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SOURCES AND PREFERENCE DIFFERENTIALS FOR CASSAVA SEED AMONG SMALLHOLDER FARMERS IN OBINGWA LGA, ABIA STATE, NIGERIA

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Abstract
This study examined various sources and preferences for cassava seed among smallholder farmers in Obingwa Local Government Area (LGA) in Aba Agricultural Zone, Abia State, Nigeria. This study utilized primary data from cassava farmers and a well-structured questionnaire to elicit information. A multi-stage sampling procedure was adopted for the study; two communities and two villages from each of the selected communities were purposively selected in the area for the study based on intensity of cassava production. Fifteen (15) cassava farmers were randomly selected from each of the selected villages, giving a total number of Sixty (60) respondents for detailed study. Simple descriptive statistics were used to analyze the data. Rsults show that many (58.3%) of the respondents were females, still in their productive years (75%), married (63.3%), attained formal education (88.3%), with small household sizes (58.3%). Many (61.7%) of the respondents used both Family labour and hired labour, with long years of farming experience (96.7%) and small farm sizes (55%) and used their personal/inherited land for cassava production (41.5%) Results show that majority (71.7%) planted improved varieties, intercropped (61.1%), sourced for improved varieties (62.5%), indicated termites/pest infestation as their major reason for seed replacement in the study area (52.2%), process their roots (60.8%), and specifically processed into gari (73.9%). The study therefore, recommends for policies to reduce the cost of improved cassava seeds, thereby making it available to the farmers and at affordable prices. Also awareness creation and distribution of improved cassava seeds should be prompt and on time. Farmers should be empowered to go into improved cassava seed production as a business for income generation, and availability to other farmers.

Keywords: Sources, Preferences, Cassava varieties, and farmers

Introduction

Cassava is a major staple food in the developing world, providing a basic diet for over half a billion people (Clifton and Keogh, 2016). Cassava is well-known for its ability to produce reasonable yields on marginal soils, in areas with low or erratic rainfall, and without agrochemicals and other external inputs. These 'hardy' traits have made cassava highly suitable for low-input, small-scale agriculture, while its inherent potentials have placed it among the crops most suitable for resource-poor farmers in the tropics under 21st-century climate change scenarios (Magsasaka, 2016). Many countries in West Africa have witnessed greater attention being given by different actors to the promotion of cassava as an industrial crop with the objectives of diversifying farmers' incomes, enhancing foreign exchange earnings, and increasing employment opportunities (Sanni *et al.,* 2009). According to Food Agriculture Organization statistics (FAOSTAT 2015), the world cassava production rose above 263 million tons in 2013; a 27% increase in production during the last 10 years. From these, Asia contributed 33.5% (88.2 million tons), Africa 54.8% (144.2 million), and the Americas 11.6% (30.5 million tons). Among these three regions, Asia holds the highest average yield per hectare at 21.1 tons; this however is still far from its yield potential. The second is America with an average yield of 12.3 tons per hectare, while Africa places third with an average yield of 8.3 tons per hectare. Africa produce more than 50% of the world's cassava but uses it primarily as a staple food. Besides having cheaper human labor costs, Asia set up the growing production trend by adopting high-yielding, high-starch cassava varieties, and better agronomic practices for fertilization, and soil protection that led to very competitive production costs and higher per-capita consumption in the region.

The full yield potential of cassava will not be realized until some critical production constraints are mitigated. These include the use of higher-yielding, well-adapted varieties. For example, cassava is susceptible to waterlogging, low temperatures at high elevations, and

a wide spectrum of mutable pests and diseases that can have deleterious effect on yields yields (Chavarriaga-Aguirre *et al.*, 2016). With its growing importance worldwide, the demand for cassava has been on the increase in Africa, new varieties are needed to accommodate cultivation of the dry savannah, semi-arid and subtropical zones since the shift towards market-oriented production has long been accelerating. The use of high-quality planting materials that maintain genetic purity, and are free of diseases and pathogens is crucial in cassava production. However, being a vegetatively propagated crop, diseases and pests can build up over several generations of propagation, a problem that is negligible with botanic seeds. Also, cassava stem cuttings are perishable, bulky, and cumbersome to transport, and require considerable storage space.

To increase the efficiency of cassava seed production and mitigate these constraints, the International Institute of Tropical Agriculture(IITA), and National Root Crops Research Institute (NRCRI), Umudike developed a rapid multiplication technology, which involves cutting cassava stems into stakes with 2 or 3 nodes, rather than the usual 5 to 7. With efficient field management, cassava stems can be harvested twice anyear, at 6 and 12 months after planting, yielding around 50 times morenstems than were used for planting (FAO, 2013). The production of cassava is dominated by smallholder farmers with an average farm size of 0.5 Hectares. Over 90% of these farmers use the informal seed system by recycling stems from the previous harvest. Less than 5% buy new stem cuttings, leading to poor yields (Sahel, 2016). These issues hinder the production of quality cassava roots that are of interest to end-users, particularly industrial processors. Improving access to quality seeds, and transiting from subsistence to commercial production requires an integrated seed system, where certified cassava stems are available, and accessible from formal (Seed Companies, NGOs, and Research Institutes) and informal (Village Seed Entrepreneurs) sources. Sahel Capital has been at the forefront of initiatives based on integrated seed systems, in collaboration with the CGIAR research program on Roots, Tubers, and Bananas (RTBs), National Agricultural Seed Council (NASC), National Root Crops Research Institute (NRCRI), International Institute of Tropical Agriculture (IITA), Catholic Relief Services (CRS), Context Global Development, and FERA (UK). The consortium is pioneering a processor-led model of the cassava seed system in Nigeria through the BASICS Project.

Between 1970 and 2010, 65 improved varieties were released in Nigeria (Alene *et al.,* 2015). From the beginning of that period, large-scale interventions, such as the World Bank's support of the Agricultural Development Project and the International Fund for Agricultural Development's (IFAD) grants, supported the distribution of planting material of these improved varieties (Oparinde *et al*., 2016). Recent studies on the adoption of improved cassava varieties and released landraces in Nigeria identified adoption rates of 46–60% (Alene *et al*., 2015; Tahirou *et al*., 2015; Wossen *et al*., 2017). However, the reported uptake rates vary considerably among studies and different regions in Nigeria. For example, Wossen *et al*. (2017) identified adoption rates of 79% in the South-West region compared with 31% in the South-East. Several studies recognize the difficulty in correctly identifying and distinguishing cassava varieties by farmers and formal seed experts, resulting in different estimates of adoption rates (Oparinde *et al*., 2016; Tahirou *et al*., 2015; Wossen *et al*., 2017).

In Nigeria, multiplication, distribution, and adoption of improved varieties have increased significantly in recent years, thus putting Nigeria in the current position of the largest producer of cassava in the world (Udensi *et al.*, 2011). More so, certain socio-economic factors affecting production relate to inadequate resource allocation, poor infrastructure, and extension services. The complexity of seed systems; including its formal and informal actors, and prevailing practices of farmers in multiplying and sourcing seed need to be understood to achieve a larger impact of formal seed interventions (Almekinders *et al*., 2019). Especially for RTB crops, where the market for planting material is still limited. It is key to understand farmers' demand for clean planting material and more productive, nutrient-rich varieties. This study, therefore, seeks to assess the sources and preferences of cassava seed among smallholder farmers in Obingwa LGA, Abia State, Nigeria. The specific objectives of the study are to identify Cassava Seed sources used and preferences for cassava varieties by the respondents in the study area and identify constraints militating against cassava seed sourcing in the study area.

Methodology

Study area

The study was carried out in Obingwa LGA of Abia State in 2018. Obingwa is one of the LGAs under Aba Agricultural Zone, with heavy rainfall of about 2000mm/year, located between latitude 50°4′ and 60°12′N of the equator, and longitude 50°25′ and 70°30′ of the Greenwich meridian and covers an area of 395km^2, with a population of over 181,439 people (NPC, 2006). Obingwa LGA is bordered to the east and south by Akwa-Ibom State, to the north by Isiala-Ngwa South, and the west by Osisioma-Ngwa LGAs. This zone favors the production of root and tuber crops, and lies within the riverine parts of the state.

Sampling

This study utilized primary data from cassava farmers with the use of a well-structured questionnaire. Both purposive and random (multi-stage) sampling techniques were used in the selection of respondents. The random sampling method ensures a high degree of representation by providing the elements with equal chances of being selected as part of the sample. In the first stage, two communities with high intensity of cassava and seed production were purposively selected in the area for the study. The second stage was the

random selection of two (2) villages from each of the selected communities. Lastly, fifteen (15) cassava farmers were randomly selected from each of the selected villages, giving a total number of Sixty(60) respondents. Descriptive statistics such as frequency, percentage, mean, etc were used to analyze the data from the study.

Results and Discussion

Socio-economic characteristics of the respondents

Table 1 shows the frequency distribution of respondents according to sex, age, marital status, household size, education, type of labour used, farming experience, farm size, and land acquisition. Results show that many (58.3%) respondents were females, while 41.7% were males. This implies that women constitute a greater percentage of those involved in cassava production in the study area. About 50% of the farmers who form the majority in the study area were within the age range of 40-59 years, 25% between 39 years old and below, 25% were aged 60 and above. This implies that the majority of farmers are still strong and active. The younger farmers are likely to be more active in farming, and also more receptive to innovations in cassava production than their aged counterparts. (Omoregbee and Banmeke 2014). The result further shows that majority of the farmers (63.3%) were married, single (10%), and widowed (26.7%), indicating that married people dominate in cassava activities, implying better management decisions are expected to be made by these farmers. The result also indicates that the many (58.3%) farmers had a household size of 5 persons and below, followed by 33.3% with 6 to 10 persons, and 8.3% with 11 and above. About 30% of the farmers attained tertiary, secondary (36.6%), and primary (21.7%) levels of education, while only 11.7% had no formal education. The implication of this outcome is that a greater proportion of the respondents attained formal education. Educated farmers are expected to be more receptive to improved farming techniques (Okoye *et al*., 2004). Only 3.3% had less than and 5 years of farming experience, while most (96.7%) had more than 5 years. This indicates the practical skill and knowledge the respondents must have acquired for cassava farming in the area. Farmers are therefore described as experienced and are expected to have higher efficiency. Nwaru (1993) reported that farmers count more on their experience than educational attainment to increase their productivity. The result also indicates that the majority (61.7%) utilized both household and hired labour in their farming activities, 30% used only household labour, while only 8.3% utilized hired labour. However, 45% of the farmers cultivated 1 or less than one hectare of land for cassava production, 43.3% cultivated between 1.1-3ha, 8.4% between 3.1-5ha, while only 3.3% cultivated above 5ha in the study area. This implies that they are small holder farmers. About Many (41.5%) respondents used their inherited/personal land for cassava farming, while 30.5% and 24.7% purchased and hired land respectively for cassava production in the study area.

Table 1: Socio-Economic Characteristics of the Respondents

Variables	Frequency	Percentage	Mean
Sex			
Male	25	41.7	
Female	35	58.3	
Total	60	100	
Age (Yrs)			
≥ 29	2	3.3	
30-39	13	21.7	48.7
40-49	21	35	
50-59	9	15	
≤60	15	25	
Total	60	100	
Marital Status			
Single	6	10	
Married	38	63.3	
Widowed	16	26.7	
Total	60	100	
Household Size			
≤5	35	58.3	
6-10	20	33.3	
≥11	5	8.4	
Total	60	100	
Educational Background			
No Formal Education.	7	11.7	
Primary Education	13	21.7	
Secondary Education.	22	36.6	
Tertiary Education.	18	30	
Total	60	100	
Labour Used			
Household labour	18	30	
Hired Labour	5	8.3	
Both	37	61.7	
Total	60	100	
Farming Experience			
≤5	2	**3**.3	
6-10	11	18.3	18.47
11-15	9	15	
16-20	17	28.4	
≥20	21	35	
Total	60	100	
Farm Size (Ha)			
≤1ha	27	45	
1.1-3ha	26	43.3	
3.1-5ha	5	8.4	
≥6ha	2	3.3	
Total	60	100	
Land Acquisition			
Inherited	24.8	41.5	
Gift	0	0	
Purchase	18.3	30.5	
Mortgage	2	3.3	
Hire	14.9	24.7	
Total	60	100	

Source: Field survey, 2018

Awareness of improved Cassava Varieties

The result in Fig. 1 shows that majority (76.7%) of the respondents are aware of improved cassava varieties while 23.3% were not aware. In four decades of work on cassava genetic improvement, IITA and NRCRI has produced more than 400 improved varieties with traits such as resistance to cassava mosaic disease (CMD), bacterial blight and green spider mites. The varieties have been released throughout sub-Saharan Africa, and are estimated to have doubled cassava yields in some countries. In the absence of a national cassava seed system, cassava development programmes in a number of African countries have used a 3-tier community-based system of rapid multiplication to supply farmers with improved, healthy planting material (FAO, 2013).

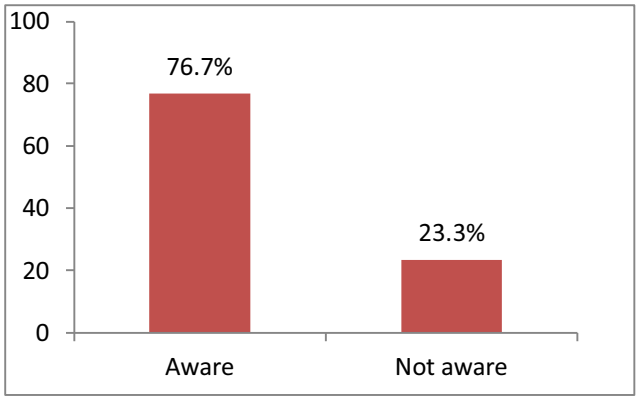

Fig.1: Awareness of improved vari eties

Distribution of Crops Planted by the Respondents

Across the agricultural zone and the communities in Obingwa LGA, Abia State, farmers predominantly produce Cassava, Yam, Cocoyam, Vegetables, Okro, Maize etc, The result in Fig. 2 shows that many (25%) of the Farmers planted Cassava in their farms, Yam (21.6%), Cocoyam (18.3%), Maize (11.7%), Vegetables, Okro and Pepper (6.7% each), while the least was melon (3.3%).

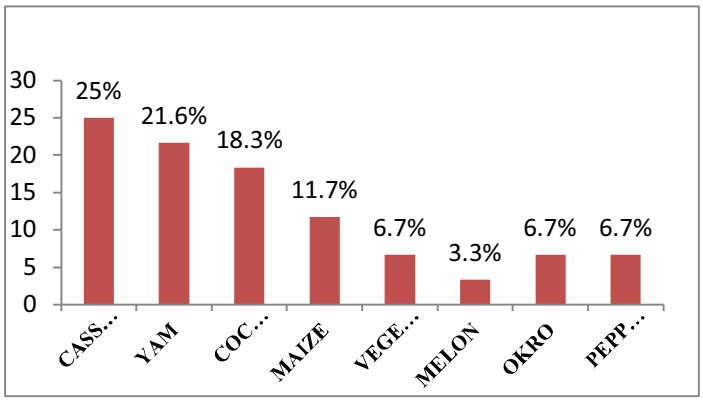

Fig. 2: Crops planted by the Farmers

The distribution of Cassava varieties planted as shown in Table 2 indicates that majority (71.7%) of the farmers used improved cassava varieties during the planting season, while 28.3% used only local varieties. The result also shows that 28.8% planted TMEB 419. Other varieties planted include: NR 8080 (13%), TMS 30572 (13.8%), Yellow root (14.9%), TMS 0505 (5%) and local varieties (25%). The general trend here was that most of the farmers in the study area were still growing the same local varieties. However, significant progress had been made in replacing these local varieties with improved varieties. The survey results in Table 2 also show that majority (64.7%) of the land area for farming was used in planting improved cassava varieties, while the remaining 35.3% was used for local varieties. About 61.2% of the respondents practiced intercrop, while 35.4% practiced mono-crop system of farming.

Table 2: Details of Cassava Varieties Planted

Variables	Frequency(N)	Percentage (%)
Cassava Varieties Planted		
Improved varieties	43	71.7
Local varieties	17	28.3
Both	60	100
Name of Varieties Planted		
TMEB 419	17.3	28.8
NR 8082	7.8	13
TMS 30572	8.3	13.8
Yellow Root	8.6	14.3
TMS 0505	3	5
Local Varieties	15	25
Land Area		
Improved Varieties	38.8	64.7
Local Varieties	21.2	35.3
Cropping Practice		
Intercrop	36.7	61.2
Pure Stand (Monocropping)	23.3	38.8
Total	**60**	**100**

Source: Field survey, 2018

Results show that 40 Farmers out of 60 across the study area use cassava seeds from different sources in a single season. The dominant source of seeds was the farmers' fields (32.5%). Off-farm seed sourced (Table 3) show 14.9% from relatives, and 8.7% from friends and traders each. Others were 13.2% from fellow farmers, 22% from the government/ADP (second important source of seed in the study area). Data on the cassava varieties sourced shows that local varieties were the most sourced (26.3%), followed by TMEB 419 (23.7%), Yellow root (12.7%), NR 8082 (13.6%), TMS 30572 (14.7%), while the least variety sourced was TMS 0505 at (10%).The analysis on the types of cassava seed sourced shows that majority of the farmers sourced improved varieties (62.5%) more than the local varieties (37.5%), reflecting a higher intensity of use of improved varieties over the local varieties by the farmers in the study area. Furthermore, the result on the quantity of seed sourced by the farmers show that many (36.8%) farmers sourced 10 bundles and below, 13.9% sourced between 11-20 bundles, 134.2% 21-30 bundles, while 16.2 sourced between 31 bundles and above in the study area. The result also indicated that the average price per bundle of Cassava seed sourced is N750 per bundle.

Tables 3: Details of Cassava Seeds Sources

Sources of Cassava Seed	Frequency	percentage
Own farm	13	32.5
Relatives	5.9	14.8
Friends	3.5	8.7
Fellow farmers	5.3	13.2
Traders	3.5	8.7
Government/ADP	8.8	22
Varieties Sourced		
TME 419	14.2	23.7
NR 8082	8.2	13.6
TMS 30572	8.5	14.7
Yellow root	7.3	12.7
TMS 0505	6	10
Local Varieties	15.8	26.3
Types of Cassava Seed Sourced		
Improved varieties	25	62.5
Local varieties	15	37.5
Quantity of Seeds Sourced (bundles)		
≥10	14.8	37
11-20	6	15
21-30	12.7	31.7
31-40	2	5
41 and above	4.5	11.2
Total	40.0	100.0

Source: Field survey, 2018
Price per bundle=N750

Majority of the farmers sourced cassava seeds outside (off-farm) for the following reasons Table 4): access to good/improved varieties (41.66%) which was most important, followed by inadequate cassava seed (28.3%), high yielding seed (6.7%), and theft (5%). The least was stem dryness during storage (1.67%).

Table 4: Why Source for Cassava Seeds

Reasons for sourcing of Cassava seed	Frequency	Percentage
Stem dryness during storage	1	1.7
Access to good/improved varieties	25	41.7
Inadequate cassava seed	17	28.3
High yielding seed	4	6.7
Due to theft	3	5

Source: Field survey, 2018

The result in Table 6 shows the constraints militating against Cassava seed sourcing in the study area. The result indicates that the high cost of transportation ranked the highest (31.6%), followed by poor road network (25%), high cost of improved varieties and lack of access to improved varieties (10% each). Others are lack supply of cassava seeds and far distance to the farm (6.7%), while low sprouting of the stems and bad weather conditions ranked the least (5% each) in the study area.

Table 6: Constraints militating against Sourcing of Cassava Seeds

Variables	Frequency	Percentage	Rank
Poor road network/bad road network	19	31.6	1
High cost of improved varieties	15	25	2
High cost of improved varieties	6	10	3
Lack of access to improved varieties	6	10	3
Lack supply of cassava seeds	4	6.7	4
Far distance to the farm	4	6.7	4
Low sprouting of stems	3	5	5
Bad weather	3	5	5

Source: Field survey, 2018

The result in Table 7 for preferences for cassava products shows that majority (73.9%) of the farmers process their cassava into *gari*, while only 13% process their roots into *fufu*, *abacha* (8.8%), and starch (4.3%).

Table 7:Preferences for cassava Products

Variables	Frequency	Percentage
Preferences for Cassava Products:		
Gari	44.3	73.9
Fufu	7.8	13
Abacha	5.3	8.8
Starch	2.6	4.3
Total	**60**	**100**

Source: Field survey, 2018

Conclusion

The study examined the sources and preferences of cassava seed among smallholder farmers in Obingwa LGA, Abia State, Nigeria. The results of the study show that the Cassava farmers who participated in the study were married, strong and active, educated, experienced, with small household sizes. They are mainly small holder farmers, and cultivates more of inherited land. Majority of the farmers planted improved varieties like TMEB 419, NR 8082, TMS 30572, yellow roots, and TMS 0505, and sourced these improved varieties mainly from their farm and ADPs. Important constraints militating against seed sourcing were poor road networs and high cost of improved varieties. There is need therefore, for cassava seed producers to reduce the cost of improved cassava seeds thereby making it available to the farmers and at affordable prices and farm roads should be rehabilitated to give the farmer's accessible road network for easy transportation of cassava and other food crops from the farm. Also awareness creation and distribution of improved cassava seeds should be prompt and on time. Farmers should be empowered to go into improved cassava seed production as a business for income generation and availability to the farmers. Advocacy on profitability of improved cassava seed production in the study area should be advocated and intensified.

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