Ministem multiplication technology selection skills need for improved cassava production in Akwa Ibom State, Nigeria

Erinyana Ime Okon, Prof Savior Okon Nsa & Agba Paul Ikongshul
Department of Agricultural Education,
University of Uyo, Uyo

Abstract
The study centered on perceived ministem multiplication selection skills need of farmers for improved cassava production in Akwa Ibom State, Nieria. Two specific objectives, two research questions and two hypotheses were formulated to guide the study, using a descriptive survey research. The population of the study consist of 4543 registered farmers and extension agents with sample size of 428 which was randomly distributed within the ADP zones. The instrument titled Ministem Multiplication Technology Skills Need Questionnaire (MMTSNQ)" was face validated by three experts with reliability coefficient of 0.81 analyzed using Cronbach Alpha statistics. Mean statistics was used to answer the research questions while independent t-test analysis was used to test the null hypotheses at .05 level of significance respectively. Findings from the descriptive analysis of the study revealed that ministem multiplication stem selection skills and tools handling skills were needed by cassava farmers for improve cassava production in Akwa Ibom State. The study recommends that extension agents should train and retrain farmers on basic skills in selecting healthy, matured and improve cassava stems from the field for usage in ministem production to ensure quality cassava stem availability during planting season.

Keywords: cassava**,** ministem, multiplication, technology, skills

Introduction

Cassava (*Manihot esculenta* Crantz) is a perennial dicotyledonous plant which belongs to the Euphorbiaceae family. According to Schoffel *et al*. (2022) cassava stands out for its starchy tuberous roots and important energy food crop cultivated for consumption and other end products for human and animal feed, especially in family farms. Okokon (2018) noted cassava as one of the most dominant and main crop components in crop mixtures in south eastern Nigeria and is gradually gaining importance as an industrial crop.

Uwimana *et al*. (2022) observed that the traditional, easiest and most commonly used planting method for cassava is the propagative method, which consists of planting stem cuttings with approximately six buds in unfertilized furrows and spacings that vary according to the cultivar and available technology. This is characterized as an important limiting factor on cassava. According to Ilona, (2017) it's a delivery challenge and also an obstacle to large-scale propagation that results to low rate of multiplication and utilization of high-quality propagation materials. Furthermore, da Silveira *et al*. (2017) in their study noted that each cassava plant produces an average of 10 stem cuttings of 20 cm, in a period of 12 months; this is to say that the propagation rate of cassava is 1:10 and only 1:5 in rural on-farm situations which

considered low for the planting of commercial crops. Stem cuttings may accumulate pathogens during successive propagation cycles. This particularity reduces the production of storage roots, the amount of available stem cuttings and their vitality. In critical situations, this effect can impair farming.

The use of ministem multiplication techniques according to Schoffel *et al*. (2021) is important for increasing the cassava multiplication rate. Ministem multiplication technology was developed by the International Center for Tropical Agriculture (CIAT) as an alternative to the traditional planting method, allowing an increased in the utilization rate of sanitary and physiological quality stems. The use of this method allows an increase in the multiplication rate of up to 16 times or more depending on the stem length and portion of the stem portion used compared to the traditional method. In addition, they acknowledged that the ministem multiplication technology is particularly important in cases of disease, pest attack, or frost damage, which drastically reduce the quantity and quality of propagation materials.

For ministem multiplication method to be successful for the improvement and utilization rate of the available propagation material, there is need for cassava farmers to acquire the basic skills in selection of appropriate stem and also have good knowledge in right cutting portion. According to Bassey (2016) the need to select cassava with large vigorous stems (trait) is important for securing adequate planting materials for next generation. Skills are the capacity to carry out a task within a given time and energy. According to Adike (2019) skill is defined as dexterity that is acquired through repetitive performance of an operation. It refers to expertness, practical ability, dexterity and tact. Likewise, Salaam (2018) defined need as what is and what ought not to be. Likewise, need shows lack of something which if present, will better the welfare of an individual or group of individuals whose situation is at stake. Hence, it is clear that skill is an essential resource which fosters ability, capability and competence towards achieving ones needs.

Cassava multiplication technology started in the year 2001 by the Federal Government of Nigeria with the aim of alleviating poverty and increasing income among farmers. According to Ansah and Gyoung-Rae (2014) technology is the application of scientific and practical knowledge and skill to use the tools of the environment to produce goods and services for the society. It is the process of applying the finding of science and other forms of enquiry to situations. Ministem multiplication is an emerging technology which adopts the application of improved scientific and practical knowledge to make production of cassava stem production much easier in quality and quantity. Nkouaya-Mbanjo *et al*. (2020) asserted that the adoption of this improved technology helps to ensure improved food security due to average yield per hectare, higher earnings, poverty alleviation, reduction of hunger, improved nutritional status, increased employment opportunities, increased earnings for landless labourers and lower food price. So, the use of developed multiplication technologies has provided alternate options for cassava multiplication and development of cassava stem. Newly developed cultivars can also be offered for commercial planting in a short period of time.

Statement of the Problem

It is observed that many farmers are still using the old cassava varieties that do not produce much and do not mature early as well. Despite economic and social importance of high-yielding cassava cultivars, they are only released after extensive research, mainly due to the low multiplication rate, expensive labor, time-consuming, and the possible transfer of diseases by stem cuttings from generation to generation, limiting the effectiveness of this approach. The prolong propagation period of conventional stem multiplication creates a remarkable bottleneck in commercial propagation and breeding programs. As a result, conventional propagation methods in the Akwa Ibom State, farmers could not meet the rising demand for newly released cultivars and the people being one of the largest consumers of cassava need to fully adopt new seed system approach to compete globally and keep the price of cassava-based foods stable and affordable in the country. Therefore the present study aimed to determine the ministem multiplication technology skills need of farmers for improved cassava production in Akwa Ibom State.

Purpose of the Study

The main purpose of this study was to determine the perceived ministem multiplication technology skills need of farmers for improved cassava production in Akwa Ibom State. Specifically, the study sought to determine the:

1. perceived ministem multiplication stem selection skills need of cassava farmers for improved production.
2. perceived ministem cutting tools handling requirement skills need of cassava farmers for improved production.

Significance of the Study

The findings of this study would be of significance primarily to cassava farmers, extension workers and agricultural education students. It would provide cassava farmers and students with the knowledge necessary for choosing the right type of cassava stem for ministem based on the required variety, health, age and physiology of cassava plant. Including the various items needed for ministem cutting, the state of the equipment, how to cut and the required cutting nodes. To the extension workers, the findings on selection skills need would help them to train farmers on ministem technology so that they would be able to replicate or provide for farmers to practice more readily for cassava stem production. Again, it would help them to communicate to farmers the number of nodes to be cut, state of the cutting tools, how to cut, when to cut as well as materials needed for cutting cassava ministem.

Research Questions

The following research questions were answered in this study

1. What are the perceived ministem multiplication stem selections skills need of cassava farmers for improved production?
2. What are the perceived ministem cutting tool handling skills needs of cassava farmers for improved production?

Research Hypotheses

The following null hypotheses were tested at .05 level of significance

H_{01} There is no significant difference in the mean response of cassava farmers and extension agents in the perceived ministem multiplication stem selection skills need for improved production.

H_{02} There is no significant difference in the mean response of cassava farmers and extension agents in the perceived ministem cutting tools handling skills need for improved production.

Scope of the Study

The study covered the six agricultural zones of Akwa Ibom State, Nigeria. The study was to determine the ministem multiplication technology skills need of farmers for improved cassava production. It was delimited to the skills for selection of stem for ministem multiplication technology and tools handling for cutting of ministems.

Literature Review

Ministem Multiplication Stem Selection Skills Need of Cassava Farmers

For seed to be a highly productive technological component, it must have stake quality. This is in line with the study of Opara *et al*. (2022) who stated that the size and quality of stakes are of fundamental importance for high stable yield in any production system. Reason being that a good quality seed gives good results in the field while poor quality seed leads to unsatisfactory results and failure. de Oliveira *et al*. (2020) stated criteria for selection of cassava planting material as follows:

i) vigorous and healthy plants without any signs of insect or disease damage;
ii) mature plants aged 10–12 months with fully grown tuberous roots;
iii) tissue from the base, middle and top part of the stem, provided they were mature enough to generate vigorous plants;
iv) the diameter of the pith was at least 50% of the cutting diameter.

According to López (2015) quality is that set of genetic, physiological, and health attributes that enable stakes to give rise to productive plants. The presence of high levels of these three essential components of quality indicates that seed is at its maximum integrated quality. In contrast, weakness in any component introduces a constraint. Thus, perfect genotypes cannot express their true potential if their seed has physiologically deteriorated and shows poor germination. Genetic quality can be ensured by planting authentic seed chosen from certified source. The genetic factors that mostly affect the seed production of a cassava variety are general vigor and branching habit. Vigor affects the total growth of a plant's aerial parts and, as a result, the number of branches from which stakes can be obtained. While branching habit influences the availability of primary and secondary stems, which are the parts most used for planting materials. Schoffel (2021) agreed that vigorous varieties produce more stakes than non-vigorous ones. Wongnoi *et al* (2020) noted additional physiological characteristics that support the efficiency of selecting the appropriate cassava

genotypes for the farmers as stake's ability to sprout and give rise to a vigorous plant. The physiological quality involves seed nutrition, seed age, and seed viability.

According to John *et al* (2020) nutritional status of stem cutting is fundamental to the initiation of a new plant rather than fertilizer applications to the soil. If stakes with high nutrient contents are used, then a higher production of stems, suitable for use as planting materials, is possible. This is very important for seed production programs because of cassava's low multiplication rate. Hence, Ukpe and Mustapha (2016) agreed that such a low-cost technological component demonstrates that using stakes that have good nutritional status would likely enable farmers to increase cassava production with adequate soil conservation. Stem viability is directly related to its moisture content. da Silveira (2017) observed that a visual indicator for estimating moisture content and stake viability is the speed at which latex flows from a recently cut stake. If it flows immediately, then the stake has sufficient moisture and, thus, good germination power as the stake becomes dehydrated, the latex appears more slowly and its quantity is less.

In seed production, Nakabonge *et al*. (2020) stated that health problems may arise when induced by pathogens and pests which do not only reduce the quantity of stakes a plant can produce, but also reduce their quality, which is later reflected in low yields. They also pose a risk when introduced into areas free of such problems. According to Sanusi *et al*. (2022) the stakes cut from healthy stems free of pests and diseases have a higher rate of sprouting and produce higher root yields. Using planting materials gotten from vigorous and apparently disease-free plants of stakes are also selected for their high root production, on the basis of the simple principle that plants with the highest yields should also be the healthiest. This type of selection has proven to be highly successful, and its advantage is more effective for clones that are susceptible to several production constraints (Thomas-Sharma *et al*., (2017). They agreed that the yield stability of cassava is highly dependent on the quality of planting materials, and there is evidence that the initial use of healthy cuttings is a very important factor in the subsequent attainment of good yields. Conversely, cuttings with low vigor and infested with pests and diseases often limit cassava production. Most farmers do this without careful inspection to ensure selection of disease-free propagating material. Such practice increases the spread of disease from field to field, from farm to farm and finally across the local government areas in the state. Besides edaphoclimatic conditions which interfere with rooting and sprouting of cassava stem cuttings, Schoffel *et al*. (2022) noted that visual assessment of stems is essential for ministem multiplication method as it shows maturity level and presence of pathogens. Cuttings should be freshly harvested at least 2 cm diameter and 20-25 cm long.

Ubong (2016) emphasized that in order to obtain a good yield of cassava, it is essential to select planting material of good quality. Locally, selection is one of the most neglected management practices. Overtime careful visual selection of cuttings with no signs of disease or physical damage has been shown to greatly increase yields. Equally, selection of high-

yielding plants with no virus symptoms, coupled with visual selection of cuttings has been shown to double yields in certain circumstances. According to Ime *et al* (2023), the main objective of ministem selection skills need of cassava production is the selection of improve varieties with the following characteristics: early maturity, high yields, low HCN content, good root quality, harmatan hardiness, disease resistance, easy harvesting, reduced perishability, and suitability for biennial cultivation (including high ratooning ability and less lignified tissue in the roots harvested the following year).

Ministem Multiplication Tools Handling Requirement Skills Need of Cassava Farmers

To cut the stakes, two aspects should be taken into account: length and age or stake's location in the plant. Stake length is important in terms of the number of nodes and the amount of nutrient reserves and moisture they contain. Node number is closely related to variety, and age of both plant and stake. A mature plant has a larger number of nodes than a young plant. In addition, in mature plants, nodes in basal parts are shorter than in apical parts. Whole stems are cut into mini-stems: hard woods (older parts, 1 or 2 nodes), semi-hard woods (semi-mature parts, 4-6 nodes), and tip shoots (green and tender parts, 6-10 nodes). Da Silveira *et al*. (2017) recommended that hardwood and semi-mature stems should be prepared and cut into ministems containing 2 to 3 viable nodes of 10 – 15 cm (a 1^{-ha} field requires $\geq$ 2 500–3 000 m of cuttings). Hence, Chiona *et al*. (2016) is of strong opinion that cuttings with four nodes should be taken instead of two as the latter may easily get dried up.

This is in line with the study of Schoffel *et al.* (2023) who stated that the number of nodes per mini-stem depends on inter-node length, stem diameter, and weather condition at and after planting. In most cases, one-third portion of the top stem is usually discarded in the traditional system; however in ministem technique it is utilized. Tip shoots are being stripped of all leaves except the youngest and kept in water to prevent dehydration. Care is therefore taken not to damage the auxiliary buds because of its tender nature.

Farmers should ensure that they select healthy physiologically mature, pest and disease free cassava stems for cutting in order not to contaminate the cutting tools. This is in line with the study of Schoffel *et al*. (2021) who collected stem cutting using a stiletto knife disinfected with 70% alcohol. de Oliveira *et al*. (2020) in their study made used of sharp blade of electric rotary saw for stem cutting. The cuts must be straight, perpendicular to the direction of the length of the shoots. Irregular cuts are not suitable for this technique Tarawali, *et al* (2015) opined that 2 or 3 stem cuttings should be cut with sharp tools to ensure straight smooth cut ends and avoid jagged cuts. If a machete is used, cutting is done in the air as uniformly as possible taking care to avoid tearing the bark or splinting the woody piece. It is most convenient to hold the stem in one hand and make a small cut, then turn the stem 180^{o} and make a second cut to separate the stem pieces. When cut transversely the cutting is able to root uniformly around the perimeter giving better root distribution.

Methodology

A descriptive survey research design was adopted for the study. This study was carried out in Akwa Ibom State, Nigeria. The population for this study comprised of 4543 respondents made up of 3473 registered cassava farmers and 70 extension agents in Akwa Ibom State. A sample size of 358 registered cassava farmers were determined using Taro Yamene formula while the entire 70 extension agent were used for the study since their population were manageable amounting to a sum total of 428 respondents. Three out of six ADP zones were randomly selected. From the three ADP zone, 18, 307 and 33 cassava farmers were randomly selected as sample size of the study respectively. While 24, 38 and 10 extension agents were all purposively selected forthe study.

Researcher made instrument entitled "Ministem Multiplication Technology Skills Nee d Questionnaire (MMTSNQ)" was developed to collect data from the respondents. Section A contain information on the demographic data of the respondent, section B has two response categories and contained 19 item each on different skills need/required in ministem multiplication technology. A 5-point response options on the level of skills need ranging from Very Highly Needed (VHN); Highly Needed (HN); Moderately Needed (MN); Lowly Needed (LN); and Not Needed (NN) were responded by cassava farmers while the required category has response option of Very Highly Required (VHR), Highly Required (HR), Moderately Required (MR), Lowly Required (LR) and Not Required (NR) were responded by agricultural extension agent with corresponding values of 5, 4, 3, 2, and 1 respectively were used. The instrument was face validation by three experts.

Internal consistency was determined using split-half reliability method. Cronbach's Alpha was used to analyze the data collected and the reliability index of 0.81 was obtained. The questionnaires were administered to the respondents with the help of the three research assistants. Thereafter, it was retrieved on the spot after given enough time for completion. Mean statistic was employed to answer the research questions. Item with mean of 1.50 or above was regarded as needed while less than 1.50 was regarded as not needed. To determine the required-need gap (RNG) of cassava farmers, the needed gap (NG) was determined by finding the difference between the values of Xr (mean of the required skill) and Xn (mean of the needed skills). That is, Xr – Xn = RNG. The value of RNG of each item indicated the skills need gap of cassava farmers on that item. Where RNG is zero (0) and below, it means skill is not needed. Where the NRG is positive (+), it means skill is needed. Independent t-test analysis was used to test the null hypotheses using Statistical Package for Social Science (SPSS). In testing the null hypotheses, the calculated t - value was compared with critical t-value at 0.05 level of significance. When the calculated t-value was less than the critical t-value, the null hypothesis was retained otherwise rejected.

Results

Research Question 1: What are the perceived ministem multiplication stem selections skills need of cassava farmers for improved production?

Table 1: Required-Need Gap Analysis of Mean rating showing perceived ministem multiplication stem selections skills need of cassava farmers for improved production

SN	Stem Selection Skills Need	Xr	Xn	RNG (xr-xn)	Remarks
1	Skills in selecting good quality variety	4.52	3.09	1.43	Skill Needed
2	Skills in selecting healthy cassava stem	4.44	2.86	1.58	Skill Needed
3	Skills in selecting cassava stem of matured physiological status	3.93	2.87	1.06	Skill Needed
4	Skills in selecting stem of required diameter	3.49	3.12	0.37	Skill Needed
5	Skills in selecting disease free stem	4.51	3.07	1.44	Skill Needed
6	Skills in selecting stem based on recommended height	3.22	3.07	0.15	Skill Needed
	Grand Mean	**4.01**	**3.01**	**1.01**	**Skill Needed**

N = 428, Xn= Mean of Needed, Xr= Mean for Required, RNG = Required Need Gap Value,
(Source: Field Survey, 2024)

Table 1 revealed that all the six items on stem selection skills for ministem multiplication technology were needed for improved cassava production and they have their required - need gap ranging from 0.15 to 1.58 and showed positive. Generally, the overall mean of required minus needed response is 1.01 and was positive. The implication is that, cassava farmers need skills in all identified stem selection requirements for cassava ministem multiplication technology. **Research Hypothesis 1:** There is no significant difference in the mean response of cassava farmers and extension agents in the perceived ministem multiplication stem selection skills need for improved production.

Table 2: Independent t-test Analysis showing difference in the mean response of cassava farmers and extension agents on the perceived ministem multiplication stem selection skills need

Categories	N	$\bar{X}$	SD	Df	t-cal	t-crit.	Decision
Extension Agents	70	3.98	.287				
				426	-.71	1.97	Not significant
Cassava Farmers	358	4.01	.265				

(Source: Field Survey, 2024)

Data analysis in Table 2 revealed that calculated t-value (-.71) was less than the critical t-value (1.97) at 0.05 level of significance, therefore the null hypothesis was retained. Hence, there was no significant difference in the mean response between the cassava farmers and extension agents in ministem multiplication stem selection skills need for improved production.

Research Question 2: What are the perceived ministem cutting multiplications tool handling skills need of cassava farmers for improved production?

Table 3: Required - Need Gap Analysis of Mean rating showing perceived ministem cutting tool handling skills need of cassava farmers for improved production

SN	Tool Handling Skill Need	Xr	Xn	RNG xr-xn	Remarks
1	Skills in cutting ministem according to desired number of nodes	4.57	3.02	1.55	Skill Needed
2	Skills in avoiding bruising the cassava stem	4.47	3.03	1.44	Skill Needed
3	Skills in cutting stem according to recommended weight	3.50	2.95	0.55	Skill Needed
4	Skills in positioning stem properly for cutting	4.02	3.06	0.96	Skill Needed
5	Skills in cutting stem with the use of sharp tool (knives)	3.51	2.94	0.57	Skill Needed
6	Skills in avoiding damage to auxiliary buds	4.49	2.93	1.56	Skill Needed
7	Skills in cutting stem according to recommended diameter	2.93	3.07	-0.14	Skill not Needed
	Grand Mean	**3.93**	**3**	**0.93**	**Skill Needed**

N = 428, Xn= Mean of Needed, Xr= Mean of Required, RNG = Required Need Gap Value
(Source: Field Survey, 2024)

Data in Table 4.1.3 revealed that six out of seven skills for ministem cutting multiplications tool handling skills were needed by cassava farmers for improved production and they have their required - need gap ranging from 0.55 to 1.57 and showed positive. The implication is that skills from item 1- 6 were needed while skills in item 7 with required- need gap of -0.14 was not needed. Since farmers indicate the need for ministem cutting multiplications tool handling skills, it is difficult to ignore during extension training without creating a gap. Generally, the overall mean of required minus needed responses is 0.93 and was positive. Therefore, cassava farmers need skills in all identified ministem cutting multiplications tool handling skills for improved production in Akwa Ibom State.

Research Hypothesis 2: There is no significant difference in the mean response of cassava farmers and extension agents in the perceived ministem cutting multiplication tools handling skills need for improved production.

Table 4: Independent t-test Analysis showing difference in the mean response of cassava farmers and extension agents on the perceived ministem cutting multiplication tools handling skills need for improved production

Categories	N	$\overline{X}$	SD	Df	t-cal	t-crit.	Decision
Extension Agent	70	3.97	.267				
				426	1.3	1.97	Not significant
Farmers	358	3.93	.224				

(Source: Field Survey, 2024)

Data analysis in Table 4 revealed that calculated t-value (1.3) was less than the critical t-value (1.97) at 0.05 level of significance, therefore the null hypothesis was retained. Hence, there was no significant difference in the mean response between the cassava farmers and extension agents in ministem cutting multiplication tools handling skills need for improved production.

Discussion of Findings

Ministem Multiplication Stem Selection Skills Need of Cassava Farmers

Findings of the study showed that ministem multiplication stem selection skills were needed by cassava farmers for improved production in AkwaIbom State. Findings also revealed that, there was no significant difference in the mean responses of cassava farmers and extension agents in ministem multiplication stem selection skills need for improved production in Akwa Ibom State. The findings agreed with the findings of Ime *et al.* (2023) on ministem pre-planting skills need using blendspace technology for rapid cutting multiplication instruction which showed that farmers moderately needed blendspace skills in sourcing and selecting improved stem varieties with better yield (mean of 2.7); selecting healthy stem, pest and disease free stem (mean 2.88) for successful ministem poduction in Akwa Ibom.

The findings also conform to the finding of Akwagiobe *et al*. (2022) who conducted a study on operational skills required by youth in cassava production for enhancing food security in Northern agro-ecological zone of Cross River State and found out that youths required operational training on planting operations such as: to select improved variety of cassava, identify sources of sale of improved variety of cassava stems, procure the stems from registered cassava farms etc in the farm in order to improve in cassava production to ensure food security. They maintained that farmers who possess such skills are bound to select good quality varieties best for-consumption and massive production of stem cutting that would lead to food security. Therefore a careful selection of cassava stem is a rudimental requirement for selection of healthy and vigorous cassava stem for improved production cassava cuttings.

Ministem Multiplication Tools Handling Requirement Skills Need of Cassava Farmers

Findings also showed that ministem multiplication tools handling skills were needed by cassava farmers for improved production. The corresponding hypothesis test showed that there was no significant difference in the mean responses of cassava farmers and extension agents in ministem cutting multiplication tools handling skills need for improved production in AkwaIbom State. The findings agreed with the findings of Ime *et al.* (2023) on ministem pre-planting skills need using blendspace technology for rapid cutting multiplication instruction. Their study showed that farmers highly needed blendspace skills in cutting cassava stem into 2-3 nodes (mean of 3.66) and cutting cassava stem to avoid bruises (mean 3.66) for successful ministem cutting in Akwa Ibom. In general, Schoffel *et al.* (2022) observed in their study that at planting seasons, stem cuttings with a diameter lower than 20 mm had higher sprouting index (46.60%) in relation to those with diameter higher than 20 mm (41.37%). This implies that vigorous varieties produce more stems than non-vigorous ones.

Findings of the present study points to the fact that cassava farmers are not aware of these techniques as such do not have adequate skills in tool handling requirement needed for the production of ministem multiplication which made them shy away from total utilization of the technology. As such both cassava farmers and extension workers agreed that skills in tool handling requirement of ministem multiplication were needed for availability of planting materials which will further give room to improve cassava production for sustainable food security.

Recommendations

Based on the findings of this study it is recommended that:

i. Extension agents should train and retrain farmers on basic skills in selecting healthy, matured and improve cassava stems from the field for usage in ministem production to ensure quality cassava stem for multiplication.
ii. Extension agents should organize a workshop to educate cassava farmers on various tool handling requirements to encourage the acquisition of relevant knowledge before usage to prevent waste of planting material.

Conclusion

Propagation of cassava is undertaken vegetatively, through pieces of the stems which are commonly known as stem cuttings. Vigorous shoot development is important for the production and accumulation of the reserves used at the beginning of plant growth, so, the selection of quality stem for ministem cuttings is therefore essential for increased cassava stem. This study agreed that it is only when high productive cassava cultivars are made available through appropriate selection strategy and cultivated that the food needs could be met and surplus available for feeding livestock. The size of the mini cuttings depend on the distance between the buds. Tools like a manual saw, shears, secateurs, machetes and knife must be sharp to ensure that cut ends are clean and care must be taken to avoid harming the buds. The study

concluded that matured stem cuttings with adequate physiological conditions for planting are desirable attributes that boost stem availability for improved cassava production.

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