 respondents who were basically cassava farmers through a structured questionnaire and estimate were made through the Ordinary lease square model.

The result shows that extension service delivery is strongly impacting cassava production and significance at one percent. Other factors associated to this effect are: farm experience, access to credit, agricultural training, nature of support, main occupation, source of labour and female gender of cassava farmers. We equally observed that, planting techniques, multiplication of cuttings, transformation tubers and improved planting materials are the different extension services offered to cassava farmers in Cameroon. Finally, the analysis of the determinants of extension service delivery shows that farm size, gender, source of labour and marital status are corroborating with extension service delivery.

Policy aiming at increasing farmers' access to inputs, cooperative development and access to credits, pest and diseases resistance varieties, developing and improving infrastructure and extension delivery services will go a long way to increasing cassava production in Cameroon.

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