# ASSESSMENT OF TECHNOLOGY NEED PRIORITIES OF ARABLE CROP FARMERS IN ONDO STATE, NIGERIA

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**Abstract**

*The study was designed to assess the need priority of the available technologies used by the arable crop farmers in Ondo State, Nigeria. The study described the socio-economic characteristics of the farmers, determined the available technologies in use by the respondents and determined the need priority among the technologies used by the farmers. . The study was carried out in Ifedore Local Government Area of Ondo State Nigeria. One hundred and twenty respondents were randomly selected for the study. Information was collected from the respondents with the aid of well-structured questionnaire while additional information was gathered with Focus Group Discussion (FGD). Data collected were analysed with the use of descriptive statistics, chi-square, ranking and correlation. The result revealed that the average age of the respondents involved in the production of arable crops in the study was 31 years. Improved variety of seed was the most important technology needed by the respondents in the study area, while machinery for commercial production was the least needed. In the study, use of agrochemicals was the technology mostly used while machinery was the least used technology. The chi-square analysis showed that there is a significant relationship between technology need of respondents and their marital status (p=0.00) and source of land (p= 0.00). The Pearson correlation coefficient also indicated a significant but negative relationship between respondent's household size and technology need (r= -0.058, p=0.02). The distance of the farm to the village market was significant with the technology need of the farmers (p-value = 0.030). The study recommended that government effort should be channelled towards making improved varieties of seed available for the farmers at a subsidised rate. In addition public-private partnership should be encouraged to make capital-intensive technologies available to farmers at affordable rates.*

**Keywords**: Assessment, arable, crops, Technology-need, farmers, storage, improved-seeds

## 1.0. Introduction

Crop production is an important sub-sector in Nigeria agriculture and it contributes largely to the development of Nigeria's agricultural sector. Arable crops play a major role in all issues concerning agriculture and environment, both in terms of adaptation of agriculture to different economic systems and in terms of impacts on the environment and the landscape by agriculture (Etienne, David and David, 2009).

Technology as a term means many things to several people and this depends on the setting or the context. Broadly defined, however, technology implies any practical art which utilizes scientific knowledge. The object is usually to advance and enhance human society and conditions. Technology is used to harness the forces of nature and transform the resources that nature has bestowed on man, into goods and services for better quality of life. Such goods and services range from power generation to military weaponry, from food production to food processing, storage and packaging, to housing and to every other human needs and activity. (Oni,2009)

An increase in efficiency in arable crop production could present a ray of hope and could lead to an improvement in the welfare of the farmer and consequently a reduction in their poverty level and insecurity. New innovations in agricultural development are of little value until they can be put to use for the economic and social well-being of the people involved. Ondo state land is called arable land because eighty percent of the land in the state is arable and can produce arable crops like cassava, yam, plantain, cocoyam, maize e.t.c but farmers in the state are mostly in need of some technologies used in improving arable crop production. It is in view of these problems of the technology of arable crop production that the study broadly assessed the technology need priority of arable crop farmers in Ifedore Local Government Area of Ondo state Nigeria.

### Objectives of the Study

The general objective of the study is to assess the technology needs of arable crop farmers in Ondo state, Nigeria, while the specific objectives were to:

1. ascertain the socioeconomic characteristics of the respondents,
2. identify the technologies in use by farmers and
3. determine the need priority among the technologies used by arable crop farmers

## 2.0 Methodology

### 2.1 Study Area

The study area was Ifedore Local Government Area in Ondo state, Nigeria, which has her communities majorly agrarian. They are involved in planting various types of arable crops like maize, yam, cocoyam, cassava, melon and potatoes

### 2.2 Sampling Procedure and Sample Size

Multi-stage sampling procedure was used in this study. In the first stage, Ifedore Local Government Area was randomly selected from the 18 LGAs in the state. In the second stage, four communities were randomly selected from Ifedore LG namely: Ijare, Ilara-Mokin, Ibule and Aba-Oyo while in the third stage, 30 arable crop farmers were randomly selected from list of arable crop farmers generated for each of the selected communities. Any farmer with cash crop plantation were excluded from the list. The total sample size of 120 respondents was used. Data was subsequently collected with the use of questionnaire and interview schedule. Focus Group Discussion was used to gather additional qualitative data

**2.3 Measurement of Variables**
**Independent Variables**

i. Socio-economic variables such as sex, marital status and religion were measured at nominal level; the level of education was measured at ordinal level while age and household size were measured at the interval level of measurement. This is achieved by asking the respondents their exact age in years and the number of people in their household. This information was later categorized into age range and household size range.

**Dependent Variables**

i. **Technology Needs of the farmers:** This is measured by listing technologies needed in arable crop production from literature, personal experience and pre-survey. These technologies are then categorized into 5 groups namely: Improved seed varieties, Agrochemical, storage facility and machinery. This is measured using 4 point scales of 'Highly needed', 'Needed', 'Slightly needed' and 'Not needed'. Scores of 3, 2, 1 and 0 were assigned respectively.Individual scores were obtained and grand mean for each technology was obtained and used in the ranking.

ii. **Technology Use:** This was measured at the nominal level of Yes or No and were assigned 1 and 0 respectively

**2.4 Statistical Analysis**

The data collected were analysed using descriptive statistics such as frequency counts, percentages and mean. These descriptive statistics were used to describe the socio-economic characteristics of the respondents such as age, sex, marital status, level of education. Inferential statistics used to test the relationship between the selected variables in the hypotheses were: Pearson Product Moment Correlation, Chi-square and Spearman rank-order correlation.

**3.0 Results and Discussions**
**3.1 Socioeconomic Characteristics**
The measured socio-economic characteristics of the respondents were: age, sex, religion, marital status, level of education and household size. According to Table 1, 54.2% of the respondents fell between 31 to 50 years in the age category, 43.8% of them were above 50 years and 2% of the respondents were below 31 years. The mean age of respondents was 31years. About half (53.3%) of the respondents were males while 46.7% of the respondents were females. The majority (78.3%) of the respondents were Christians, 20% were Muslims and 1.7% were traditional worshippers. The results on the marital status of the respondents showthat eight percent (provide in figure) of the respondents were single, 97.5% among them were married and almost two percent (1.7%) were widowed. The educational attainment of the respondents in Table 1 reveals that 57.5% of the respondents had primary school education, 28% had secondary school education, 10.8% of the respondents had no formal education, and 6.7% of respondents are educated to tertiary level. From Table 1, 52.2% of the respondents had more than seven members in their household, 31.4% of the respondents had between 4 and 7 members in their households and 16.4% of the respondents had 3 members and below in their household.

**Table I: Distribution of Socio-Economic Characteristics of the Respondents**

| Variables | Percentage (N= 120) |
|---|---|
| **Sex** | |
| Male | 53.3 |
| Female | 46.7 |
| **Age** | |
| <30 | 2.0 |
| 31-50 | 54.2 |
| >50 | 43.8 |
| **Mean= 31 years** | |
| **Religion** | |
| Christianity | 78.3 |
| Muslim | 20.0 |
| Traditional | 1.7 |
| **Marital Status** | |
| Single | 8.0 |
| Married | 97.5 |
| Widowed | 1.7 |
| **Educational Level** | |
| No formal education | 10.8 |
| Primary school | 57.5 |
| Secondary school | 28.0 |
| Tertiary school | 6.7 |
| **Household Size** | |
| <3 | 16.4 |
| 4-7 | 31.4 |
| Above 7 | 52.2 |

**Source: Field survey (2016)**

**3.2 Technology Needs**

According to Table 2, an improved variety of seed is the technology needed most among the technologies used by the farmers and was ranked 1st with 2.55 mean score. Agro-chemical was ranked second in the need priority ranking with 2.13 mean score. Storage facilities had a mean score of 2.09 thereby making it the 3rd most needed technology. Machinery for the commercial farm was ranked the 4th and the least needed with a mean score of 1.92.

**Table 2: Technology Need Ranking**

| Technology | N=120 | Mean Score | Ranking |
|---|---|---|---|
| Improved variety of seed | 120 | 2.55 | 1 |
| Agro-chemicals | 120 | 2.13 | 2 |
| Storage facilities | 120 | 2.09 | 3 |
| Machinery | 120 | 1.92 | 4 |

**Source: Computed from Field Survey (2016)**

**3.3 Technology Used by arable farmers**

Figure 1 is the bar chart showing the distribution of technologies used by respondents which include an improved variety of seed, machinery, agro-chemicals and storage facilities.

The use of agrochemicals as shown in figure 1 is represented by 75.5% of the respondents. This shows that a very larger percentage of the respondents make use of agrochemicals. Figure 1 reveals further that only 9.1% of the respondents were planting improved varieties of crops, 5% of the respondents were using modern storage facilities as technology and just about one per cent (0.8%) were using machinery as a technology for production

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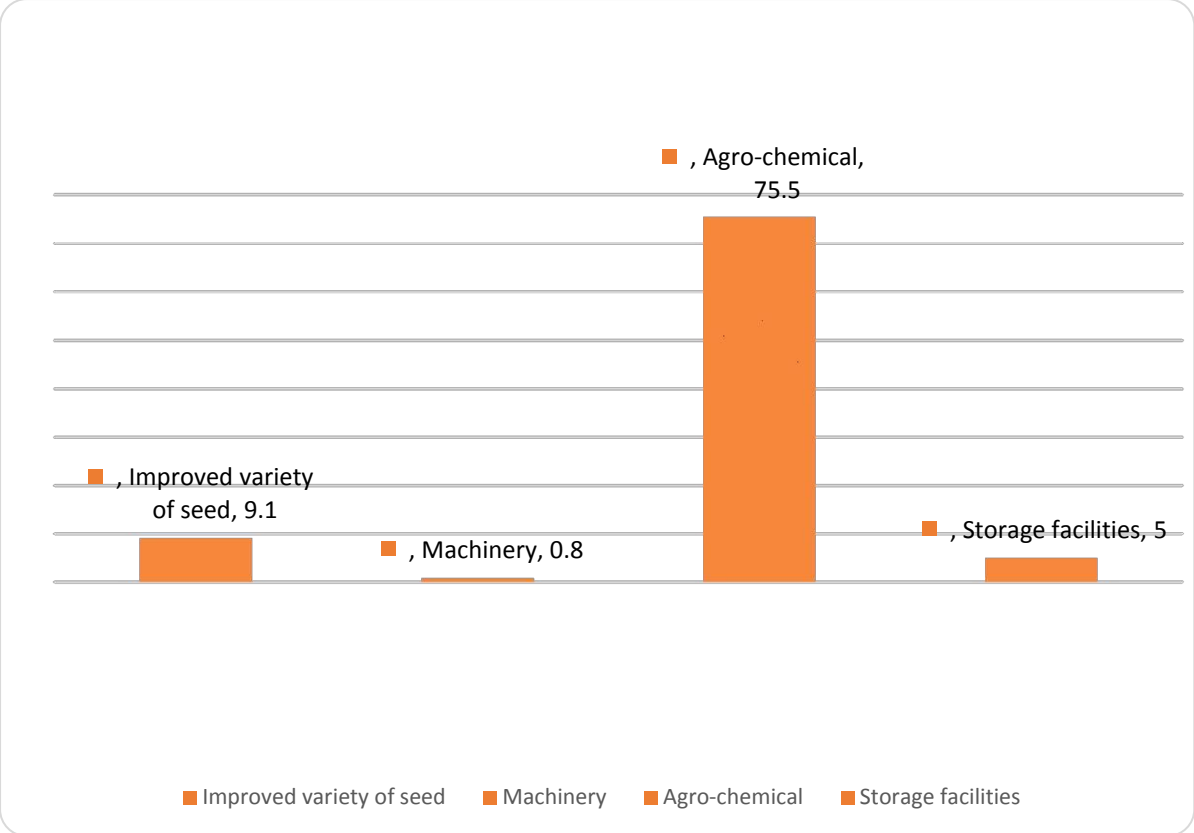


**Figure 1: Technology Used by Respondents**

**3.4 Results of hypothesis**

The result of the statistics test in Table 3 shows that there is no significant relationship between the sex of the respondents and technology need (p= 0.00); between the educational level of the respondents and the technology need (p-value = 0.53). However, there is a significant relationship between respondents' marital status and technology need (p-value is 0.000); and between respondent's source of land and technology need (p-value =0.000)

**Table 3: Chi-Square Test between Socio-Economic Characteristics of Respondents and Technology Need**

| Variable | $\chi^2$-value | df | p-value | Decision |
|---|---|---|---|---|
| Sex vs. technology need | 31.738 | 33 | 0.530 | Not significant |
| Marital status vs. technology need | 148.974 | 66 | 0.000 | **Significant** |
| Educational level vs. technology | 105.467 | 99 | 0.310 | Not significant |
| Source of land vs. technology need | 205.444 | 132 | 0.000 | **Significant** |

**Source: Field survey (2016)**

Table 4 shows that there is a significant relationship between respondents' household size and the technology need (p-value of 0.020). There is also a significant relationship between respondents' distance of farm to the village main market and the technology need. The Pearson correlation coefficient value of 0.172 is significant at the 0.05 level of significance the p-value = 0.030. In contrast, there is no significant relationship between respondents' distance of farm to an agricultural extension office and the technology need the p-value is 0.063; and between the age of respondents and the technology need (p-value of 0.328)

**Table 4: Correlation between Socio-Economic Characteristics of Respondents and Technology Need**

| Variables | r-value | p-value | Decision |
|---|---|---|---|
| Household size Vs. technology needs | -0.058 | 0.020 | **Significant** |
| The distancefrom your farm to an agricultural extension office Vs. technology needs | 0.140 | 0.063 | Not significant |
| The distancefrom your farm to the village main market Vs. technology needs | 0.172* | 0.030 | **Significant** |
| Age of respondent Vs. technology needs | -0.041 | 0.328 | Not significant |

**Source: Field Survey, 2016**

**5.0 Discussion**

The result in Table 1 shows the socioeconomic characteristics of the respondents. Age implies that most of the people are in the active age bracket. These active people can still practice arable crop production and with the right technology available to them, they can take arable crop production in the Nigerian agricultural sector to a self-sufficiency level. Arable crop production is dominated by males in this study area. This may be as a result of males being more active and stronger than the females or because females engage in other activities like child care. The women may be involved more in the processing of arable crops than in its production. Women play an important role as producers of food, as managers of natural resources, in income generation and as providers of care for their families (Akinyele, 2009). In addition, African society is a male dominated one which makes women have less access to land and other necessary inputs when compared to their male counterparts. Nigerian men are five times more likely than women to own land (British Council, 2012)

The result shows that most respondents are Christians. This confirms that Ondo state is a Christian dominated state. The majority of the inhabitants of the state are Christians. This could be as a result of the influence of early missionaries who brought western education to the state. This finding is in tandem with Fasina and Odefadehan (2014) who investigated the prospects of using mobile phones among farmers in Ondo state. They found out that 82% of farmers were Christians. The study also shows that most arable crop farmers were married. This is a reflection that African society holds marriage in high esteem while singles of the marriageable age or divorced individuals are not accorded respect and are seen as deviants from the norms of the society. The arable farmers being mostly married could also be attributed to the need for cheap family labour. Most arable crop farmers get married and start their families in order to get assistance in farming from their family members. Nigerian farmers carry out farm operations manually and tend to utilise more of family labour thereby making the farm family-based and not commercial.(Nmadu and Akinola,2015).

The primary school education which most of the respondents attained will assist the farmers in making right decisions about technologies needed compared to those without education. Education has been discovered to have positive correlation with adoption of technology. Education level was found to have significantly influence adoption of improved maize varieties. (Bawa and Ani 2014)

Improved varieties of seeds is the technology mostly needed by the farmers and was ranked 1st. Improved varieties of seeds is an important input which must be available to farmers. Yield is determined to a large extent by the quality of seed planted regardless of all other technologies or cultural practices but complained of its poor distribution during the survey. Nigeria is blessed with arable land that could help lift its people out of hunger, but despite the huge potential improved seeds hold for crop yield, its distribution system in Nigeria is poorly developed (Channels Television,2016).For example, using agro-chemicals like fertilizer on poor - quality seed planted is a waste of resources because the fertilizer can only enhance the nutrients in the soil and not the quality of the seed planted. Agro-chemical was ranked second on the priority need ranking. During the survey, the farmers opined that agro-chemicals are very useful input but they complained of its scarcity and high cost in the local market. The scarcity of these products could be attributed to the location of the respondents being rural. Most of these agrochemicals are available in the major agrochemical stores in the state capital and some local government headquarters across the state. This implies that governmental and non-governmental efforts at making improved seed and agrochemicals available at subsidized rates will greatly boost arable crop production. Storage facilities ranked 3rd in order of needed technology. The respondents complained of low income which they attributed to inadequacy of technology to preserve their produces after harvesting. The farmers often sell at ridiculously low prices during the cropping season. The cropping season is usually characterised by glut which forces the farmers to sell at low prices. In the offseason, products often become scarce because the excesses that could have been stored for sale in the offseason could not be stored as a result of non-availability of storage technologies. Machinery for commercial farm was ranked the least needed (4th) technology. This could be so because most of the farmers were subsistence farmers. The mechanization need of the farmer will depend on the power requirements of the farm as determined by the farm size, the production system and the extent to which existing power supply is a constraint on improving output (Onwualu *et al*., 2006)

Agrochemicalsis the technology mostly used. This could be as a result of the benefits derivable from its use, such as, increased yields, less stress in weeding, pest and disease

control and its cost-effectiveness. Examples of such agrochemicals are herbicides, fertilizers, fungicides and pesticides. According to the respondents during FGD, *improved varieties of seeds was not popular as expected because of its non-availability locally and also because of its high cost. According to the respondents, most of them were not using modern storage facilities due to its non-availability in villages and the high cost to build one. In addition, the level of the production of the farmers is not on the commercial scale. The level of their production may not encourage huge investments involved in the building of storage facilities*. The very negligible proportion of the farmers use machinery. Machinery is not rarely needed because the land used for cultivation is not large enough to use machinery profitably. It will not be cost-effective due to the small size and scattered plots most of the farmers have. *The high cost of acquiring these machines was also mentioned as a limiting factor in the use of machinery. In addition, the topography of the land in Ondo state makes it difficult to use farm machinery, as mentioned by the farmers during the focus group discussion (FGD).*

The marital status of respondents has a significant relationship with the technology need. This implies that the marital status of the respondents determines the need for particular technologies. A married farmer may have large family size, whose members can work on his farm, and may therefore not really need labour saving technologies compared to an unmarried farmer. Table 3 reveals that there is a significant relationship between the ownership of land and the technology need. The implication of this is that if a farmer owns a land through lease, the type of technology he might need may be different from someone who inherited his own land because ownership is permanent in the inherited land, while it is temporary in the lease arrangement. This could be explained by the cost of the lease which the farmer will consider alongside the cost of technology to be used in such a way to make a profit. Conversely, inherited land is free of such cost to acquire land.

The correlation in Table 4 between the household size of respondents and technology need is significant but inverse. The implication of this is that the size of a household size determines the need for technology i.e. a big households will possibly need a different type of technology compared to a family of smaller household size. The negative sign shows an inverse relationship i.e the larger the household size the less the technology need of such household in the production of arable crops. The relationship between the distance of farmers' farm to the village main market and technology need is also significant. The implication of this is that the distance of respondents' farm to the village main market affects his or her technology need; for example if the distance of respondents' farm to the village market is very large, the farmer may need tractor to transport the farm produce to the market compared to a farmer whose farm is a stone throw to the market, such farmer can afford to carry the products on his head or use wheelbarrow and walk down to the market. Time is also a factor to be considered, if the products do not get to the market on time they may spoil or the market could have been over. Therefore farmers whose farms are far from the market need technologies that can assist in getting their farm produce to the market on time and with ease i.e motorcycle, tricycles or vehicles.

**Conclusion**

The study assessed the need for various agricultural technologies by arable crop farmers in Ifedore LGA of Ondo State. The technology needed most was improved variety of seed followed by agro-chemicals, then storage facilities and lastly machines in order of priority. The study also revealed that arable crop farmers were not using some of these technologies like modern storage and machines because of cost as such not available. Improved varieties of seed are crucial to boosting arable crop production.

**Recommendation**

Based on the findings of the study, the following are recommended:

- Government effort should be channelled towards making technologies available to the farmers in remote areas at subsidised rate especially the ones that were ranked as very important.
- Farmers should be encouraged to form societies so that they can pool resources together to purchase expensive technologies like storage facilities (cold rooms, silos) which are capital intensive.
- The model of Public-Private partnership should be considered if agriculture is to be treated as a real business rather as intervention programmes. Private companies can build cold rooms, silos, purchase tractors and charge farmers for the use.

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