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ASSESSMENT OF FARMERS' USE OF IMPROVED AGRO-INPUT FOR MAIZE AND CASSAVA PRODUCTION IN NSUKKA AGRICULTURAL ZONE OF ENUGU STATE, NIGERIA

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ABSTRACT
The study assessed the level of farmers' utilization of improved agro-input for the production of maize and cassava in Nsukka agricultural zone of Enugu State Nigeria. Specifically, the study sought to determine the socio-economic characteristics of the farmers, the extent to which improved agro-inputs are accessible to the farmers, the extent of their usage of agro inputs, their perceptions towards the use of agro input and the constraints encountered. Primary data were used in the study. A multi-stage random sampling technique and 135 maize and cassava farmers were adopted for the study. The results obtained showed that more men were involved in farming than women in the study area, the farmers were between 40 and 49 years of age. Some agro-inputs were fairly accessible to the farmers while some were highly accessible to them, indicating that the farmers had the knowledge of the agro inputs and also the desire to use them. Averagely, the farmers' utilization of agro inputs was at moderate level. The constraints encountered include, lack of fund, high cost of input and high labour cost. It was recommended that government agencies should provide agro inputs to the farmers and at lower cost and that farmers should form cooperative societies to enable them access loans from banks and financial institutes.

INTRODUCTION

Improved agricultural inputs are the factors of production which have undergone some form of amendment from their original state with the intent of enhancing their performance. They are products permitted for use in organic farming. These include feedstuffs, fertilizers and permitted plant protection products as well as cleaning agents and additives used in food production. According to Cultivating New Frontiers in Agriculture (CNFA, 2021) improving access to high-quality agricultural inputs and services is key to increasing agricultural productivity and addressing food security challenges.

Agricultural inputs are divided into four principal types which can be used to enhance the production of crops such as maize, yam, cowpea spinach and ginger etc. they are grouped into

biological, chemical, mechanical and management types. Biologically improved inputs include high yielding, disease resistant and drought resistant varieties. Chemical improved inputs include chemical fertilizers, pesticides, fungicides insecticides and herbicides. Mechanical improved inputs include farm machinery and equipment used in tilling, weeding, irrigation, spraying and transportation. Management inputs on the other hand is concerned with the decision-making entrepreneurial and managerial abilities of farming activities for the improvement of agricultural production (Knight,Parker & Keep, 2001).

To improve productivity in the agricultural sector will, require a concerted effort in providing the farming community with high yielding varieties that are drought and pest resistant and also making them accessible for farmers for utilization.

Blait, Calvelo and Masias (2003) pointed out that the least expensive input for improved rural agricultural development is adequate access to knowledge the information in areas of new agricultural technologies, early warning systems (drought, pests, diseases etc), improved seedlings, fertilizer, credit, market prices etc. Okobi (2011) asserts that there have been short-comings of traditional print and library based methods required for the provision of beneficial agricultural information to rural farmers who are generally illiterate and relatively removed from formal sources of information such as extension stations libraries and internet facilities etc. In the words of Aina (2007), farmers would benefit from global information, if information centres are cited in rural areas with complete information and communication gadgets.

Rural farmers in Nsukka Agricultural Zone of Enugu State usually inter crop maize and cassava. However, they usually produce it at subsistence level, probably due to some constraints that lead to lack of access to appropriate and up-to-date information that its utilization has the capacity to enable them to achieve optimal yield from their farmlands. This relevant information usually is made available via extension workers, community libraries, state and local government agricultural agencies such as the ministry of Agriculture, Agricultural development projects (ADP), internet and telecentres. Other ways of delivering these information to rural farmers include rural radio, video, printed matters, television, films, slides, pictures, drama, dance, folk lore, group discussion, meetings, exhibitions and demonstrations (Munyua, 2000).

Farmers in Nsukka agricultural zone depend mostly on indigenous knowledge for their farming activities. This knowledge has not helped the maize and cassava farmers in Nsukka agricultural zone to improving the production of such crops. The result of the application of this knowledge has always been poor farm yield, pest and disease infestation, weeds and wrong application of inorganic fertilizer if available.

Farmers' use of improved agro-inputs may have influenced maize and cassava production in Nsukka Agricultural zone of Enugu State. Unfortunately, there is no knowledge of any empirical data, known to the Authors, to establish such claim. This study is guided by the following specific objectives;

i. Describe the socio-economic characteristics of maize and cassava farmers in the study area.
ii. Assess the extent improved agro-inputs are accessible to the maize and cassava farmers.
iii. Assess the extent of farmers' use of improved agro-inputs in maize and cassava production in the study area.

iv. Examine farmers' perceptions towards the use of improved agro-inputs in maize and cassava production.
v. Ascertain the constraints farmers encounter in the use of improved agro-inputs for maize and cassava production.

METHODOLOGY

The study area which is Nsukka agricultural zone is one out of the three agricultural zones in Enugu State. The zone is made up of six local government areas which include, Nsukka, Igbo-Eze South, Igbo-Eze North, Isi-Uzo, Udenu and Uzo-Uwani. The population of the study is made up of all maize and cassava farmers in Nsukka Agricultural zone of Enugu State, Nigeria. A multi-stage sampling technique was used to sample the respondents for data collection. In the first stage, three LGAs were randomly selected. In the second stage, three (3) communities were randomly selected from each sampled LGA, making a total of nine (9) communities. In the third stage, fifteen (15) respondents were equally selected randomly from each of the sampled communities, thus giving a sample size of 135 respondents for the study. Data were collected. using a well-structured and validated questionnaire.

Objectives (i) and (v) were realized using descriptive statistics. Objectives (ii), (iii) and (iv) were realized using frequency, percentage and means on data generated from a five point Likert measurement scales. The mean scores of each item were computed. Any item with the mean of 0.00-1.66 was considered poorly accessible, 1.67-3.33 was considered fairly accessible while any means score range of 3.34-5.00 was considered very accessible.

RESULTS AND DISCUSSION

Socioeconomic Characteristics of the Respondents

Table 1 presents the socio-economic characteristics of the respondents. Twelve (12) variables were considered. The Table shows that males accounted for 55.50% while female accounted for 44.40%. of the respondents. This finding agrees with that of Nwagwu and Opeyemi (2015) This could be attributed to the fact that men have more household responsibilities than the females. The average age of the respondents in the study area was 42 years. This could be seen as most = (27.3%) of the respondents were between the age of 40 and 49 years. It implied that the farmers were within an active age of strength which helps them to engage in intensive farming which require agro-inputs. This is in tandem with Uloh and Igwe (2018). Martially, most (67.40%) of the respondents were married. The implication of this is that the respondents could use family approach in the dissemination of agricultural innovation. The result gotten from the level of education of the respondents showed that 46.7% and 39.3% had their tertiary and secondary school education respectively. This indicates that their level of education will have a positive influence on the adoption of improved agro-inputs such as fertilizer, agro- chemicals and improved varieties. It was also observed that 59.30% of the respondents were member of social organizations, while 40.70% of them were not. Farmers' membership to social organization is recommendable as it enhances diffusion of innovation among farmers, helps them to learn new ways of farming it also act as a source of communication and dissemination of information on improved agro-inputs for enhanced agricultural production.

Table 1: Distribution of the respondents according to their socio-economic characteristics (n = 135)

Variable	Frequency	Percentage	Variable	Frequency	Percentage
Sex			**Farm size**		
Male	75	55.5	<0.5	17	12.6
Female	60	44.40	0.5-1.00	33	24.4
Age(years)			1.01-1.50	41	30.4
<30	20	14.8	1.51-2.00	36	26.7
30-39	32	23.5	>2.00	8	5.9
40-49	37	27.3	**Mean(ha)**	**1.44**	
50-59	18	13.3	**Household size**		
>59	20	14.8	1-3	16	11.90
Mean(years)	**42.0**		4-6	67	49.60
			7-10	45	33.3
Marital status					
Married	91	67.40	>10	7	5.2
Widowed	5	3.70	**Mean**	**5.90**	
Divorced	1	0.70	**Membership of organization**		
Single	38	28.10	Yes	80	59.30
Level of Edu.			No	55	40.70
Primary	19	14.1	**Extension agent contact**		
Secondary	53	39.3	Once in a week	2	1.5
Tertiary	63	46.7	Once in 2weeks	8	5.9
Involvement in farming			Once in a month	14	10.40
Full time	18	13.40	Once per quarter	24	17.80
Part-time	117	86.60	Never	87	64.40
Farming Exp.(yrs)			**Monthly Income (N)**		
<10	93	68.9	16000-25000	101	74.80
10-19	31	22.9	26000-35000	11	8.10
20-29	8	5.9	36000-45000	9	6.60
30 and above	3	2.2	46000-55000	9	6.70
Mean(years)	**6.59**		>55000	5	3.6
			Mean (N)	**13530.30**	
			Credit access		
			Yes	39	29.10
			No	96	70.90

Source: Field survey, 2020

Farmers' Access to Improved Agro-Inputs in the Study Area

The accessibility of maize and cassava farmers to improved agro-inputs in the study area (Table 2) shows the mean scores of improved varieties of maize ($\bar{x}$=2.92), agro-chemicals for seed treatment ($\bar{x}$ = 2.69), agro-chemicals for grain storage ($\bar{x}$= 2.73) and limes for control of soil fertility ($\bar{x}$ = 2.27), improved varieties of cassava ($\bar{x}$ = 3.09) are fairly accessible to the farmers. However, agro chemicals for weed control ($\bar{x}$ =3.42), inorganic fertilizer ($\bar{x}$ = 3.51) and organic fertilizer ($\bar{x}$ = 4.17) were very accessible to the farmers. From the results obtained, none of the agro-inputs were poorly accessed. This implied that the maize and cassava farmers had

knowledge of these agro-inputs and also had the desire to use it to enhance their maize and cassava enterprise.

Table 2: Distribution of respondents according to their access to improve agro-inputs for cassava and maize production in the study area

Agro-inputs	Always accessible	Most times accessible	Occasionally accessible	Rarely accessible	No accessible	Mean	SD	Remark
Improved varieties of cassava	35(25.9)	21(15.6)	26(19.2)	13(9.6)	40(29.6)	**3.09**	1.54	Very accessible
Improved varieties of maize	25(18.5)	33(24.4)	30(22.2)	16(11.9)	31(23.0)	**2.92**	1.38	Fairly accessible
Agrochemicals for seed/stem treatment	15(11.1)	25(18.5)	30(22.2)	14(10.4)	51(37.7)	**2.69**	1.41	Fairly accessible
Agrochemicals for weed control	28(20.7)	52(38.5)	32(23.7)	5(3.7)	18(13.3)	**3.42**	1.22	Very accessible
Agrochemicals for grain storage	14(10.4)	27(20.0)	23(17.0)	40(29.6)	31(23.0)	**2.73**	1.37	Fairly accessible
Limes for acid soil	8(5.9)	17(12.6)	33(24.4)	23(17.0)	54(40.0)	**2.27**	1.25	Fairly accessible
Inorganic fertilizer (NPK)	31(22.9)	45(33.3)	33(24.4)	20(14.8)	6(4.4)	**3.51**	1.11	Very accessible
Organic fertilizer	77(57.0)	25(18.5)	17(12.6)	12(8.9)	4(3.0)	**4.17**	1.13	Very accessible
Grand Mean						**3.10**		**Fairly accessible**

Source: field survey, 2020. N/B: figures in parenthesis are percentages. Mean score range: 5-3.34=very accessible; 3.33-1.167= fairly accessible; 1.66-0.00= poorly accessible

Extent of Utilization of Improved Agro-inputs for Maize and Cassava Production

The result of the extent of utilization of improved agro-inputs for maize and cassava production showed that the farmers moderately utilized improved varieties of cassava (x=3.01), improved variety of maize ($\bar{x}$= 2.92), Agro chemical for weed control ($\bar{x}$= 3.33) and inorganic fertilizer (NPK) ($\bar{x}$= 3.25). among all the utilized agro inputs, it was only organic fertilizer that was highly utilized with the mean score of ($\bar{x}$ = 3.8). The grand mean score ($\bar{x}$ = 3.00) indicates that on the average, farmers extent of utilization of agro-input was at moderate level.

Table 3: Distribution of respondents according to the farmers' extent of utilization of improved agro-inputs for cassava and maize production

Agro-inputs	Always used	Used most times	Occasionally used	Rarely used	Never	Mean	S.D	Remark
Improved varieties of cassava	35(25.9)	21(15.6)	25(18.5)	19(14.1)	35(25.9)	**3.01**	1.54	moderately utilized
Improved varieties of maize	26(19.3)	24(17.8)	31(23.0)	22(16.3)	32(23.7)	**2.92**	1.43	moderately utilized
Agrochemicals for seed/stem treatment	13(9.6)	19(14.1)	31(23.0)	19(14.1)	61(45.1)	**2.42**	1.37	moderately utilized
Agrochemicals for weed control	17(12.5)	60(44.4)	26(19.3)	18(13.3)	14(10.4)	**3.33**	1.16	moderately utilized
Agrochemicals for grain storage	18(13.3)	29(21.9)	26(19.3)	16(11.9)	46(34.0)	**2.78**	1.44	moderately utilized
Limes for addressing acid soil	14(10.4)	24(17.8)	22(16.3)	31(22.9)	44(32.6)	**2.50**	1.39	moderately utilized
Inorganic fertilizer (NPK)	22(16.2)	40(29.6)	40(29.6)	23(17.0)	10(7.4)	**3.25**	1.13	moderately utilized
Organic fertilizer	63(46.7)	25(18.5)	19(14.1)	19(14.1)	9(6.7)	**3.8**	1.32	Highly utilized
Grand Mean						**3.00**		Moderately utilized

Source: field survey, 2020. N/B: figures in parenthesis are percentages. Mean score range: 5-3.34= highly utilized; 3.33-1.67=moderately utilized; 1.66-0.00= low utilized

Perception of the Use of Improved Agro-inputs for Maize and Cassava Production in the Study Area

Table 4 shows that farmers had positive perceptions towards the use of all improved agro-inputs for maize and cassava production. The perception based on the result of the grand mean showed that the agro-inputs were considered by farmers as relatively available ($\bar{x}$=3.02), cheap ($\bar{x}$= 3.22), simple to use ($\bar{x}$= 3.37) gives high yield ($\bar{x}$ = 3.16), good to soil ($\bar{x}$= 2.96) and moderately safe to use ($\bar{x}$= 2.65).This implies that maize and cassava farmers in the study area have a positive perception in the use of agro-inputs in their maize and cassava farming enterprises.

Table 4: Mean distribution of responses of farmers' perception of use of improved agro-inputs for maize and cassava production

Agro-inputs	Readily available	Cheap	Simple to use	Give high yield	Good to soil	Safe to use	Mean	S.D
Improved varieties of cassava	30(4.37)	12(2.63)	40(4.80)	37(5.61)	10(1.74)	5(1.80)	**4.92**	1.63
Improved varieties of maize	18(2.62)	14(3.07)	43(5.16)	35(5.30)	12(2.09)	5(1.80)	**4.58**	1.59
Agrochemicals for seed/stem treatment	18(2.62)	15(3.29)	36(4.32)	20(3.03)	9(1.56)	30(10.8)	**4.55**	1.79
Agrochemicals for weed control	30(4.37)	28(6.14)	34(4.08)	12(1.82)	14(2.43)	7(2.52)	**4.75**	1.73
Agrochemicals for grain storage	18(2.62)	1(0.21)	24(2.88)	7(1.06)	5(0.87)	4(1.44)	**3.39**	1.90
Limes for addressing acid soil	22(3.21)	18(3.95)	17(2.04)	10(1.51)	40(6.96)	11(3.96)	**4.08**	1.91
Inorganic fertilizer (NPK)	14(2.04)	17(3.73)	17(2.04)	38(5.76)	30(5.22)	7(2.52)	**4.09**	1.64
Organic fertilizer	35(5.10)	18(3.95)	14(1.68)	19(2.88)	35(6.09)	6(2.16)	**4.60**	1.85
Grand total	**3.02**	**3.22**	**3.37**	**3.16**	**2.96**	**2.65**		

Source: Field survey, 2020. N/B: figures in parenthesis are the mean

Constraints in Using Improved Agro-inputs

The constraints encountered by maize and cassava farmers in their use of agro-inputs is presented in Table 5. The results of the analysis which was ranked, based on the extent of effect, showed that the farmers' major constraint was lack of fund to buy inputs (($\bar{x}$ = 2.54), high cost of input (($\bar{x}$ = 2.38), and high labour cost (($\bar{x}$ = 2.29). Other constraints such as high disease occurrence, scarcity of inputs, scarcity of original planting materials, poor market demand of maize and cassava products and fake agro inputs were equally serious. The implication here is that these constraints seriously limit the farmers' capacity to increase and expand their maize and cassava production in the study area.

Table 5: Distribution of respondents based on their constraints in using improved agro-inputs

Constraints	Very serious	Serious	Not serious	Mean	Rank
Lack of fund to buy input	85(63.0)	41(30.4)	9(6.6)	2.54	1st
High cost of the input	62(45.9)	66(48.9)	7(5.2)	2.38	2nd
High disease occurrence	48(144)	34(68)	53(53)	1.96	4th
High labour cost	60(44.4)	55(40.7)	20(14.8)	2.29	3rd
Scarcity of the inputs	41(30.3)	45(33.3)	49(36.2)	1.94	5th
Scarcity of original improved planting materials	36(26.7)	55(40.7)	44(32.5)	1.94	5th
Poor market demand of maize and cassava products	26(19.3)	30(22.2)	79(58.5)	1.60	7th
Fake agro inputs	30(22.2)	41(30.4)	64(47.4)	1.74	8th
Grand Mean				**2.04**	

Source: Field survey, 2020. N/B: figures in parenthesis are percentages

The hypothesis that the farmers' socio-economic characteristics had no significant effects on their use of improved agro-input for maize and cassava production was tested. Out of the 10 predictor variables. The coefficients of farm size, membership of organization and access to land were significant at 10%, 5% and 5% respectively and hence had significant effects on the farmers' utilization of improved agro-inputs for maize and cassava production in the study area. The coefficient of farm size of the respondents (t = 1.688, p = 0.095) was significant at 10% and negatively related to the level of farmers' utilization of improved agro-inputs. This implies that the use of agro-input decreases as farmers' farm size increases, perhaps the farmers do not have enough capital to procure the agro-inputs required to serve the large farm size.

Table 6: Regression estimate of relationship between farmers' socio-economic characteristics and their utilizations of improved agro-inputs

Variables	Linear	Exponential	Semi-log	Double log
Constant	4.684(.117)	.319(5.586)***	26.469(-1.169)	1.707(-1.373)
Sex	.036(.685)	.038(.721)	.029(.293)	.054(.555)
Age	.004(.085)	.005(.093)	.059(.649)	.092(1.020)
Farm size	-.396(1.688)*	1.265(4.328)***	.319(1.009)	.297(.950)
Level of education	-.099(-1.101)	-.016(-.179)	-.848(-1.876)*	-.719(-1.609)
Farming experience	.104(1.254)	.099()1.176	1.470(3.700)***	1.294(3.295)***
Household size	-.016(-.318)	-.027(-.526)	.319(-.802)	-.034(-.356)
Membership of org.	-.313(-2.944**)	-.288(-2.681)**	-.078(-.802)	-.202(-1.264)
Extension contact	.021(.429)	-008(-.157)	-.271(-1.677)	.109(1.107)
Income	.027(.437)	.009(.138)	-151(.069)	.129(1.122)
Access farm land	.209(2.305)**	.162(1.769)*	.075(.364)	.064(.314)
R^2	.801	.797	.737	.743
Adjusted R^2	.777	.772	.665	.673
F-statistics	33.001***	32.142***	10.213***	10.537***

Source: Computed from field survey. Lead equation-linear functional form. *** denotes p<0.01; ** denote 0.01 < 0.05; while * denote 0.05 < p<0.10

CONCLUSION AND RECOMMENDATIONS

The agro-inputs for maize and cassava production were very accessible to the farmers. On the average, farmers extent of utilization of agro-inputs was moderate. The farmers had a positive perception towards the use of all the improved agro-inputs for maize and cassava production The constraints encountered by maize and cassava farmers by using agro-inputs, included lack of fund to buy inputs, high cost of inputs and high labour cost.

The following recommendations were made:

1. The Government should provide adequate agro-input facilities to the Ministry of Agriculture and Agricultural Development Protects (ADP) to enable the extension agents reach out to farmers effectively.
2. Cassava and maize farmers should be encouraged to form or join existing cooperative societies. This will encourage diffusion of innovation, facilitate extension services and help farmers to easily access credit.
3. Credit facilities should be made available by credit institutions, individuals and agencies to improve farmers' use of agro inputs in maize and cassava production.

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