# Assessment of the Utilization of Agro Inputs for Cassava Production in Nsukka Agricultural Zone, Enugu State, Nigeria

**[1]Ekwe K.C., [1]Obetta, K.T. and [2]Okoro J.P**
Department of Agricultural Extension and Rural Development,
Michael Okpara University of Agriculture, Umuidke, Abia State, Nigeria.
Department of Agricultural Economics, Extension and Rural Development,
Imo State University, Owerri, Imo State, Nigeria
Corresponding author: kcekwe@yahoo.com

Abstract
The study assessed the level of farmers' utilization of agro-inputs for cassava production in Nsukka agricultural zone of Enugu State, Nigeria. A total of 135 cassava farmers were selected through a multi-stage sampling procedure. A structured interview schedule was used to collect the data and was analyzed using descriptive statistics and Ordinary Least Square (OLS) regression analysis. The results of the study show that the average age of the respondents was 42.0 years, with 55.5% of them being males. A majority of the respondents were married (67.40%). The mean household size of the respondents was six persons. The farmers sourced for their inputs primarily from the open market especially for improved cassava varieties (20.0%), agrochemicals for stem cutting treatment (31.1%), herbicides (52.6%) and limes for acid soil (43.9%). The level of utilization of the improved agro-inputs for cassava production was moderate for cassava varieties ($\bar{x}$=3.01), inorganic fertilizer ($\bar{x}$=3.25), and high for herbicides ($\bar{x}$=3.36),'.
The results of Ordinary Least Square (OLS) regression analysis of socioeconomic factors affecting farmer's use of improved agro-inputs for cassava production revealed that. socio-economic variables such as farm size, membership of the social organization, level of education, farming experiences and access to credits significantly affected farmer's level of use of agro-input for cassava production in the study. From the preceding, it is thus the recommended that Agricultural extension agencies should further promote the improved agro-inputs so as to encourage their use among farmers in order to achieve increased cassava production in the area while on the other hand extension agents should be supported with the vital logistics to improve their contact with the farmers for delivery of requisite technical advice.
**Keywords:** Agro-inputs, cassava production, fertilizers, herbicides, varieties

## Introduction

In Nigeria, cassava is one of the most important carbohydrate sources. The large population of Nigeria depended on cassava daily as their main dish such as *gari* and *fufu,* and it serves as raw material to industries as well as been a means of alleviating poverty. In spite of the various gains derived from its production by rural farmers is still not sufficient to keep the resource poor farmers above the poverty line (FAO, 2010). According to IITA (2003), cassava accounts for over 200 calories per day in the diet of an individual. It generates
about 25% of cash income from all food crops grown, constituting the most important single source of cash income. Cassava is produced mostly in the south and central zones of Nigeria by mostly small holder farmers who utilize traditional farming methods on marginal lands with minimal modern agro-inputs (Ezedinma, et.al 2007). Nevertheless, significant population of cassava growers in Nigeria has equally made the transition from traditional production systems to the use of improved agro-inputs and mechanization of processing activities (Nweke *et al,* 2002).

The use of agro improved inputs in production has been desirable and as such massively promoted by extension due to its obvious positive impacts on productivity of crops. The use of improved agricultural inputs such as improved varieties, agrochemicals, and inorganic fertilizer is indispensable to the production of food crops, especially the cereals, legumes and root crops. Without these inputs, farmers' productivity will remain low and they continue in the vicious cycle of poverty (low productivity, low income and low savings). For instance, Ogundele and Okoruwa (2006) reported that the use of fertilizer increased agricultural productivity of crop farming in the dry savannah and humid forest agro-ecological zones of Nigeria. But despite their obvious benefits, not all farmers use the improved agricultural inputs due to various reasons. Furthermore, Langyintuo and Mekuria (2005) showed that variables categorized as farmers characteristics, institutional factors and

characteristics of the inputs do commonly influence farmers' use of improved inputs.

In Nsukka agricultural zone, many farmers depend on indigenous resources in the production of their crops. These local resources are characterized by low yield in quantity and quality, high pest and disease infestation, and subsequently, low-income (Obeta, 2018).

Several innovations on improving cassava production are generated by research institutes in Nigeria. Some of which includes biologically improved inputs (such as high yielding varieties, disease-resistant varieties and drought-resistant varieties); chemically improved inputs (such as chemical fertilizers, pesticides, fungicides, insecticides and herbicides) mechanically improved inputs (such as farm machinery and equipment used in tilling, weeding, irrigation, spraying and transportation) (Knight et al., 2001). There is the need to disseminate information on the innovations at the appropriate time to the end users- the farmers. It is paramount to note that Information dissemination in Nigeria mainly depends on the public extension services.

Although several farmers in Nsukka Agricultural Zone of Enugu State embraced the use of agricultural innovations in cassava production, however, there is a dearth of information on the level of its utilization and factors influencing such. Hence, the study examined farmer's use of improved agro-inputs in Nsukka Agricultural Zone of Enugu State. The specific objectives of the study included to:

describe the socio-economic characteristics of cassava farmers;

ascertain farmers' sources of the improved agro-inputs; and

determine the level of farmers' use of improved agro-inputs for cassava production

The hypothesis of the study is stated in a null form:

The socio-economic characteristics of the respondents have no effect on the utilization of agro inputs

**Methodology**

Nsukka agricultural Zone is one of the six agricultural zones in Enugu State, Nigeria. The Zones comprises six local governments areas (LGAs) namely: Isi-uzo, Udenu and Uzo-uwani, Nsukka, Igbo-Eze South and Igbo-Eze North, The zone is bounded on the south by Enugu agricultural zone, on the North-east by Benue State and the north-west by Kogi State, on the east by Ebonyi State and the West by the River Niger. The people of the zone are predominantly farmers who produce and process a reasonable high quantity of cassava, cocoyam, rice, maize, melon, groundnut and varieties of vegetables (Obeta, 2018). Also, some of the people engaged in petty trading.

A multi-stage sampling procedure was used to select the respondents for the study: In the first stage, three out of the six local government areas were randomly selected from the zone In the second stage three (3) communities were randomly selected from each sampled local government area, making a total of nine (9) communities. In the third stage, fifteen (15) respondents were randomly selected from each of the communities, thus giving a total sample size of 135 respondents used for the study. The study utilized primary data collected through a structured interview schedule. The data collected were analyzed with descriptive statistics and Ordinary Least Square regression model.

The levels of use of improved agro-inputs were captured with 5-point Likert type measurement scale where 'always' was assigned the largest scale of 5 and other responses graded downwards to were 'never' had the lowest scale of 1. The maximum weighted score of 5 was further divided by 3 to obtain the class interval of 1.33 for the three levels of use by Ekwe and Nwachukwu, (2006). As a result, class ranges for the three levels of agro-input use emerged as follows low=0.00-1.66; moderate=1.-67-3.33 and high=3.34-5.00. Furthermore, the socio-economic factors influencing the level the use of the agro-inputs were determined using an ordinary least square regression model. The implicit form of the OLS regression model is indicated thus:

$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + B_8X_8 + B_9X_9 \ldots\ldots B_nX_n + Ei$

where Y= mean responses of farmers' level of use of improved agro-inputs

$\beta_0$ = constant term

$\beta_1 - \beta_9$= beta coefficient of explanatory variables

$X_1$ = age (in years)

$X_2$ = farming experience (in years)

$X_3$ = education level (years spent in school)

$X_4$ = Access to credit (yes=1; otherwise=0)

$X_5$ = household size (number of persons in the household)

$X_6$ = Regularity of extension contact (proxied as the frequency of farmers' contact with extension)

$X_7$ = gender (Male=1, female=0)

$X_8$=Membership of social organization (Yes=1; otherwise=0)

$X_9$=farm size (in hectares)

$E_i$= error term

| Variable | Frequency | percentage | Variable | Frequency | percentage |
|---|---|---|---|---|---|

**Result and Discussion**

**Socio-Economic Characteristics of the Respondents**

The result in Table 1 shows that 55.50% of the respondents were males while 44.5% were females. It shows that both male and female genders were involved in cassava production in the study area. The mean age of the respondents was 42 years , implies that the farmers were within an active age and are expected to be strong and ready to imbibe the use of improved agro inputs for cassava production. Most of the respondents (67.40%) were married, 28.10% of them were single while 3.70% were divorced.

Moreover, 46.7% of the respondents attended tertiary institutions while 39.3% completed secondary school education. it could be deduced that most of the respondents were literates and, thus, are expected to have a positive attitude towards the adoption of improved agro-inputs for an increased cassava production. This finding is consistent with that of Nwosu et al. (2012) that a high level of education of farmers increases their farm production and also enhances the ability to understand and evaluate new production technologies. A majority of the respondents (68.9%) had less than ten years of farming experience while the mean years of farming experience was seven (7) years. It indicates that most of the respondents are still young in the business of cassava production. Their low level of experience should spur them to look for information on how to improve their production.

The mean farm size of the respondents was 1.44 hectares. The results depict that most of the farmers were smallholders and subsistence. This result indicates that the study area consisted of small scale farmers, and corroborates Agwu *et.al*. (2002) which reported that majority of Nigerian farmers are smallholders cultivating small areas of farmland.

The mean household size of the farmers was six persons. According to Ani (2004), household size in traditional Agriculture determines the availability of labour and the level of production.

Similarly, the results revealed that 59.30% of the respondents belonged to social organizations, while 40.70% of them were not members of any social organizations. Membership to social organization could enhance the diffusion of innovation among farmers. It could also help the farmers to learn new ways of farming, and acts as a source of information on improve Agro-inputs for the production of cassava. According to Arimi (2014), these farmers' organizations are effective channels of communication.

The majority (70.90%) of the respondents had no access to credit facilities, while only 29.10% of the respondents had access to credit facilities. Low access to credit among rural farmers has also been reported by Ugbajah (2011) who found that access to agricultural credit was linked to low agricultural productivity in Nigeria. The inability to access credit facilities by most cassava farmers might hinder the usage of improved agro-inputs.

The result also showed that the majority (64.40%) did not have contact with the extension agents. However, 10.40% of the respondents had contacts with extension agents once in a month. It is an indication that most of the farmers do not obtain new agricultural technologies from extension agents. It may impede their production and profit margin. A similar assertion was reported by Waziri et al. (2014) that low level of contact with extension agents was mainly responsible for the low-level adoption of new technologies.

The results in Table 1 equally showed that majority (74.80%) of the respondents earned between N16,000 and N25,000 per month while only 3.6% earned above N55,000. The result showed that a larger proportion of the respondents are low income earners. In a previous work, Ekwe, *et.al*, (2016), had reported that low income earners have inadequate fund to procure certain technologies such as farm inputs.

| **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 |
| **Marital status** | | | 7-10 | 45 | 33.3 |
| Married | 91 | 67.40 | >10 | 7 | 5.2 |
| Widowed | 5 | 3.70 | **Mean** | **5.90** | |
| Divorced | 1 | 0.70 | | | |
| Single | 38 | 28.10 | | | |
| **Level of Education.** | | | **Contact with Extension agents** | | |
| Primary | 19 | 14.1 | Once in a week | 2 | 1.5 |
| Secondary | 53 | 39.3 | Once in two weeks | 8 | 5.9 |
| Tertiary | 63 | 46.7 | Once in a month | 14 | 10.40 |
| | | | Once per quarter | 24 | 17.80 |
| | | | Never | 87 | 64.40 |
| **Farming Experience (years)** | | | **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** | | | **Membership of organization** | | |
| Yes | 39 | 29.10 | Yes | 80 | 59.30 |
| No | 96 | 70.90 | No | 55 | 40.70 |

**Table 1: Socioeconomic characteristics of the respondents**
Source: Field Survey 2018

**Farmers Sources of Improved Agro-Inputs for Cassava Production**

The results in Table 3 show different sources through which the farmers obtained improved agro-inputs for cassava production. Specifically, open markets (20.0%) and extension agents (19.3%) were farmers' primary source of improved cassava varieties. Furthermore, the same open market was farmers' primary sources of other agro-inputs such as agrochemicals for seed/stem treatment (31.1%), herbicides (52.6%), limes for acid soil (43.9%) and inorganic fertilizer.

Table 3: Distribution of respondents according to their sources of improved agro-inputs for cassava production in the study area

| Agro-inputs | Agric. Extension | Research institute | Cooperative | Fellow farmers | Open market | Own farm |
|---|---|---|---|---|---|---|
| Improved varieties of cassava | 26(19.3) | 21(15.6) | 13(9.6) | 14(10.4) | 27(20.0) | 6(4.4) |
| Agrochemicals for seed/stem treatment | 13(9.6) | 12(8.9) | 17(12.6) | 9(6.7) | 42(31.1) | 06(4.4) |
| herbicides | 16(11.9) | 14(10.4) | 08(5.9) | 12(8.9) | 71(52.6) | 4(3.0) |
| Limes for addressing acid soil | 24(17.8) | 14(10.4) | 16(11.9) | 10(7.4) | 59(43.9) | 9(6.7) |
| Inorganic fertilizer (NPK) | 20(14.8) | 5(3.7) | 19(14.1) | 20(14.8) | 59(43.7) | 7(5.2) |

**Source**: Field survey, 2018.
**N/B:** multiple responses recorded; figures in parenthesis are percentages

**The hypothesis of the study**

The relationship between farmers' socio-economic characteristics and their use of improved agro-inputs shown in Table 4 reveal the Ordinary Least Square (OLS) regression analysis result of the effect of parameters expected to affect farmers' utilization of improved agro-input for production of cassava. The linear functional form was chosen as the lead equation because the $R^2$ value, F- ratio and number of significant variables were highest among the relative functional forms.

An estimate of the social-economic variables expected to affect the respondents' utilization of improved agro-input is presented in Table 4. A total of 10 predictor variable were included in the regression model. Out of these variables, farm size, membership of the organization, level of education, farming experiences and access to credit had significant effects on their utilization to improved agro-inputs for cassava production in the study area.

The coefficients of farm size, membership of the organization, and access to credit were significant at 10%, 5%, and 5% respectively. The coefficient of farm size of the respondents (t = -1.688; p = 0.095) was significant at 10 per cent and negatively related to the level of farmers utilization of improving agro-inputs. It 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. Membership of organization (t = -2.944; p = 0.05) at 1% probability level shows a negative relationship with utilization of improved agro-input for cassava production. It implies that the use of agro-inputs decreased as membership to social organization increases. It contradicts the t a-priori expectation. Similarly, farmers' level of education (t= -1.876; P=0.05) had negative significant relationship with the utilization of agro-inputs for cassava production in the area.

On the other hand, there was significant positive relationship existing between farmers' farming experiences (t=3.700; P=0.01) and their utilization of agro-inputs at 5% probability level indicating that as farmers' farming experiences increased, there was corresponding increase in the use of agro-inputs in the area. Also, farmers' access to the credit (t=2.305; P=0.05) equally had a positive relationship with the farmers' utilization of improved agro-input at 5% significant level. This could imply that the farmers' increased access to credit would enable them to procure the improved agro-inputs for use in cassava production in their area.

**Table 4: Regression estimate of the relationship between farmers' socio-economic characteristics and their utilization of improved agro-inputs in the study area.**

| 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 to credit | .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*** |

## Summary, Conclusions and Recommendations

The study assessed the utilization of agro-inputs for cassava production in the study area; the factors were the socio-economic variables such as farm size, farming experience, level of education, membership of the social organization and access to credit. The assessment showed that socio-economic variables such as farm size, membership of the organization, level of education and access to credit had significant positive relationship with utilization of improved agro-inputs for cassava production in the study area. On the other hand, farmers' farming experiences and access to credit were negatively related to the utilization of agro-inputs for cassava production in the area.

The study recommended that ADPs should further promote the supply of agro-inputs to encourage their use among farmers for increased cassava production. Also, the government should provide enabling environment for effective delivery of extension agent's activities.

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