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PARTICIPATION AND PERFORMANCE OF ROOT CROPS SCIENTISTS ON CASSAVA RESEARCH AND DEVELOPMENT IN SOUTH EASTERN NIGERIA

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ABSTRACT
The study was conducted among cassava crops research scientists in Abia State Nigeria in order to evaluate their participation and performance in cassava research. The study described the socio economic characteristics of the researchers ascertain their level of participation in different research activities, identify their achievements in cassava technology development and the constraints militating against cassava research in the area. Data for the study were collected by the means of structured questionnaire from sixty two scientists at the National Root Crops Research Institute, Umudike. Data collected were analyzed by means of descriptive statistics such as frequency distribution tables, percentages, means and inferential statistics. The result of the study showed that 64.25% of respondents were young scientists between the age of 31-40 years and 90.32% of them have their M.sc and PhD in Agriculture, 87.09% and 80.65% of respondents were involved in problem identification and research planning activities. Mean $(\bar{x})$ *of 2.74, 2.68 and 2.58 showed high participation of respondents in cassava research activities. The study also showed the researchers agreement to the various technologies developed on cassava by researchers. Mean of 2.0 and above showed an agreement. Hundred(100) percent of the researchers indicated fund as the major constraint to cassava research in the study, followed by lack of motivation by government (96.77%), high cost of research (93.54%) and weed control problem (90.32%). It was recommended that researchers should increase their participation in research activities. Fund and motivational aids should be made available to researchers for a reliable research outcome.*
Keywords: Participatory, Performance, Root/tuber Crops, Scientists, and Cassava.

INTRODUCTION
Cassava is one of the major food crops grown in Nigeria with annual production output of 45 million metric tons; the production has continued to increase in the phase of climate change. 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). Cassava is applicable in many types of products such as foods, confectionery, sweeteners, glues, plywood, textiles, paper, biodegradable products, monosodium glutamate, and drugs. Cassava chips and pellets are used in animal feed and alcohol production and different types of food preparations: gari, fufu, lafun, kpokpogari, tapioca, abacha. The solution to poverty and low returns to the men and women engaged in cassava production and processing is to concentrate on introducing improved varieties, agronomic practices, labour-saving harvesting and processing technologies and finding new industrial uses for cassava (Nweke, F.I, 2005). IITA realized that national cassava research programmes were underfunded and in a state of disarray. IITA took steps to persuade governments of the large cassava producing countries to establish cassava research programmes in the agricultural research system (FAO and IFAD 2005). Cassava development through applied research is a very important factor for increased

cassava production (Ikpi 2000). Over the years the national agricultural sector has been directing effort towards improving productivity of the farmers in the country through technology development. This is with the view to ensuring steady supply of food, increasing income and foreign exchange earning capacity, providing employment and improving living standard (Ironkwe, 2011). Cassava technology development in Nigeria comprises of technology developers, technology disseminators and technology utilizes. The key components of the system are; Production technologies through genetic improvement, Biological control technologies, Irrigation technology, Mechanical equipment technologies, Post harvest/ processing and storage technologies (Ikpi 2000). Development of better seeds had been one of the biggest improvements in the past 100 years in agricultural research (Iowa, 2012). The development of new genotypes with more productive and acceptable qualities depend solely on the ability to produce botanical seeds which are highly viable (Amanze *et,al* 2009; Mbanasor, et al 2011). The most obvious role of agricultural research institutes is to generate agricultural innovations that can lead to increased production in farmer's field, and which consequently lead to increased national production. There are a growing number of programs of research in Africa on cassava addressing genetic enhancement, seed systems, production, marketing and nutrition impacts and different approaches to improve the quality of production technologies used by smallholder farmers have been developed. New varieties were developed and distributed to farmers. Partnerships involving both national and international actors were created to expedite access and availability of the improved technologies to African small holders (Nteranya, 2015). The utilization of these technologies by farmers and other end users is meant to reduce food insecurity and poverty in Nigeria (Nwosu, 2005; Nwakor et,al 2015). Demand- driven research conducted by scientists at National Root Crops Research Institute (NRCRI) Umudike, Nigeria has lead to the development of many improved technologies/ practices in cassava which have been transferred to farmers with the hope to give the farmers a stable new market along with new production technologies (Nwakor, et,al 2015), Among the developed technologies are improved land preparation/tillage practices, agronomic practices, cassava stem multiplication technologies, improved cassava varieties and cassava value addition technologies. It was expected that the activities of the National Root Crops Research Institute which is saddled with the responsibility of genetic improvement of cassava would lead to significant improvement in productivity of cassava farmers with full participation of the researchers. It was against this background that it becomes imperative to assess the participation and performance/achievements of the scientists at the NRCRI, Umudike in cassava technology generation. However, several limiting factors constrained further improvement and participatory efforts of the researchers in cassava and other root crops research (Nwakor, *et al*. 2015).

Objectives of the Study

The major objective of the study was to assess the participation and performance of root and tuber crop scientists on cassava research in Nigeria.

Specific Objectives

- Describe the socio-economic characteristics of respondents.
- Ascertain the various researched areas by respondents
- Ascertain the level of participation on cassava research
- Identify the recent achievement in cassava technology development
- Ascertain the constraints in cassava research among respondents.

METHODOLOGY

The study was conducted in Abia State Nigeria. The respondents constituted all the researchers at National Root Crop Research Institute Umudike and the only research institute known for root and tuber crops in Nigeria. About sixty two research officers were randomly selected and interviewed by means of well structured questionnaires on their level of participation in cassava research and development. Data collected were analyzed by descriptive statistics such as frequency distribution tables percentages means and multiple regression analysis. A 3 point likert type scale of measurement of strongly agree, partially agree and disagree was used to analyzed the performance of the researchers on cassava research. Also a 3 point likert type scale of high, low and none was used to identify their levels of participation in research activities. The value was calculated; Thus: $3 + 2 + 1 = {}^{6}/_{3} = 2.0$. The score ($\bar{x}$) 2.0 and above show the high participation in cassava research, while < 2.0 shows low participation in cassava research

RESULTS AND DISCUSSION

Table 1 show that 64-52% of the respondents were between the ages of 31-40 years. This is an indication that majority of the respondent were still young scientists at their active age. Majority of the respondents were males (54.84%) whereas 67.74 percent were married. Majorities (54.84%) of respondents have their master degree (M.Sc) whereas many 35.48% have their Ph.D. the implication is that research needs highly educated personnel's for increase output. The largest population 48.38% and 48.38% of respondents has 1-10 years and 11-20 years research experience respectively. Table 2 shows the various researched areas by respondents and majority (83.87%) had done work on cassava. The result in table 3 showed the level of participation of respondents in cassava research activities and the study showed the highest participation of respondents in problem identification with the mean of ($\bar{x}$ = 2.74), followed by design of trial with the mean of ($\bar{x}$ = 2.69) and research planning with the mean of ($\bar{x}$ = 2.68). There was high participation of respondents in all the research activities except on farm testing with a mean($\bar{x}$) participation of (2.58). the low participation of scientists in on-farm trial may be as a result of the activities of field superintendents' who assist to carry out some field operations. The grand mean of ($\bar{x}$ = 2.45), which was greater than the decision mean of 2.0 showed a high level of participation of respondents in cassava research activities. The study in table 4 showed the response of the scientists on cassava technology development in the study area. A 3 point likert scale of strongly agreed, partially agreed and disagreed were used to rate the performance agreement of the respondents in the various technologies or improved practices developed on cassava. The table was partitioned into land preparation practices, cassava stem multiplication technology, agronomic practices, improved cassava varieties and value addition technologies. The mean of 2.97, 2.94, 2.81, and 2.81 showed an agreement in the development of land preparation technologies in cassava. Also the mean of ($\bar{x}$ = 2.93), ($\bar{x}$ = 2.65) and ($\bar{x}$ = 2.06) showed the performance agreement on the development of four nodes, two nodes and three nodes for cassava stem multiplication technology. Use of NPK fertilizer ($\bar{x}$ = 3.0), and use of Herbicide ($\bar{x}$ = 3.0) showed the highest performance agreement in the area of agronomic practices. The table also showed a high level of agreement on the performance of the scientists on improved cassava varieties development. Tms 0505, Tme 419, Umucass 36, Umucass 37 umucass 38 showed the highest agreement followed by NR varieties. In the case value addition technology development, high quality cassava flour ($\bar{x}$ = 3.0) has the highest agreement, followed by cassava starch and cassava chin-chin with the mean of (2.93 and 2.93) respectively.

Table 5 shows the challenges to cassava research in Nigeria. Inadequate funding of agricultural research was the major challenge to cassava research in the study as 100% of respondent accepted fund as the major challenge to cassava research This finding agrees with (FAO AND IFAD 2005) that national cassava research programmes were underfunded and in a state of disarray.. High cost of research (93.54%), lack of motivation (96.77%) problem of weed control (90.32%) and poor condition of service among researchers were the next challenges to cassava research in the study area.

CONCLUSION

In conclusion this study revealed that majority of the scientists were young and highly educated to carry out any type of research on root and tuber crops for increased food security and empowerment. The participation of the scientists in agricultural research activities was highly interesting and encouraging. Also their achievement/ performance in cassava research and development were outstanding in all the technologies assessed. There was high level of agreement in all the technologies showing that these technologies were developed by the researchers within a period of time. It was also an evidence of rapid development in cassava research in the study area.

RECOMMENDATIONS

1. Agricultural research should be well funded to meet up with the high cost of research projects and for food security.
2. Researchers should be committed to participate in all aspects of research activities for increased technology development
3. Government should provide motivational aids for researchers for more committed research.
4. Participation and achievements of researcher should be conducted in other root and tuber crops for easier comparison and for policy making.

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Table 1; Distribution of respondents according their socio-economic characteristics

Age (yr)	Frequency	Percentage
20-30	2	3.23
31-40	40	64.52
41-50	12	19.35
51-60	4	6.45
Above 60	4	6.45
Total	62	100.00
Sex		
Male	34	54.84
Female	28	45.16
Total	62	100
Marital status		
Married	42	67.74
Not married	20	32.36
Total	62	100
Educational status		
B.Sc	6	9.68
Ph.D	22	35.48
M.Sc	34	54.84
Total	62	100.00
Research Experience		
1-10	30	48.38
11-20	30	48.38
21-30	2	3. 24
31-40	0	0
Total	62	100.00
Household size		
<3	10	16.14
3-5	44	70.96
6-8	8	12.90
Above 8	0	100.00
Total	**62**	

Source: Field Survey, 2016

Table 2; Distribution of respondents according their major of research

Areas researched	Frequency	Percentage
Cocoyam	30	48.39
Yam	30	48.39
Cassava	52	83.87
Sweet potato	32	51.61
Technology dissemination	16	25.81
Technology development	16	25.81
Ginger	14	22.58
Turmeric	**6**	**9.68**
Biotechnology	**10**	**16.13**

Source: Field Survey, 2016

Table 3; Distribution of respondents according to their level of participation in cassava research activities

S/No	Activity	High	Low	None	Total	Mean $\bar{x}$
1.	Problem identification	48	12	2	170	2.74
2.	Research planning	46	12	4	166	2.68
3.	Design of trial	45	15	2	167	2.69
4.	On farm testing	10	16	36	98	1.58
5.	Technology development	28	20	14	158	2.55
6.	Technology delivery	46	6	10	1 60	2.58
7.	Monitoring and evaluation	34	18	10	148	2.39
						Grand-mean 2.45

Source: Field Survey, 2016

Table 4; Distribution of respondents according to their responses to questions on cassava technology development

Technology/practices	Strongly Agreed	Partially Agreed	Disagreed	Total	Mean
Land Preparation					
Hand clearing lashing	54	0	8	182	2.94
Ploughing	50	12	0	174	2.81
Harrowing	50	12	0	174	2.81
Ridging	60	02	0	184	2.97
Mounds	12	0	50	86	1.38
Beds	12	0	50	86	1.38
					Grand mean 2.38
Cassava Stem Multiplication					
Two nodes	44	14	4	164	2.65
Three nodes	24	18	20	128	2.06
Four nodes	60	0	2	182	2.93
					Grand mean 2.55
Agronomic practices					
Recommended time of planting	54	0	8	170	2.74
Recommended spacing	60	0	2	182	2.93
Use of NPK fertilizer	62	0	0	186	3.0
Use of herbicides	62	0	0	186	3.0
Use of organic manure	60	0	2	182	2.93
Recommended time of harvest	58	0	4	178	2.87
					Grand mean 2.91
Improved Varieties					
Tms 0505	62	0	0	186	3.0
Tms 98/10510	52	0	10	160	2.28
Tme 419	62	0	0	186	3.0
Tms 92/0002	54	6	2	176	2.83
Umucass 36	62	0	0	186	3.0
Umucass 37	62	0	0	186	3.0
Umucass 38	62	0	0	186	3.0
NR 8082	52	10	0	176	2.84
NR 8083	52	10	0	176	2.84
NR 03/0211	52	6	4	168	2.58
					Grand mean 2.84

Value Addition					
High quality cassava flour	62	0	0	186	3.0
Cassava starch	60	0	2	182	2.93
Cassava odorless fufu	58	0	4	178	2.87
Cassava bread	56	6	0	180	2.90
Cassava biscuit	58	0	4	178	2.87
Cassava chin-chin	58	4	0	182	2.93
Cassava crisps	58	2	2	180	2.90
Cassava salad cream	52	6	4	172	2.77
Cassava cake	32	12	18	138	2.220
					Grand mean 2.81

Source: Field Survey, 2016

Table 5; Distribution of respondents according to their challenges in cassava research

S/No	Challenges	Accepted		Rejected	
1.	Inadequate funding	62	100	0	0.0
2.	Lack of skill staff	18	29.03	44	70.97
3.	Unavailability of research equipments	44	70.97	18	29.03
4.	Poor facilities laminitis	24	38.71	38	61.29
5.	Poor education	62	0.0	62	100
6.	Lack of motivation from government	60	96.77	2	3.22
7.	Poor condition of service	54	87.09	8	12.90
8.	High cost of research activities	58	93.54	4	6.45
9.	Lack of interest in research	28	45.16	34	54.83
10.	Unfavorable government policies	40	64.52	22	35.48
11.	Poor managerial skill	34	54.83	28	45.16
12.	Poor Adoption of technologies	40	54.83	22	35.48
13.	Poor research/extension/farmers linkage	38	61.29	24	38.71
14.	Fire outbreak in research farmers	44	70.97	18	29.03
15.	Soil erosion hazards	48	77.42	14	22.50
16.	Weed control problem	56	90.32	6	0.09
17.	Poor storage facilities	34	54.83	28	45.16

Source: Field Survey, 2016