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Original Research Article

Viability of Improved Cassava Varieties in Moyamba and Bonthe Districts of Southern Sierra Leone

Emmanuel S. Hinckley[1], Adolphus J. Johnson[2*], Abdul Rahman Conteh[1]

[1]Sierra Leone Agricultural Research Institute (SLARI)

[2]Department of Agricultural Extension and Rural Sociology, Njala University

***Corresponding Author's Email: ajohnson@njala.edu.sl**
Tel.: +23276727989

Abstract

The study evaluated the viability of improved cassava varieties in Moyamba and Bonthe districts of southern Sierra Leone. Root, tuber and grain legumes are mandated crops of Njala Agricultural Research center (NARC), a constituent of Sierra Leone Agricultural Research Institute (SLARI), charged with the mandate of developing and disseminating improved crop varieties within Sierra Leone.Among them, cassava appears to be prime crop, based on its utility among end-users. Atregular intervals through research,feedback from farmers as to the extent of reachability and level of performance of the crop commodity will to a larger extent shape the researchers focus. To ascertain that, four hundred and fifty (450) cassava growers were selectedbased on population proportion in six chiefdoms in both Moyamba and Bonthe districts of southern Sierra Leone, using purposive and random sampling methods. Data were analyzed quantitatively, using descriptive statistic. Resultsrevealed that there was weak (32.7%) extension contact with farmers. However, information through farmer-to-farmer methodengenders farmers high knowledge and access to technology. It also shows that even though information regarding the other released varieties was scarce, farmers to a larger extent adopted the technology based on trialability and income generated (profit accrued) through sales of its products.

Keywords: End-users, Reachability, Released Varieties, Sierra Leone, SLARI, Trialability

INTRODUCTION

Cassava (*Manihot esculenta* Crantz) is a very important root crop, containing high carbohydrate levels and, used for human consumption, animal feed and industrial applications (Sánchez *et al*., 2009). It is extensively cultivated as an annual crop in tropical and subtropical regions for its edible storage root as major source of carbohydrate and it cultivation contributes greatly to the food security of many households in rural and urban areas. Technological improvement (such as improved cassava varieties) is the most important factor in increasing agricultural productivity and reduction of poverty in the long-term (Solomon 2010; Solomon *et al.,* 2011).

Intensification of the crop will to a larger extent satisfy its demand, increase farmers income and thereby reduce poverty. One possible way as Afolami *et al*. (2015) put it ‘’if farmers take advantage of improved crop variety such as cassava’’. Some direct impacts of agricultural technologies (such as changes in agricultural productivity and farm income) are relatively easy to measure quantitatively, which is probably why they have been the focus of most impact research. It is however difficult to establish the causal effect of farming technology on welfare, but at the same time this is necessary if we want to know the extent of agricultural enhancement of the poor. Agricultural technologies include all kinds of improved techniques and practices which affect the growth of agricultural output (Jain *et al.,* 2009). For Loevinsohn *et al.* (2013) the most common areas of technology development and promotion for crops include new varieties and management regimes; soil as well as soil fertility management; weed and pest management; irrigation and water management. By virtue of improved input/output relationships, new technology tends to raise

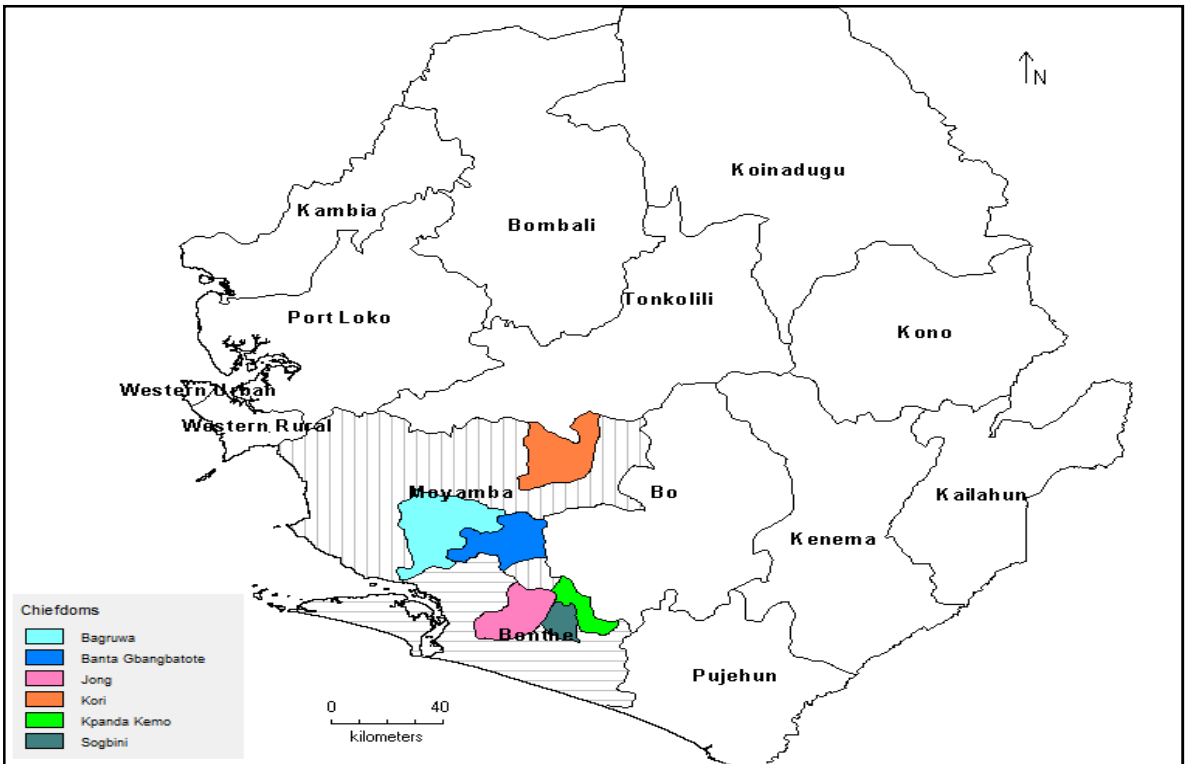

Figure 1. Map of Sierra Leone showing the study area (2 districts with chiefdoms)

output and reduces average cost of production which in turn results in substantial gains in farm income (Challa, 2013).

In Sierra Leone, Cassava is being regarded as the key root crop and the second staple after rice Gboku *et al.* (2017). The crop is been regarded as a poor man's food because of its ability to stay in the field for a longer time, prepared into different recipe for household meal and cheaper in price compared to the staple rice. Despite its potential, it is still grown by many farmers at subsistence level. However, cassava potentials can more be realized when it is explore along its value chain. It continued to serve as food for man, feed for animals and industrial raw material. Because of its potential to also increase income of farmers when cultivated with a business mind-set, and also the ability to reduce food insufficiency, adoption of its improved variety will be the best option. Hence, it is worth investigating how farmers relate with the improved varieties diffused in their communities. Therefore, the general objective of this study was to examine the viability and adoption of SLARI improved cassava varieties by farmers in Southern Sierra Leone. The specific objectives of the study entails, determining the characteristics of adopter and non-adopters of farm families, the viability of the research commodity, their institutional capacities of the farming enterprise, challenges and policy recommendation for the research.

METHODOLOGY

Description of Study Location

The study was conducted in two (2) districts in southern Sierra Leone; Moyamba and Bonthe. Due consideration was given to Moyamba district because its host Njala Agricultural Research Station where the research commodity (cassava) is generated and disseminated to farmers, country-wide. The district was then compared to Bonthe district where cassava is widely cultivated too. Figure 1

Sampling Procedure - Sample frame and sample size

The research was a non-experimental design. It was explanatory in nature, thereby enabling the researcher to exhaustively explore the characteristic of cassava farmers in the two districts.

The population of the studyconstitutes small holder farmers in the Moyamba and Bonthe districts. The sampling frame for the study comprise of cassava growers within the farming population. The study design is based on the multi-stage sampling procedure: the first stage involved the purposive selection of cassava growing chiefdoms within each district, the second stage involved purposive selection of cassava growing

communities within each chiefdom and the third stage involved random selection of cassava growers within each community. Empirical data on specific number of cassava growers were not available, hence the researcher resorted to guiding principles to sample size determination. According to Taherdoost (2016), there are numerous approaches, incorporating a number of different formulas, for calculating the sample size for categorical data.

Thus, $n= p (100-p) z^2 /E^2$ was used, where

n is the required sample size

P is the percentage occurrence of a state or condition

E is the percentage maximum error required

Z is the value corresponding to level of confidence required.

Since the two districts are renowned for cassava production and as a main livelihood activity, proportion of the population was estimated as 0.5 considering that the exact proportion of the population was unknown. Also, 5% was used as the margin of error for producers in the study.

In the case to determine the number of sample for the cassava growers(n), it was assumed that the proportion of cassava growers within the study area 50% (p=0.5), 95% confidence level precision (z = 1.96) and 5% level of precision (E= 0.005).

As indicated in Table 1, sample size of 450 farmers were selected and distributed according to household population of the twodistricts, taking into consideration the 2015 Household population census data. However, caution was taken, because according to Gill et al., (2010) while the larger the sample the lesser the likelihood that findings will be biased does hold, diminishing returns can quickly set in when samples get over a specific size which need to be balanced against the researcher's resources.

To ensure validity of the data collection instrument and reliability of the collected data, purposefully, the questionnaire was pre-tested and pilot study conducted. Primary data was supplemented by interview and secondary data from the Ministry of Agriculture, Forestry and Food Security and desk review of other related literatures.

Source and Method of Data Collection

Primary and secondary data were collected for this study: Primary data was collected through personal interviews with the use of structured questionnaires. About (450) individual cassava farmers were interviews using android devices that was programmed with software package of Open Data kit Collect (ODK). Secondary data was collected through desk review of scientific literatures). Quantitative data from the household individual interviews was exported from CSPro to Microsoft Excel 2010 and Statistical Package for the Social Sciences (IBM SPSS Statistics 2) for analysis using different analytical tools in statistics.

Descriptive statistics (frequency and percentages) in form of tables and charts was used to analyze quantitative data related to the respondent's level of adoption, source of information and extension services obtained, cost benefit analysis of cassava production at household level, institutional analysis. Probit analysis was employed to test independents variables with adoption.

RESULTS AND DISCUSSION

Socioeconomic characteristics of respondents

In Table 2, majority (74.7%) of cassava farmer interviewed were male. Data similar to finding of Akerele (2019) which opined that gender distribution of the cassava farmers revealed that majority (80.8%) of the cassava farmers were male while only 19.2% were female. World Bank, (2009), view, ''this imbalance in gender could partly be explained by the economically lucrative nature of the farming enterprise (as compared to other farm enterprises) which tend to attract men into the business''. Others attributed the gender advantage to the tedious or physical nature of the farming activities.

The result also indicates that about half (52.2%) of the respondent are adults, with the tendency of having much experience and as active participants in conducting farming activities. As Anyanwu *et al.* (2001) put it '' recognized that people are more likely to be energetic and have the capacity to use innovation. Table 2 also revealed that majority of the cassava farmers never access secondary school; with few also reaching post-secondary institutions. Data contrary to Ogunleye and Oladeji (2012) whose findings comprises people with high level of education that probably made them ready to accept innovation as education helps in adopting innovations. As education positively influencing adoption, with the category of higher learning able to read and perceive characteristic blue prints of technologies. The main source of information about cassava technology according to respondent is through farmer-farmers (54.3%) channel. About 26.0% get information from extension agent. In Africa there is an estimated 1 extension worker per 4,000 farmers, compared with 1 per 200 hundred farmers in developed countries. In Ghana**,** the extension staff-to-farmer ratio is estimated to be 1:1500 (Sraku-Lartey and Sam, 2003). This ratio falls far below the Food and Agriculture Organization (FAO) recommendation of I officer for every 400 farmers, according to Agriculture for Impact Agricultural Extension. In Sierra Leone, extension agent to farmer ratio is assumed to be widen and with no updated empirical data; thereby reducing valuable contact time with the farmers. Minimal extension contacts limits diffusion of knowledge to farmers, and this impedes agricultural productivity

Table 1. Sample size, based on 2015 HH census of population (Sierra Leone)

No.	District	Chiefdom	HH Population	Sample size
1	Bonthe	Jong	33,816	101
		KpangaKemo	10,438	31
		Sogbini	10,863	32
2	Moyamba	Bangruwa	27,623	83
		Kori	30,514	91
		Lower Banta	37,317	112
Total			**150,571**	**450**

Table 2. Socioeconomic characteristics of cassava farmers

Characteristics	Frequency (n=450)	Percentage (%)
Gender		
Male	336	74.7
Female	114	25.3
Age category		
18-35 (youth)	117	26.0
36-55 (adult)	235	52.2
56 and above (aged)	98	21.8
Educational level		
Informal	186	41.3
Koranic	65	14.4
Primary	74	16.4
Junior Secondary School (JSS)	71	15.8
Senior Secondary School (SSS)	34	7.6
Tertiary	20	4.4
Sources of information on cassava farming		
Extension agents	147	26.0
Other farmers	307	54.3
Media	103	18.2
Inputs dealers/Markets	8	1.4
Organization extension agent is from		
Not from extension agent	303	67.3
Farmer cooperatives	9	2.0
Ministry of Agriculture and Forestry	100	22.2
Non-Governmental Organizations	18	4.0
Sierra Leone Agricultural Research Institute	7	1.6
Extension services received		
Input supply	23	6.5
Tools and equipment	26	7.4
Training	127	36.1
Advice	175	49.7

Source: *Survey data (2019)*

growth. According to Jones (2003), extension agents avail agricultural and climate information that help farmers to make timely decisions regarding crop management practices that address climate change. According to Umar (2014), access to extension has been widely reported to positively influence adoption and continued use of agricultural technologies. Arshad Farooq et al., (2010) findings in their study revealed that non availability of field assistant's offices at union council level, lack of teaching equipments/facilities, poor linkages between research and extension organizations, mobility/funds and dispersion among the farmers were the major obstacles hampering extension agent's work.

Table 2 further revealed that bulk (67.3%) of farming information was not from extension agent; probably from fellow farmers family members or friends. Moreover, about 22.2% of the information is coming from Ministry of Agriculture and Forestry personnel, 4.0% from Non-Governmental Organizations, 2.0% from farmers Co-operatives. Only 1.6% is from Sierra Leone Agricultural

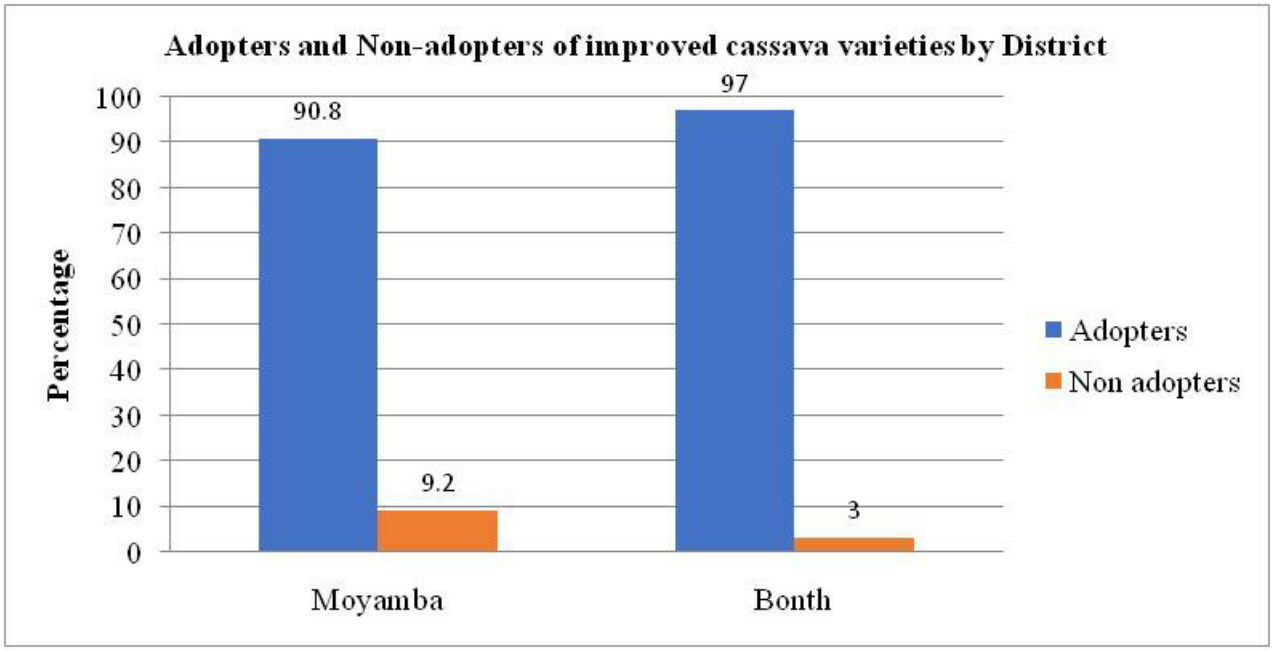

Figure 2. Summary statistics on adoption of improved cassava varieties by districts
Source: Survey data (2019)

Research Institution. Other sources of information which may include media also account for 2.9%. Implying that bulk of the farmers are still deprived of obtaining accurate and firsthand information from technical experts concerning implementing improved technologies. Despite the Ministry of Agriculture and Forestry leading in terms of extension contact with farmers, the gap is visibly identified from the data. This data also revealed the outreach/extension nature of Sierra Leone Agriculture Research Institute outreach component of the research system. SLARI practice complete integration between research and extension in which the one institution host both component. Most extension systems in developing countries are faced with several multifaceted problems. These problems include lack of appropriate technology, top-down approaches, poor remuneration and incentives for extension staff, and weak or no linkages among researchers, farmers and extension staff (Davis, 2008).Out of the limited extension contact with farmers, almost half (49.7%) of the farmer were able to obtain advice from extension agents, 36.1% received training opportunities, 7.4% obtained tools and equipment for farming activities, 6.5% secured input supplies. Because of the multiple nature of the questions, it is also possible that the two or more activities overlapping in this context. Sometime training or advice is followed by input supply such as fertilizer, pesticides, etc. Or tools and equipment discharged after their specific trainings. According to Farooq *et al.* (2010), finding indicate that no single extension method is sufficient in the training of farmers and the extension agents used all the methods to reach the target farmers. Extension services offered in developing countries have been deficient regarding accuracy, relevance and applicability to farmers' problems (Agholor *et al.,* 2013). In addition, poor funding from government and employing institution poses some challenges (Masere,2015).

To determine the viability of the adoption of SLARI release varieties in the study area.

In this study, an adopter is defined as a respondent that had grown at least one of the introduced improved cassava varieties for at least one season prior to year 2019 and had the variety on his farms in the year 2019. Over the years, improved cassava varieties have been disseminated to farmers in the study area within the country by Njala Agricultural Research Center in collaboration with Ministry of Agriculture and Forestry. From Figure 2, more than 90 percent and more of the respondents had adopted at least one of the improved cassava varieties introduced to them in both Moyamba and Bonthe districts. In a similar studies conducted by Ojo and Ogunyemi, (2014) in Ekiti State, Nigeria , about 73 percent of the respondents adopted at least one of the improved cassava varieties introduced to them. According to Roger' (1995, 2003), model, it is the characteristics of technology that influence the adoption of technologies that include relative advantage, compatibility, complexity, trialability and observ-ability. This finding is also in support with 'An extract from

Table 3. Summary statistics of number of improved varieties adopted

Varieties	Frequency	Percent
SLICASS 4 (Blue boat, Super bowl)	400	71.8
SLICASS 6	94	16.9
SLICASS 7 (World Vision/TME 419)	63	11.3
Total	**557**	**100.0**

Note: this is multiple responses
Source: Survey data (2019)

Table 4. Reason for selecting Improve cassava varieties (SLICASS varieties)

Two (2) reasons why prefer SLICASS variety 1-14	Frequency	Percentage (%)
High yielding & quality root	394	43.8
High dry matter & quality gari for market	92	10.3
Vigorous growth & Early maturity	56	6.2
Malleable & Good taste (palatability of root)	62	6.8
Easily processed into vegetable (leaf)	22	2.4
Resistant to pest and diseases	26	2.9
Good for food (gari, tho, fufu, etc.)	106	11.8
Job & High income & family welfare/support	142	14.9
Total	**900**	**100.0**

Multiple choice
Source: *Survey data (2019)*

Statistics Sierra Leone, 2015 survey report (Thematic Report on agriculture); by Gboku *et al.* (2017) which revealed that 'Cassava crop is the second most important crop in Sierra Leone, with the Southern region recorded the most households cultivating cassava of which, Moyamba and Bonthe rank third and fourth respectively among all the districts of Sierra Leone. It is also worth noting that at the regional level, the Southern region produced more than half the nation's cassava crop (53 per cent), which also equated to 54 per cent of total regional food production, and 15.1 percent of total national food production as revealed by Gboku *et al.* (2017).

From Table 3, Blue boat or Super Bowl is most (71.8%) cultivated improved cassava variety in the two districts where the study was conducted. 'Super Bowl' because of its tendency to bully the secondary crop it is intercropped with in the field. SLICASS 6 (16.9%) and SLICASS 7 (11.3%) commonly called World Vision or TME419 are also cultivated at different scale. The latter is named (World Vision) after the NGO that diffused it to the farmers in the locality. Personal observation couple with quantitative data reveals that only these three improved varieties and local types are been grown in the farmers' fields in the study area. The local types are grown for its perfect boil and eat quality. SLICASS 4 is topping the list as a result of its characteristic of producing quality gari for market, high yield and light weight when processed into gari. SLICASS 6 is also grown for it leaves (as vegetable) and tubers. For SLICASS 7, the root is suitable (mealiness) for biol and eat especially during the hunger period when rice (SL staple) is in short supply in their communities.

It is also worth noting that some farmers grow both improved varieties plus local types on separate plot in the same piece of land. Some farmers also grow small amount of local for boil and eat and at the same time grows large amount of improve varieties for gari processing and market. The adopted skill is to both secure household food security and generate income at the same time. Areas prominent for gari processing for home consumption and much more for trading appears to be favorable for high adoption level (personal observation). As Asiedu-Darko (2013) put it,'farmers easily adopt technologies with traits associated with their own traditional practices'.

Data from Table 4 shows that farmers who opt for improved cassava varieties have reasons ranging from its high yielding qualities and quality root (43.8%), because the enterprise create job opportunities that provide income which them to take care of their families (14.9%), its good quality products when process into different food stuff, etc. Some also cited high dry matter and quality market value for gari, which earn them income, vigorous growth and fast maturity especially for family food security. According to Challa, (2013), increasing agricultural productivity is critical to meet expected rising demand and, as such, it is instructive to examine recent performance in cases of modern agricultural tech-nologies. In addition, they stated that it is by virtue of

Table 5. Yearly revenue from improved cassava production

Revenue Generated from Sales of Product	Frequency	Percentage (%)
Le500,000-1,500,000	61	13.5
Le1,501,000-5,500,000	178	39.6
Le5,501,000-10,500,000	125	27.8
Above Le10,500,000	86	19.1
Total	**450**	**100.0**

Source: *Survey data (2019)*

Table 6. Cost of Production per year of cassava tuber

Cost of production (income per year	Frequency	Percentage (%)
Le180,000-1,000,000	161	35.8
Le1,001,000-4,000,000	264	58.7
Above Le4,000,000	25	5.5
Total	**450**	**100.0**

Source: *Survey data (2019)*

Table 7. Annual profit obtained from sale of cassava tuber

Profit margin	Frequency	Percentage
Less than 100,000	179	39.8
Le101,000-500,000	89	19.8
Le501,000-999,000	92	20.4
Le1,000,000-2,500,000	35	7.8
Le2,501,000 and above	55	12.2
Total	**450**	**100.0**

Source: *Survey data (2019)*

improved input/output relationships, new technology tends to raise output and reduces average cost of production which in turn results in substantial gains in farm income (Challa, 2013).

Similarly, Asiedu-Darko (2013) found that farmers easily adopt technologies with traits associated with their own traditional practices. This though is also in harmony with findings by Masere (2011) that farmers are keen to learn new or modern technologies if they perceive their livelihoods are at stake.

Cost benefit associated with cassava production activities

The gross margin analysis (Table 5) was carried out to measure the profitability of cassava production. According to David and Stanley (2000), gross margin is measured as Total Revenue (TR) less Total Variable Cost (TVC). The net return (Profit) was calculated by subtracting the Fixed Cost (FC) from Gross Margin (GM).

Revenue is the total amount of income generated by the sale of goods or services related to the company's primary operations. Revenue is often referred to as the top line because it sits at the top of the income statement. The revenue number is the income a company generates before any expenses are taken out, the Fixed costs are expenses that must be paid whether or not any units are produced. They are fixed over a specified period of time or range of production.

Unit costs vary depending on the number of products produced and other factors. For instance, the cost of the materials needed and the labor used to produce units isn't always the same.

Cost of cassava production (Table 6) covers from the period of land preparation and establishment, weeding and harvesting. According to Nabay *et al.* (2017), cassava root production systems in Sierra Leone normally includes + brushing + burning + clearing + no ploughing + manual ridging + no fertilizer. For Adebayo *et al.* (2015) Controlling weeds in sub-Saharan Africa takes up to 60% of the labor in crop production and more than 40% of the total cost of growing cassava. Therefore, Cost of weeding = 2 times cost labor per man-day + feeding and other costs.

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measured as Total Revenue (TR) less Total Variable Cost (TVC). The net return (Prof-it) was calculated by subtracting the Fixed Cost(FC) from Gross Margin (GM).
Mathematically:
TC = TFC + TVC
GM = TR – TVC
NR/PROFIT = GM – TFC
Where,
GM = Gross Margin
TR = Total Revenue
NR = Net Return
TFC = Total Fixed Cost
TVC = Total Variable Cost (Fagoyinbo, 1999).

Even though majority (39.9%) of the farmers could secure less than Le100,000 as profits per cultivation; probably due number of acreage of land obtained for cultivation, some others (12.2%) are realizing above Le2,000,000 as profit. Whether the said amounts is big enough for the maintenance and sustainability of enterprise becomes a researchable issue. Reason being that the crop is cultivated only once a year. In similar studies by Ebukiba, (2010). Where Gross Margin analysis was used to analyzed the cost and return data, the result reveals that for a hectare of sole cassava the gross margin was #141,950.00 giving a cost benefit ratio of #1.90; #1.00, this shows that for every #1.00 spent there is a corresponding profit of 90kobo.

Farmers institutions capacity and external factors using Strength Weakness Opportunities Threat (SWOT) Analysis

A SWOT analysis evaluates the internal strengths and weaknesses, and the external opportunities and threats in an organization's environment. The internal analysis is used to identify resources, capabilities, core competencies, and competitive advantages inherent to the organization. The external analysis identifies market opportunities and threats by looking at competitors' resources, the industry environment, and the general environment. The objective of a SWOT analysis is to use the knowledge an organization has about its internal and external environments and to formulate its strategy accordingly - Tanya Sammut-Bonnici and David Galea, (2015). This paper's SWOT analysis comprises two main components: Strengths and weaknesses stand for the internal factors of cassava sector in Sierra Leone while Opportunities and threats report all sector external elements that can pettily or significantly influences the sector Meyo and Liang, (2012). SWOT analysis in agricultural sector has to be a strategic point helping to produce recommendations for future considerations, Dyson, (2004).

For Valentin (2001), SWOT analysis is the traditional means of searching for insights into ways of realizing the desired alignments. Strengths and Weaknesses describe 'where the project or organisation is now: the existing resources that can be used immediately and current problems that won't go away. It can help identify where new resources, skills or allies will be needed' (*Start and Hovland, 2004*). According to Meyo and Liang (2012), SWOT analysis is one of the most effective tools used to assess the level or the development of a given sector. Novkovie (2008) Carried a SWOT analysis on agriculture in the republic of Serbia, where capacities, conditions and productivity of the agriculture sector were looked into. The study used statistical tools to assess the evolution of certain production factors such as resources (work force, land, and livestock), productive results (the yields and total production of significant crops) and economic results (domestic product of agriculture). In the farming context, strength serve as drivers or enablers or things that make people call the farmer a-farmer. Existing resources that cassava growers can boast of include; their long experience in the enterprise, enough land to crop on, their positive perception about farming itself, etc. (Table 8).

On the other hand, weakness depicts things that the farmer lacks which debar farming activities. Findings from this work identifies weaknesses that includes but not limited to insufficient/limited farm income, cost of labour, level of their education, limited farm sizes etc. Other silent handicap of the enterprise they highlighted is that most the farmers are aging; the young and energetic youth are now involved in Byke riding and other lucrative jobs that earn them quick money.

From the study,cassava farmers in rural communities enjoy the abundant opportunities through farm land for cassava cultivation, access to planting materials, market availability for the cassava products with the information surrounding the market (Table 9). Threat surrounding the farming enterprise is seen prominently in pest and diseases management. Insect (grass hopper) continue to unleashes devasting effect on the crop lifecycle. In many cases, its destruction can cost the whole cassava farm; including the stem and yield. Some improved types can also be seen going down with Cassava Mosaic Disease and the cost can be devastating. According to Ezedinma *et al.* (2007) root yield losses due to cassava mosaic disease are as high as 70% on susceptible genotypes in Nigeria and further expressed that the emerging threat to cassava production in Nigeria is the incidence of the cassava mosaic disease (CMD). Farmers also complained of inadequate medical facilities, since they are prone to health complication such as bodily pain and snake bites especially.

Table 10 shows a multiple linear regression. The model summary table shows the prediction power of the model. Five variables were hypothesized to influence the probability of farmers' adoption of improved cassava varieties in the study area as shown on Table 10. Out of these, only one was found to be significant. That is; from the table the results indicate that the number of years

Table 8. Internal Factors (Strength and weakness of farmers) that influence adoption of ICV

Strength				**Weakness**			
Comment	**F**	**%**	**Rank**	**Comment**	**F**	**%**	**Rank**
Access to Land	294	21.8	2nd	Farm size	235	17.4	4th
Labour	100	7.4	7th	Membership in farm org.	48	3.6	6th
Market	73	5.4	6th	Limited Farm income	325	24.0	1st
Experience	307	22.7	1st	Level of education	271	20.0	3rd
Perception	244	18.0	3rd	Age of farmer	154	11.4	5th
Infor. (farmer-farmer)	101	7.5	5th	Cost of labour	317	23.5	2nd
Finance	231	17.1	4th				
Total	**1350**	**100**		**Total**	**1350**	**100**	

Multiple responses
Source: *Survey data (2019)*

Table 9. External factors (Opportunities and Threat of cassava farmers in study area)

Opportunities				**Threat**			
Comment	**F**	**%**	**Rank**	**Comment**	**F**	**%**	**Rank**
Access Planting materials	253	18.7	2nd	Government policy	241	17.9	4th
Access to Loan	124	9.2	6th	Pest and disease	287	21.4	1st
Land	344	25.4	1st	Unstable climatic condition	246	16.0	5th
Access to market	225	16.6	3rd	Price instability(product)	78	5.8	6th
High price of product	184	13.6	5th	Health	245	18.1	3rd
Information (market, techno.)	220	16.3	4th	Weed	281	20.8	2nd
Total	**1350**	**100**		**Total**	**1350**	**100**	

Multiple responses
Source: *Survey data (2019)*

Table 10. Description of Socioeconomic Variables by adoption level Status

Coefficients[a]								
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**	**95.0% Confidence Interval for B**		**VIF**
	B	**Std. Error**	**Beta**			**Lower Bound**	**Upper Bound**	
(Constant)	3.760	.110		34.160	.000	3.543	3.976	
INCOME	-2.150E-9	.000	-.028	-.465	.642	.000	.000	1.661
What is your Age?	-.002	.002	-.068	-1.449	.148	-.006	.001	1.007
What is your level of Education?	-.009	.019	-.029	-.471	.638	-.045	.028	1.750
How long have you been farming?	.004	.002	.112	2.268	.024	.001	.008	1.100
How many people in your household?	.001	.006	.009	.192	.848	-.011	.014	1.022
Dependent Variable: Adoption Level of Farmers in Cassava Production Technologies								

Source: *Computed from Field Survey 2019*

taken in farming (P=0.024) is significant at (P<0.05) in the model.In other words, the longer the farmers take in the cultivation of cassava farming, the higher the tendency to adopt improved.

CONCLUSION

Despite low educational background of farmers, couple with limited extension-farmer contact, adoption of improved cassava varieties was favorable. This could likely be attributed to the characteristic performance of the crop varieties. Profit margin depicted could contributed to some famers putting some money into their pockets, hence improving their livelihood. However, this is not to say that the enterprise was the best alternative (crop) in their respective rural communities; but it pays off for now. Drawing from their cassava growing experience

and access to farm land, couple with opportunities of planting materials, they are likely to benefit more from these technologies. As a result of their rural posture, the farmers consider land as strength and opportunity, while farm income serves as major weakness, with pest (especially grasshopper) and weeds posing the greatest threats to cassava cultivation. Is predicted that the longer farmers continue to grow the crop, there is a tendency to adopt more improve promising cassava varieties.

RECOMMENDATION

Based on the findings of the study and field observation, it is worth noting thatthe extensionagent's farmer gap is widen and hence need urgent attention for stakeholder of extension agents in order to facilitate famers with the technical knowledge of technologies to be diffused to farmers. A researchable option could be ''to ascertain the current extension agent to farmer ratio in Sierra Leone''. About 3 out of the 14 released improved cassava varieties from SLARI were found in the study location. Probable this finding could trigger a wakeup call for intensive promotion of research commodities and more dissemination strategy in order to increase the spread of released improved crop commodities from research institutions.

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