ANALYSIS OF AGRO-BIOFORTIFIED CASSAVA INFORMATION NEEDS OF CASSAVA FARMERS IN AKINYELE LOCAL GOVERNMENT AREA OF OYO STATE, NIGERIA

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ABSTRACT
The main objective of this study was to analyse the agro-biofortified information needs of cassava farmers in Oyo state, Nigeria. Data was collected from 80 respondents using a structured questionnaire to obtain information about their socioeconomic characteristics, awareness about bio-fortified cassava, source of information, information needs, challenges and perception about bio-fortified cassava. The data collected was analysed using descriptive statistics (frequency and percentage) and inferential statistics (Chi-square) to test the hypothesis. The study revealed that 87.5% of the respondents were male while only 12.5% were female and they have formal education. Majority (93.8%) of the respondents are aware of bio-fortified cassava. It shows also that the major source of the respondent's information on bio-fortified cassava were from Extension agent and radio with 32.0% and 30.7% respectively. The study further revealed extension agents visited 90.0% of the respondents and that 87.5% of the visited respondents received information about bio-fortified cassava from the extension agents. Results show that all the respondents (100%) had the challenge of inadequate funds and 84.0% had challenge of inadequate processing facilities. The study further revealed that most of the respondents (84.0%) strongly agree that bio-fortified cassava had nutritional benefits compared with white cassava while only few (5.30%) agree that the processing is time consuming/stressful. The Chi square analysis shows that there is no significant relationship between respondent's socio economic characteristics and their awareness of bio-fortified cassava. Hence, the study recommends that extension agents should continue to reach out to the farmers especially through the radio in disseminating information about bio-fortified cassava.
Keywords: Biofortified, needs, information, cassava farmers

INTRODUCTION

According to United Nation Economic Commission for Africa (ECA, 2007), about 70% of Africans and roughly 80% of the continent's poor live in rural areas and depends on agriculture for their livelihood. Cassava is the third-largest source of food carbohydrates in the tropics, after rice and maize (Fauquet and Fargette, 1990). It is one of the most drought-tolerant crops, capable of growing on marginal soils. Nigeria is the world's largest producer of cassava, while Thailand is the largest exporter of dried cassava. Cassava is classified as either sweet or bitter. Like other roots and tubers, both bitter and sweet varieties of cassava contain anti-nutritional factors and toxins, with the bitter varieties containing much larger amounts Food and Agriculture Organisation of the United Nations (FAO, 1990).

Bio-fortified cassava have high yields and are resistant to many pests and diseases. Like ordinary cassava, it does not need nutrient rich soils or extensive land preparation and does not suffer during droughts (Consortium, 2012). Bio-fortified yellow cassava has great potential to alleviate vitamin A deficiency complementary to other interventions such as vitamin A supplementation and fortification (Bouis *et al*., 2011). Vitamin A deficiency prevails in sub-Saharan Africa despite national supplementation and food fortification programs, and 30% of preschool children in developing countries have vitamin A deficiency (United Nations System Standing Committee on Nutrition (UNSSCN, 2010).Vitamin A supplementation in preschool children reduces all-cause mortality by 24% (Mayo-Wilson *et al*., 2011). Considering the high prevalence of vitamin A deficiency, even small increases in the supply of vitamin A through bio-fortified crops are likely to result in major public health gains.

Crop production is an intricate enterprise that requires vast knowledge about the Agronomy, environmental interactions, and the application of available technology to achieve food production. Most of the food crop farmers lack information on the improved technologies hence stick to traditionally preferred methods which are not economically efficient but have prominent aromatic and palatability characteristics. Ozowa (1995), stated that the vital role played by scientific and technical information for agricultural and industrial development in developing countries is still neglected and accorded a lower status compared to other sectors. Ferris (2005), argues that in most African countries lack of accurate and relevant agricultural information by small- scale farmers is a major factor constraining efforts to improve the agriculture sector.

Babu *et al*. (2011), had stated that a better understanding of farmers' agricultural information needs and information sources could help guide extension and other agricultural programs to better target specific groups of farmers. Information is an important factor in the sustained development of any society because it reduces uncertainty and

broadens the scope of options to take in solving problems. There may be government programs, even availability of international aid but without information going round, people will not know about it. Information distribution is a key to eradicating poverty and hunger. The inability of the rural food crop farmers' information needs to be met may result in poor production output, food insecurity, inability to feed the nation. In agriculture, the role of information in enhancing agricultural development cannot be over emphasized. There therefore a need to know the information needs of cassava framers in the study area about bio-fortified cassava.

The general objective of the study is to assess the agro-biotechnological information needs of cassava farmers in Akinyele Local Government Area of Oyo state, Nigeria. The specific objectives were to;

1. determine the farmers' level of awareness of bio-fortified cassava;
2. determine extension agents' roles about bio-fortified cassava nad
3. examine the challenges faced growing bio-fortified cassava and

METHODOLOGY

This study was carried out in Akinyele local government area of Oyo state. Ọyọ, usually referred to as Oyo State to distinguish it from the city of Oyo, is an inland state in south-western Nigeria, with its capital at Ibadan. It is bounded in the north by Kwara State, in the east by Osun State, in the south by Ogun State and in the west partly by Ogun State and partly by the Republic of Benin. It was formed in 1976 from Western State, and included Ọsun State, which was split off in 1991. The climate in the state favours the cultivation of crops like maize, yam, cassava, millet, rice, plantains, cocoa, palm produce, cashew etc. There are a number of government farm settlements in Ipapo, Ilora, Eruwa, Ogbomosho, Iresaadu, Ijaiye, Akufo and Lalupon. There is abundance of clay, kaolin and aquamarine. There are also vast cattle ranches at Saki, Fasola and Ibadan, a dairy farm at Monatan in Ibadan and the state wide Oyo State Agricultural Development Programme with headquarters at Saki. A number of international and federal agricultural establishments are located in the state.

A multistage random sampling technique was used to select the respondents for this study. The first stage involved a random selection of one Local Government Area in the state. The second stage was a random selection of four (4) villages from the local government area. The third stage was a random selection of twenty (20) respondents (Cassava farmers) from each of the selected villages. Using this procedure, 80 respondents were selected and used for the study. A structured questionnaire was used to collect data from the respondents. The data collected were analysed using descriptive statistics (Frequency table, percentages, charts and mean) and inferential statistics (Chi square).

RESULTS AND DISCUSSION

Socioeconomic characteristics

The study showed that more than half (58.8%) of the respondents were within the age bracket of 45-64years with the mean age of 55. About 87.5% of the farmers were male while 12.5% were female which implies that there are more males involved in cassava production than females. Though, cassava production is male dominated, Chris (2001) asserted that women and children play the central roles of harvesting, processing and marketing activities in cassava production in many parts of Africa. Many respondents (27.5%) in the study had attained primary education level. This was followed by those who had attained secondary education level (25.0%), then those who had not attained any formal education (17.5%) and those who had attained tertiary education (1.3%). This implies that majority of the cassava farmers had formal education. Their level of education affects information accessibility, comprehension and adoption of new agricultural innovations and practices (Aina and Dulle, 1999). Well educated farmers can easily access information from various sources, and can be able to create knowledge out of those sources.

Majority (78.8%) of the respondents belong to a family of between 1-9 while 21.3% fall between the 10-18 family sizes. This implies that majority (78.8%) of the respondents have a household with about 1-9 members. The results of this study are in line with that of Ebewore *et al.,* (2013) who reported that majority (70%) of his respondents had family size of between 6-10 persons. Large households provide ready sources of labour on the farm. About 43.8% of the farmers operate a small farm size, 50% operate a medium farm size while only 6.3% of the farmers operate a large farm size. This means that respondents were mainly medium and small-scale farmers. About 36.3% falls within the range of 5-24 years, 48.8% falls within the range of 25-44 years and 15.0% falls within the range of 45-60 years, this implies that majority of the respondents are more experienced in farming. The number of years a farmer spent in the farming business according to Nwaru (2004), could give an indication of the practical knowledge he or she had acquired on how he or she could overcome certain inherent problems.

Table1: Socioeconomic characteristics of respondents

Socio economic characteristics	Frequency	Percentage (%)
Age range		
25-44 years	16	20.0
45-64 years	47	58.8
65-79 years	17	21.3
Total	80	100.0
Sex		
Male	70	87.5
Female	10	12.5
Total	80	100.0
Marital status		
Single	5	6.3
Married	72	90.0
Widowed	3	3.8
Total	80	100.0
Religion		
Christian	28	35.0
Islam	52	65.0
Total	80	100.0
Level of education		
No formal education	14	17.5
Primary school attempted	12	15.0
Primary school completed	22	27.5
Secondary school attempted	11	13.8
Secondary school completed	20	25.0
Tertiary education	1	1.3
Total	80	100.0
Household size		
1-9	63	78.8
10-18	17	21.3
Total	80	100.0
Farm size		
Small farm size	35	43.8
Medium farm size	40	50
Large farm size	5	6.3
Total	80	100.0
Years of farm experience		
5-24	29	36.3
25-44	39	48.8
45-60	12	15.0
Total	80	100.0

Source: Field Survey, 2017

Awareness about bio-fortified cassava

From Figure 1, the study shows that about 93.8% were aware of bio-fortified cassava while only 6.3% were not aware. This implies that most of the respondents in the study area were aware of bio-fortified cassava which is in contrast with the finding of Opeyemi *et.al* (2017) which says that the low level of awareness about bio-fortified cassava in Oyo state might be the cause of its low adoption.

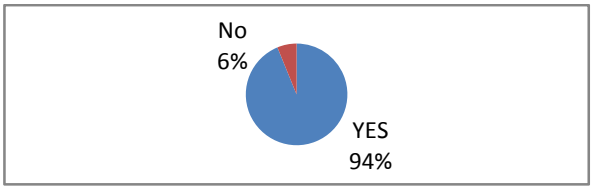

Figure 1: Awareness of respondents
Source: Field Survey, 2017

Source of information about bio-fortified cassava

Figure 2 shows that 32.0% of the respondents got information about bio-fortified cassava from extension agents, 30.7% get from listening to radio, 18.7% from research institute and only 8.0% from television. However, none of the respondents got information through internet and library in the study area. This implies that the respondents prefer interpersonal methods in receiving information, this probably because with interpersonal method farmers can easily share their experiences with each other, hence improving their production. The finding of this study is in line with what have been reported previously by Mtega and Benard (2013); who has highlighted a few reasons why farmers are reluctant to use advance technology in accessing agricultural information such as internet, and among the reasons were that they do not know the benefits of the advance technology; do not have skills or expertise in using the advance technology; lack of time spent on ICT and difficulties in using ICT.

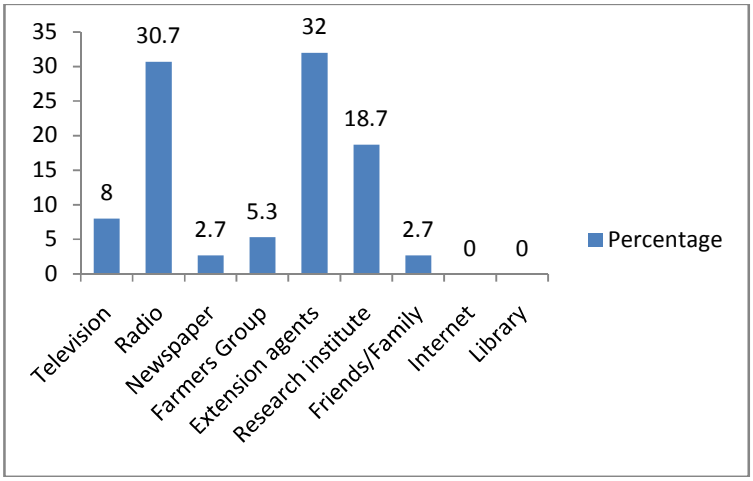

Figure 2: Sources of information about bio-fortified cassava
Source: Field Survey, 2017

Awareness about the characteristics of bio-fortified cassava

Table 2 shows that majority of the respondents are very much aware that bio-fortified cassava produce garri without addition of oil and are least aware that it help reduces measles. Increase micronutrient content is the 2nd in rank of awareness, followed by resistance to cassava pest/disease and fast sales rate both in the 3rd position. Coming 4th in the rank is the awareness about high sales rate, followed by easy to harvest, high yield, reduces night blindness, does not need nutrient rich soil or extensive land preparation, thrives in all weather condition on the 5th, 6th, 7th, 8th and 9th positions respectively. Reduces blindness, planting can be done at any season in the year and product have a longer shelf life are all in the 10th position while reduces child mortality ranked 11thwith awareness about low level of cyanide acid on the 12th position.

Awareness about the Characteristics of Bio-Fortified Cassava

Characteristics of bio-fortified cassava	VMA F (%)	A F (%)	NA F (%)	Mean	Rank
Produces yellow garri without addition of palm oil	73(97.3)	2(2.7)		2.97	1st
Increase micronutrient content	62(82.7)	13(17.3)		2.83	2nd
Resistance to cassava pest and disease	55(73.3)	19(25.3)	1(1.3)	2.72	3rd
Has a sales rate/sells faster	52(69.3)	21(28.0)	2(2.7)	2.67	4th
Easy to harvest	51(68.0)	22(29.3)	2(2.7)	2.65	5th
High yield	50(66.7)	23(30.7)	2(2.7)	2.64	6th
Reduces night blindness	49(65.3)	22(29.3)	4(5.3)	2.60	7th
Does not need nutrient rich soil or extensive land preparation	48(64.0)	23(30.7)	4(5.3)	2.59	8th
Thrives in all weather condition	45(60.0)	25(33.3)	5(6.7)	2.53	9th
Reduces blindness	42(56.0)	22(29.3)	11(14.7)	2.41	10th
Planting can be done at any season in the year	38(50.7)	30(40.0)	7(9.3)	2.41	10th

Characteristics of bio-fortified cassava	VMA F (%)	A F (%)	NA F (%)	Mean	Rank
Product have a longer shelf life	38(50.7)	30(40.0)	7(9.3)	2.41	10th
Reduces child mortality	31(41.3)	28(37.3)	16(21.3)	2.20	11th
Has low level of cyanide acid	21(28.0)	30(40.0)	24(32.0)	1.96	12th
Reduces measles	16(21.3)	26(34.7)	33(44.0)	1.77	13th

VMA= Very Much Aware, A= Aware, NA=Not Aware
Source: Field Survey, 2017

Information Needs of the Respondents

Table 3 shows that the major information needs of the cassava farmers about bio-fortified cassava ranges from Credit facilities and sources (92.0%), Weather information (8.0%), Available market (84.0%), Fertiliser application (70.7%), How to store harvested crops (58.7%), source the stems (40.0%) and Recommended crop spacing (38.7%). The implication of this is that farmers in the study area do not know where they can sell their products to and this can stop them from producing in large quantity. It was also shown that the all the respondents in the study area lacks information about Credit, facilities and source which if available could be used to improve their agricultural productivity.

Table 3: Information Needs of Respondents

Information needs	Yes F (%)	No F (%)	Rank
Credit, facilities and source	69(92.0)	6(8.0)	1st
Weather information	66(88.0)	9(12.0)	2nd
Available market	63(84.0)	12(16.0)	3rd
Fertiliser application	53(70.7)	22(29.3)	4th
How to store harvested crops	44(58.7)	31(41.3)	5th
Source of stem	30(40.0)	45(60.0)	7th
Recommended crop spacing	29(38.7)	46(61.3)	8th
Demonstration on how to plant it	19(25.3)	56(74.7)	9th
Planting method	19(25.3)	56(74.7)	9th
Recommended planting time	18(24.0)	57(76.0)	10th
Weed control	18(24.0)	57(76.0)	10th
Land preparation	10(13.3)	65(86.7)	11th
How and when to harvest	5(6.7)	70(93.3)	12th

Source: Field Survey, 2017

Extension agents' visit and roles about bio-fortified cassava

Result in Figure 3 shows that extension agents visited 90.0% of the respondents while only 10.0% were not visited by extension agents.

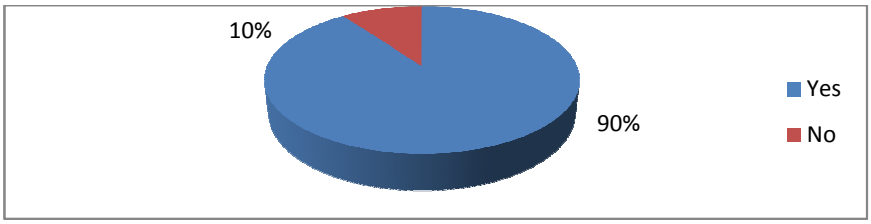

Figure 3: Extension agents' visit
Source: Field Survey, 2017

Extension Agents' Roles about Bio-fortified Cassava

Table 4 shows that 87.5% of the visited respondents received information about bio-fortified cassava from the extension agents. This implies that extension agents visitation to the respondents in the study area is effective and that the respondents benefit greatly from this process. This is in line with the findings of Aderinto *et al.,* (2016) which says that access to government extension agency implies that cassava farmers had opportunities to benefit from productivity enhancing information at little or no cost. About 56.9% were visited on a monthly basis by extension agents, 36.1% were visited fourth nightly while only 1.4% receives weekly visits. This implies that even though respondents in the study area were visited by extension agents, the visitation

were not frequently done as most of the respondents were visited on monthly basis. It also shows that 91.9% of the respondents received awareness about bio-fortified cassava from extension agents; field visitation was performed for 79.0% of the respondents, 77.4% of the respondents received solutions to reported problems encountered while Demonstration as well as Exhibition and display about bio-fortified cassava and products were not made available to 54.8% and 77.4% of the respondents respectively. This implies that there is a poor performance in the area of demonstration, exhibition and display as services rendered by extension agents in the study area.

Table 4: Extension agents' roles about bio-fortified cassava

Extension Agents' Roles	Frequency	Percentage (%)
Disseminate information about bio-fortified cassava	63	87.5
Frequency of extension agents visit		
Weekly	1	1.4
Fourth nightly	26	36.1
Monthly	41	56.9
Quarterly	4	5.6
Create awareness about bio-fortified cassava	57	91.9
Linking to source of supply	38	61.3
Organising group meeting	38	61.3
Field visitation	49	79.0
Demonstration	28	45.2
Lecture on value addition	24	38.7
Exhibition and display of bio-fortified cassava products	14	22.6
Provide solutions to reported problems encountered	48	77.4

Source: Field Survey, 2017

Challenges faced by respondents about bio-fortified cassava

Table 5 shows the challenges the respondents faced in growing bio-fortified cassava. It shows that all the respondents (100%) have the challenge of inadequate funds, 84.0% have challenge of inadequate processing facilities while 80.0% have challenge of inadequate number of extension agents which is in line with what have been found by Aina (2006), which revealed that the ratio of agricultural extension workers to the population in Africa is low. 94.7% and 89.2% of the respondents do not have challenge with language barrier and weeding and disease/pest infestation respectively.

Table 5: Challenges Faced by Respondents about Bio-Fortified Cassava

Challenges	Yes F (%)	No F (%)	Mean Score	Ranking
Inadequate funds	75(100.0)		1.00	1st
Inadequate processing facilities	63(84.0)	12(16.0)	0.84	2nd
Inadequate number of extension agents	60(80.0)	15(20.0)	0.80	3rd
Inadequate planting materials (stems)	56(74.7)	19(25.3)	0.75	4th
Non-availability of in-organic fertiliser	56(74.7)	19(25.3)	0.75	4th
Inadequate storage facilities	45(60.0)	30(40.0)	0.60	5th
Inadequate relevant materials about bio-fortified cassava in offices and libraries	14(32.0)	51(68.0)	0.32	6th
Small farm size	19(25.3)	56(74.7)	0.25	7th
Poor market	19(25.3)	56(74.7)	0.25	7th
Lack of information services	14(18.7)	61(81.3)	0.19	8th
Poor extension contact	13(17.3)	62(82.7)	0.17	9th
No market for product	10(13.3)	65(86.7)	0.13	10th
Weeding and disease/ pest infestation	8(10.8)	66(89.2)	0.11	11th
Lack of awareness of information sources	6(8.0)	69(92.0)	0.08	12th
Language barrier	4(5.3)	71(94.7)	0.05	13th
Information not current/too old	2(2.7)	73(97.3)	0.03	14th

Source: Field Survey, 2017

CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it can be concluded that majority of cassava farmers in the study area are aware of bio-fortified cassava. However, they need information on credit facilities and sources as well as available market for their produce. Although the study revealed that there is effective performance of extension services by extension agents in the study area, there is also the problem of limited number of extension agents. There is a need for government and other institution responsible to make funds available to cassava farmers in the study area as this happens to be their major challenge as showed by this study. The study therefore recommends that:

1. due to the shortage of extension officers, Private organisations should provide assistance in disseminating information about bio-fortified cassava to cassava farmers.
2. government should make funds available for cassava farmers so that they can produce bio-fortified on a large scale which will help deal with food insecurity as well as malnutrition among children.
3. extension agents should visit farmers more frequently and also give information about available market for bio-fortified cassava.

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