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# Accessibility of Women Vegetable Farmers to Production Resources in Irepodun Local Government, Kwara State, Nigeria

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## ABSTRACT
The study investigated the women youth vegetable farmers access to farm resources in Kwara State, Nigeria. The study assessed respondents' socioeconomic characteristics, access to production economics, and the constraints mitigating the accessibility of production resources. A multistage sampling procedure was used to select 120 women vegetable farmers from six (6) communities in Irepodun Local Government Area (LGA). Data collected were analysed using descriptive and inferential statistics. The results show that the mean age and the standard deviation of the farmers was 45±5.9 years, 52.5% had at least primary education, and 81.7% were married, with household size between 4-6 persons. The mean farm size was 0.19 ± 0.2. hectares while most had between two and four hired labourers who work regularly on their farms. Access to production resources was constrained by the high cost of labour, inadequate credit facilities, illiteracy, and poor infrastructural facilities. There is a positive and significant relationship between access the female farmers have to productive resources and the level of income, membership of vegetable cooperative society (p-value $< 0.01$) and farm size ($p < 0.05$). Women vegetable farmers in the study area had moderate access to productive resources because they do not have enough financial power to modernise and increase the output of their farms. It is therefore recommended that credit related policies, programmes and interventions that will increase the female vegetable farmers' financial capacity should be implemented.
***Keywords:*** *Productive Resources, women, and vegetable farmers.*

## INTRODUCTION
Nigeria rests on the back of women for the subsistent and commercial cultivation of vegetables across its borders, as many vegetable farmers in the country are females although men are also present in other areas of the industry (Olowa and Olowa, 2015). According to Ugwu (2019) and Patil and Suresh (2018) women represent about 43.0 per cent of the world's agricultural labour force. They accounted for most of the 80.0 per cent of agricultural production output that comes from small-scale farmers across Africa. However, women still appear to be inadequately supported in the sector as in some countries on the continent. Many still do not have the right to own land and other farm production resources.

In Nigeria, the situation appears to be different as women were allowed to own properties, although the process and conditions that need to be met are different in different parts of the country (Oriaghan, 2018; Food and Agriculture Organisation, 2020). For instance, in South-Western Nigeria, women can inherit their parent's properties while in South-Eastern Nigeria, it is dependent on their marital status and or whether they have a male sibling(s) or male children (in the case of her husband's properties) (Oriaghan 2018). In northern Nigeria, it is dependent on her marital status regardless of whether she has a male child or male siblings. However, due to wanting the prosperity of her family, she can decide to relinquish a property she has inherited to her brothers since she would be married anyways and her husband's property would be there for her to inherit (Munn, 2019). Outside of this instance, women were allowed to own properties wherever they choose in the country Slavchevska, *et al.*, 2018; FAO, 2020).

Since women have the legal right to own properties including agricultural ones, it appears therefore that the challenges female agricultural farmers face, including vegetable farmers, is that of financial capacity and capability rather than lack of right to property ownership. According to Ugwu (2019), the most pressing need of female farmers in Nigeria is finance related and not property ownership related. In addition, in a recent study by Adegbite and Machete (2019) using a mixed method, the authors found that the financial inclusion Gender Gap in smallholder agriculture which is a large contributor to employment in the country was just 12%. This was further confirmed by Enfield (2019) who reported that female farmers across the country owned lower amounts of household assets and have lower agricultural harvest values annually compared to their male counterparts. Moreover, Corteva (2018) reported that female farmers' greatest concern was not land related but financial access related.

Vegetable farming can be defined as the cultivation of plants for the consumption of their leaves, stalks, stems, fruits, flowers and other edible plant parts. It can be divided into Leaves, Stem and Flowers Vegetable Farming, Fruit Vegetable Farming, Root Vegetable Farming, and Bulb Vegetable Farming. The University of California Cooperative Extension (2019) defined a vegetable as any edible part of a soft-stemmed plant. They went further to divide into plants produced for their leaves (e.g. lettuce), for their stem (e.g. celery), for their tubers (e.g. sweet potato), for their roots (e.g. carrots), for their bulbs (e.g. onions) and their flowers (e.g. broccoli). Vegetables contribute vitamins, water, amino acids, and minerals to human diets.

Munn (2019), reported that women play a dominant role in the production of vegetable crops in Nigeria and they represent 43% of the total agricultural workforce in the country. They account for about 40-65% of all farm hours and between 60-90% of all rural agricultural product marketing and they contribute to the growth and development of the economy (Barau and Oladeji, 2017). Due to this fact, it is therefore necessary for studies to be conducted on how these contributors could be assisted and empowered to contribute more to the economy.

In the light of the foregoing, the study described the socio-economic characteristics of female vegetable farmers; identified the production resources available; determined their level of access and identified the constraints to access. The study hypothesized that there is no significant relationship between the selected socio-economic characteristics of female vegetable farmers and their access to production resource.

## METHODOLOGY

The Study was carried out in Irepodun Local Government Area of Kwara State, Nigeria. It's located between latitude 8° N and 8° 25' N and between longitude 4° 40' E and 5° 30' E. bound in the north by Ifelodun Local Government Area, Ekiti Local Government Area in the east, Osun State in the south, and Offa Local Government Area in the west. The headquarter is located at Omu-Aran. The local government area is 737 km in size and it has a population of 148,610 people (*National Population Commission*, 2006) The occupation of the people of this area included weaving, arts and crafts, tannery, embroidery, small and light industries, agriculture (crop and animal production), banking and insurance services. The area is a savannah vegetation with grasses and trees predominantly, and it experiences three seasons yearly which are: dry, wet and harmattan seasons; and it experiences rainfall of between 1100mm and 1500 mm for six(6) months annually.

A multistage sampling procedure was used to select the 120 respondents. The first stage involved the purposive selection of six communities that included: Esie, Elekoyangan, Agbamu, Amberi, Ijomu and Ajase been major vegetable production communities in the study area. Stage two involved the random selection of twenty (20) female vegetable farmers in the local government area making a population of one hundred and twenty respondents. Descriptive statistical techniques such as frequency, percentage and mean rank were used to describe and summarize the data while inferential statistics tools such as multiple-regression were used to test for the hypotheses. The dependent variable of this study was access. The respondents were given a list of vegetable production resources and were measured on a 3-point rating scale of accessible (3), partially accessible (2) and not accessible (1) to know the level of respondent's access. The total score for each respondent was grouped into three categories: high, low and medium. The high was placed within the mean + standard deviation, the low was placed within mean – standard deviation and the medium ± standard deviation.

## RESULTS AND DISCUSSION

**Socio-Economic Characteristics of the Vegetable Farmers:** Results contained in Table 1 show that the mean age and the standard deviation of the female vegetable farmers was 45.41 ± 5.94 years with more than 75% of them being in the age bracket of 18 to 50 years of age which implies that the majority of the female vegetable farmers are relatively strong and agile and therefore, expectedly, able to perform all the activities on their farms. This result is in agreement with the result of Balau and Oladeji, (2017) that most of their respondents were in the youthful and vibrant category of workers in their study area.

The study results presented that majority (81.7%) were married. Married people with responsibilities to cater for the family tend to be more committed to the success of their farming business. Also, a good majority (62.5%) of the respondents were literate. This is in agreement with Adekunle and Agboola (2013) report of 75% literacy level among youth vegetable farmers in Oyo State, Nigeria. The mean household size of the respondents was 4.59±1.13 persons. This means that the majority (96.7%) of the farmers had access to family labour. This result corresponds to the findings of Barau and Oladeji,

(2017) that the majority of the respondents in their study area had household sizes of between one and 5. The result also shows that the female vegetable farmers possess a mean farm size of 0.19±0.20 hectares. This implies that the majority of women vegetable farmers operate on a small scale. Adisa, *et al.*, (2016) reported a mean farm size of 0.8 hectares among youths cultivating underutilized vegetables in south western Nigeria. The majority (74%) of the vegetable farmers hired between 2-3 hired labourers on their farms apart from the potential and accessible family labour they have.

**Table 1: Socioeconomic characteristics of female vegetable farmers**

| Variable | Frequency | Percentage | Mean ± Std. Dev. |
|---|---|---|---|
| **Age** | | | |
| Less than 30 | 2 | 1.7 | |
| 31 – 40 | 29 | 24.2 | |
| 41- 50 | 60 | 50.0 | 45.41(5.938) |
| 51 and Above | 29 | 24.2 | |
| Total | 120 | 100 | |
| **Marital Status** | | | |
| Single | 1 | 0.8 | |
| Married | 98 | 81.7 | |
| Divorced | 3 | 2.5 | |
| Widowed | 18 | 15.0 | |
| Total | 120 | 100 | |
| **Educational Qualification** | | | |
| No formal education | 45 | 37.5 | |
| Primary Education | 63 | 52.5 | |
| Secondary Education | 12 | 10.0 | |
| Tertiary Education | 0 | 0.0 | |
| Total | 120 | 100 | |
| **Household Size** | | | |
| 1-3 | 23 | 19.2 | |
| 4-6 | 93 | 77.5 | 4.59 (1.133) |
| 7-10 | 4 | 3.3 | |
| Total | | | |
| **Farm Size** | | | |
| ≤ 0.09 | 51 | 42.5 | |
| 0.1 – 0.39 | 55 | 45.8 | |
| 0.4 – 0.69 | 5 | 4.2 | 0.19 (0.201) |
| 0.7 – 1.0 | 9 | 7.5 | |
| Total | 120 | 100 | |
| **Number of Employees** | | | |
| 0-1 | 11 | 9.2 | |
| 2-3 | 90 | 74.0 | |
| >3 | 19 | 15.8 | |
| Total | 120 | 100 | |

**Source:** Field Survey, 2022

**Accessibility to Productive Resources.**

Results in Table 2 show respondents' accessibility to production resources. Findings indicate that hired labour (mean=3.15), rivers (mean=325), borehole (3.25) and hoe and cutlasses (mean = 2.90) were the predominant production resources that the women vegetable farmers had access to. Other production resources were leased land (mean = 2.76), watering can (mean = 2.85) and extension services (mean=2.28). This implies that

women vegetables farmers within the study location had access to hired labour, sources of water, land and extension services. This gives further support to Barau and Oladeji, (2017) and Adegbite, *et al.*, (2020). Study results that were the most pressing need of female farmers in Nigeria is finance related and not property ownership related. This further buttresses Corteva (2018) assertions that female farmers in Nigeria do not lack access to farmlands which they can cultivate.

***Table 2: Accessibility to production resources.***

| Accessibility of Production Resources in the Community | | | |
|---|---|---|---|
| Sub Category | | *Mean Score* | *S.D.* |
| Land | Inherited | 2.00 | 0.15 |
| | Leasehold | 2.76 | 0.29 |
| | Purchased | 2.02 | 0.14 |
| Labour | Family labour | 2.00 | 0.41 |
| | Hired labour | 3.15 | 0.41 |
| Water | Well | 2.21 | 0.40 |
| | River | 3.25 | 0.20 |
| | Borehole | 3.25 | 0.20 |
| | Irrigation (Sprinkler System) | 1.10 | 0.52 |
| Mechanisation | Tractor | 1.01 | 0.25 |
| | Pumping machine | 1.00 | 0.26 |
| Fertilizers | NA | 1.04 | 0.00 |
| Pesticides | | 1.84 | 0.00 |
| Herbicide | | 1.99 | 0.00 |
| Credit and Loan | | 1.91 | 0.00 |
| Extension Advisory | | 2.28 | 0.00 |
| Means of Transportation | | 2.45 | 0.00 |
| Tools and Implement | Watering can | 2.85 | 0.07 |
| | Knapsack sprayer | 2.38 | 0.28 |
| | Wheelbarrow | 2.30 | 0.16 |
| | Hoe and cutlass | 2.90 | 0.13 |
| | Rake and shovel | 2.50 | 0.20 |
| | Watering hose | 2.35 | 0.13 |
| Seed | | 2.05 | 0.00 |
| Mean | | 2.02 | 0.20 |

***Source: Field Survey, 2022***

**Constraints to access to productive resources**:

The results in Table 3 show the constraints faced by female vegetable farmers in the study area. The major constraints militating respondents access to production resources were high price of labour (2.98), inadequate credit facility (2.73) and illiteracy level (mean=1.73). This therefore implies that the highest of the constraints faced is financial in nature with illiteracy as a sub setting factor confirming the reports of Corteva, (2018), Adegbite and Machethe (2019), and Adegbite, *et. al.*, (2020). This may be as a result of the fact that literate farmers are more likely to be exposed to information sources on credit than illiterate ones. Furthermore, this result is in tandem with the findings of Agu, *et al.*, (2015) that lack of access to credit facility was the second most constraining factor that female vegetable farmers face in the country.

**Table 3: Constraints towards access to production resources.**

| Constraints to the assess of productive resource | Mean score | Mean Rank |
|---|---|---|
| Gully erosion | 1.25 | 6th |
| High cost of treated seeds | 1.50 | 5th |
| Poor infrastructure (bad roads, water supply) | 1.60 | 4th |
| Illiteracy | 1.73 | 3rd |
| Inadequate credit facility | 2.73 | 2nd |
| High price of labour | 2.98 | 1st |

***Source: Field Survey, 2022***

**Test of Hypotheses**: As shown in Table 4 the farm size of the female vegetable farmers had a positive and significant relationship with access to productive resources ($p < 0.05$). The regression coefficient (0.259) indicates that as the farm size of the female farmer's increase by 1 hectares, the access they would have to productive resources would also increase by approximately 0.26 units. The result of this test is in support of Noack and Larsen, (2019) that access to productive resources increases with increasing farm size. It is also decipherable that the level of access the female farmers have to productive resources increases with the level of income of the farmers of and on the farm by almost nearly nil and 0.14 respectively with the off-farm income having a highly positively significant relationship at a p-value of 0.01. The implication of this result is that for every increase in off-farm income, the access of the female vegetable farmers to productive resources increases by 0.14 unit. This further confirms the result of Reij and Waters-Bayer, (2016) that farmers who have off-farm income tend to have access to more productive resources that enhances their innovativeness.

The results further indicate there is a negative and significant relationship between the access of the farmers to productive resources and the number of employees they have at a p-value of 0.01. This means that as the number of hired labour on the farms increases, the level of access to productive resources decreases by 0.09 units which is not surprising because as the level of mechanisation increases, the level of manual labour decreases and vice-versa.

Finally, there is a positive and significant relationship between access and membership of vegetable cooperative society (p-value < 0.01). It is inferable that access to productive resources increases by 0.20 units for every unit increase in membership of a cooperative society. This could be as a result of financial empowerment.

***Table 4: Result of multiple regression analysis to identify the socio-economic determinants to female vegetable farmers' access to productive resources***

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | p-value |
|---|---|---|---|---|---|
| | *(B)* | *Std. Error* | *Beta* | | |
| (Constant) | 1.899 | *0.276* | *0.000* | *6.869* | *0.000* |
| Farm Size | 0.259* | *0.106* | *0.225* | *2.435* | *0.017* |
| Number of Employees | -0.094** | *0.038* | *-0.354* | *-2.501* | *0.014* |
| Income | 8.640E-6* | *0.000* | *0.175* | *2.028* | *0.045* |
| Others Sources of Income | 0.138** | *0.047* | *0.272* | *2.943* | *0.004* |
| Age | -0.003 | *0.005* | *-0.081* | *-0.590* | *0.556* |
| Membership of Vegetable Cooperative Society | 0.201** | *0.050* | *0.432* | *4.023* | *0.001* |
| Dependent Variable | | *Access to agricultural resources* | | | |
| R | | *0.562* | | | |
| R Square | | *0.315 = 31.5%* | | | |
| Adjusted R Square | | *0.246* | | | |
| Std. Error of the Estimate | | *0.20013* | | | |
| F-Statistics | | *4.523* | | | |
| Sum of square residual | | *4.326* | | | |

***Source: Field Survey, 2022 **Significant at 1%, * Significant at 5%***

## CONCLUSION AND RECOMMENDATION

Women vegetable farmers have moderate access to production resources because they do not have enough financial power to modernise and increase the output of their farms. Access to production resources was constrained by high cost of labour, inadequate credit facilities, illiteracy, poor infrastructural facilities. It is therefore recommended that credit related policies, programmes and interventions that will increase the female vegetable farmers' financial capacity should be implemented.

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# Determinants of Child Labour Among Rural Households in Yewa Division of Ogun State, Nigeria

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**ABSTRACT**
Child labour has severe consequences including lack of child education, hazardous working condition and inhuman treatment. This study examined the socioeconomic factors influencing child labour among rural households. A multistage sampling technique was used to collect data from 120 child workers below 18 years-old through structured questionnaires. Descriptive statistics and Tobit model were used to analyse the data. The result shows that average age of a child labour was 14.31 years, 72.5% were male, 55.0% were school dropout while 43.3% were non-indigene in the residence area. Perceived characteristics of household heads show that 59.2% were below 50 years-old and 60.8% were married. Child labour generated highest income from hawking (₦5,417.02). Household size (0.215), income from child labours (3.072) and low child's education (10.734) significantly increased hours of child labour. Awareness should be created to educate parents/ guardians against child labour in the society.
Keywords: Child labour, Determinants, Working hours, Households, Economic activities

## INTRODUCTION

Child labour is an exploitative form of children employment in work that interferes with their regular attendance in school. It exposes them to hazards and prone them to exploitation as well as long and tiring domestic services. These hazards are usually associated with the violation of children's fundamental rights including denial of access to education, healthcare, leisure and recreation (ILO, 2011). The involvement of children in attaining food and nutrition security is high (55.0%) because of poverty being entrenched among the households (Dada and Fapojuwo, 2011). Oyebanjo *et al* (2021) attested that the poor farm households is large with a minimum of 7 members while 80.5% cultivated small farms between 1-2 hectares and they consumed a larger proportion of their farm output with little or no farm income. Sodiya et al (2013) reported that children who participated in agricultural activities were vulnerable to farm hazards ranging from contact with harmful insects (58.3%), injuries due to cutlass and hoe cuts (38.3%), exposure to harsh weather condition (36.7%) and skin rashes (41.7%).

The incidence of child labour is a wide spread phenomenon caused by household poverty, social exclusion, low literacy level of parents or guardians, gender and ethnic discrimination against children within households and untimely death of parents. Eric (2014) observed that the implementation of the Children Right Act in Nigeria has been a cause for concern in addressing the violations of children's right, particularly in some critical aspects of their development ranging from health, education and general well-being. However, the 1999 Constitution of the Federal Republic of Nigeria (section 4a of Article 28) recognizes a person below the age of 18 years as a child while about 15 million children were engaged in child labour in Nigeria (Ajakaye, 2013).

Ibrahim *et al*., (2018) affirmed that 11.7% of rural children who were involved in marketing of farm produce marketing were less than 10 years old while 40.8% were between 11-13 years old. Most of the child workers are separated from their families, assigned heavy works under poor working conditions, and they work tirelessly for long hours regardless of their age, sex, health conditions and they are denied the rights to education. Meanwhile, education has been globally accepted as instrument of power, prestige, survival, greatness and advancement for men and women (Okorie, 2017). The study of Adamu et al., (2018) revealed that 67.5% of the rural women had unfavourable disposition and perception to their children having the right to basic education. Sasmal and Guilen (2015) noted that parents are forced to send their child to work when there is persistent poverty. This is when a low households' income leads to increase in child labour. Abdu *et al*. (2020) reported that the pupils who were involved in child labour became too fatigued for school work, they were tired to read and had constrained enrollment in school while 55.1% of them had disruption in school attendance.

In view of the aforementioned reasons, this study aimed at investigating the factors influencing child labour in the study area. The specific objectives of the study were to describe the socioeconomic characteristics of the children who were engaged in labour activities, estimate the hours of engagement and examine the socioeconomic determinants of child labour among the rural households. The findings would be useful in formulating effective policies towards reducing child labour and its effects among the children below 18 years of age.

## METHODOLOGY

The study area is Yewa Division of Ogun State, which comprises of five (5) Local Government Areas (LGAs) with a total estimated population figure of 1,892,600 (NPC, 2022) and land mass of about 5,915.431 sq. km. The two distinct seasons namely; rainy and dry seasons favour agricultural production and related activities in the area. The type of vegetation is the tropical rain forest with mean

temperature of $30^0$C and rainfall distribution between 1000mm and 2000mm (Apantaku, 2003).

The target population comprised of children below 18 years who were involved in labour activities. A multistage sampling technique was used to select the respondents while primary data were collected using well-structured questionnaire and interview guide.

The first stage involved the selection of Yewa North and Imeko-Afon LGAs. In the second stage, six (6) communities namely; Afon, Imeko, Iwoye, obada, Oke-Agbede and Idi-Ayin were selected from Imeko/Afon LGA while Ayetoro, Ibese, Igbogila, Iboro, Imasai and Sawonjo were selected from Yewa North LGA. The study area was selected due to involvement of children in labour activities which was prevalent among the households. At least, ten (10) rural children were randomly selected from each community based on their involvement in labour activities. Consequently, complete responses from 120 children were used in the data analysis using frequency, percentage and mean. However, Tobit model which is also called a censored regression model was used to estimate the determinants of child labour. The application of the Tobit model follows Amore and Murtinu (2019) as specified below:

$X_i \beta = Y_i^* + \mu_i \quad i = 1, 2, \ldots, n$

$Y_i = Y_i^* \quad \text{if} \quad Y_i^* > 0$

$Y_i = 0 \quad \text{if} \quad Y_i^* \leq 0$

The linear form of the estimating equation is specified as:

$Y_i^* = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \mu_i$

Where

Y = Child labour (hours spent by child in labour activities per week),

$X_1$ = Age of child worker (years),

$X_2$ = Sex of child worker (1, if male; 0, if otherwise),

$X_3$ = Household size of the child (number),

$X_4$ = Income from child labour (₦) per week,

$X_5$ = Child relationship with household head (1, if parent; 0, if otherwise)

$X_6$ = Migration status of the child (1, if indigene; 0, if otherwise)

$X_7$ = Marital status of household head (1, if married; 0, if otherwise).

$X_8$ = Educational level of child worker (years)

$X_9$ = Major occupation of household head (1, if farming; 0, if otherwise)

$\mu_i$= Error term.

## RESULTS AND DISCUSSIONS

### The Socioeconomic Characteristics of the Child Workers

The estimates of socioeconomic characteristics of the child workers in Table 1 show that an average child was 14.31 years of age, 72.5% of them were male while 27.5% was female. About 24.2 % were school dropout, 30.8% had no formal education, 33.3% was in primary school while 11.7% were attending secondary schools. Specifically, 62.5% was involved in labour after school hours, 30.0% was engaged during school hours while 7.5% of them were permanent child workers either as maid or apprentice. However, 56.7% of the child workers were indigenes of the community, 43.3% were non-indigenes while 64.2% were not living with their parents or family relations.

**Table 1: Distribution of the Children by their Socioeconomic Characteristics (n=120)**

| Characteristics | Frequency | Percentage | Mean |
|---|---|---|---|
| **Age of child** | | | |
| Less than 10 years | 18 | 15.0 | |
| 10 - < 14 years | 55 | 45.8 | |
| 14 - <18 years | 47 | 39.2 | 14.31 |
| **Sex of child** | | | |
| Male | 87 | 72.5 | |
| Female | 33 | 27.5 | |
| **Educational level of child** | | | |
| No formal education | 37 | 30.8 | |
| School dropout | 29 | 24.2 | |
| Primary education | 40 | 33.3 | |
| Secondary education | 14 | 11.7 | |
| **Period of child labour** | | | |
| During school hours | 36 | 30.0 | |
| Characteristics | Frequency | Percentage | Mean |
| Characteristics | Frequency | Percentage | Mean |
| After school hours | 75 | 62.5 | |

| | | |
|---|---|---|
| Apprentice/ contracted child workers | 9 | 7.5 |
| **Migration status of child** | | |
| Indigene | 68 | 56.7 |
| Non-indigene | 52 | 43.3 |
| **Child relationship with guardian** | | |
| Parent | 13 | 10.8 |
| Family relations | 30 | 25.0 |
| Master/ Employer | 77 | 64.2 |

Source: Field data, 2021

**Characteristics of Household Heads as Perceived by Child Worker**

The socioeconomic characteristics of the household heads perceived by the child workers are presented in Table 2. The results reveal that majority (59.2%) of the household heads were less than 50 years-old while 40.8% were 50 years old and above. This implies that majority of the household heads were young and active age. The male guardians were 72.5% while 27.5% was female. Majority 60.8% was married, 27.5% was widow/ widower while (11.7%) was divorced or separated. About 30.8% of the household heads could not read or write, 62.5% was semi-literate while 6.7% was well educated. The low percentage shows that educated household heads were less involved in child labour. More so, 62.5% of the involving households had, at least, 8 members while 37.5% had a maximum of 4 persons in the family. In addition, the involving rural households were into farming (56.7%), processors/ traders (17.5%), Artisans (11.7%) and transporters (5.8%).

**Table 2: Characteristics of Household Head Perceived by Child Worker**

| Characteristics | Frequency | Percentage | Mean |
|---|---|---|---|
| **Age of household head** | | | |
| Below 50 years | 71 | 59.2 | |
| 50-60 years | 28 | 23.3 | |
| Above 60 years | 21 | 17.5 | |
| **Sex of household head** | | | |
| Male | 87 | 72.5 | |
| Female | 33 | 27.5 | |
| **Marital status of household head** | | | |
| Married | 73 | 60.8 | |
| Divorced | 4 | 3.3 | |
| Widow | 33 | 27.5 | |
| Separated | 10 | 8.4 | |
| **Education level of household head** | | | |
| Illiterate | 37 | 30.8 | |
| Fairly literate | 75 | 62.5 | |
| Literate | 8 | 6.7 | |
| **Family size** | | | |
| 1 – 4 | 45 | 37.5 | |
| 5 – 8 | 53 | 44.2 | 7.24 |
| Above 8 | 22 | 18.3 | |
| **Major occupation of household head** | | | |
| Farming | 68 | 56.7 | |
| Trading/ processing | 22 | 18.3 | |
| Civil Service | 10 | 8.3 | |
| Transportation | 7 | 5.8 | |
| Artisanship | 13 | 10.8 | |

Source: Field data, 2021

**Economic Activities and Income of Child Labour**

The results in Table 3 show the average numbers of hours spent in labour activities and income generated by a child on weekly basis. The findings revealed that most of the child workers (65.0%) were involved in land clearing/ weeding without income implying that they were possibly used as family labour. This was followed by firewood fetching (60.8%) which generated ₦ 1,674.48 ($4.15) per week. Hawking involved 40.8% of the child labour with the highest income of ₦5,417.02 ($13.42) per week.

About 29.2% of them supplied hired labour to other people's farm with income of ₦3,734.98 ($8.20) per week while the least (9.2%) were involved in hunting/ fishing to support their families.

Meanwhile, an average of ₦1,525.53 ($3.78) per week was realized by an employed/ apprenticed child. It should be noted that a child worker was engaged in more than one economic activity.

**Table 3: Distribution of Child Labour Activities by Working Hours and Income**

| Labour Activities | Frequency | % | Mean per Week | | |
|---|---|---|---|---|---|
| | | | Working Hour | Income (₦aira) | Income (Dollar $) |
| Land clearing /Weeding | 78 | 65.0 | 37.25 | - | - |
| Fetching and selling of firewood | 73 | 60.8 | 31.23 | 1,674.48 | 4.15 |
| Supply of hired labour | 35 | 29.2 | 6.14 | 3,734.98 | 9.25 |
| Livestock farming/rearing | 16 | 13.3 | 12.42 | - | - |
| Hunting/ fishing | 11 | 9.2 | 20.36 | 2,038.52 | 5.05 |
| Food Processing and marketing | 14 | 11.7 | 38.27 | 3,309.98 | 8.20 |
| Hawking | 49 | 40.8 | 19.38 | 5,417.02 | 13.42 |
| Apprentice/ contract child worker | 9 | 7.5 | 47.39 | 1,525. 53 | 3.78 |
| Average exchange rate, 2021: $1 = ₦403.5808 | | | | | |

Source: Field data, 2021

**Factors that Determined Child Labour among the Rural Households**

The factors determining child labour among the selected households were estimated using the censored Tobit model. The estimates in Table 4 show that the log-likelihood function is significant at $p<0.10$. Thus, the model is relevant to the study data. The pseudo $R^2$ (62.894) indicates that the explanatory variables accounted for 62.9% of the factors influencing child labour in the area. The estimates show that increase in age of the child (0.916) significantly influenced an increase in hours of child labour at $p<0.01$. The coefficient of sex (0.530) is significantly different from zero at $p<0.05$ meaning that there is likelihood to engage a male child in labour more than a female child. This could be due to the protection of female child from molestation, sexual abuse or exploitation which may occur. Household size (0.215) had significant increasing effect on hours spent by child labour at $p<0.01$ probably because of the poor economic condition within the household. Coefficient of child labour income (3.072) showed that there is higher likelihood at $p<0.10$ for a child to work long hours as he/ she earns more income from the labour activities. The relationship between child and household head (2.095) had positive and significant influence on the number of hours the child spent in labour at $p<0.05$. Educational level of the child has the highest significant coefficient (10.734) at $p<0.05$ meaning that an increase in education by 1 year will increase the propensity of child labour by 10.7%. This could be attributed to unaffordable increase in school fees as the child attains a higher level of education thus requiring more hours of child labour in order to support his/ her education.

**Table 4: Tobit Model Estimates of Factors Determining Child Labour in the Area**

| **Characteristics** | **Variables** | **Co-efficient** | **t-value** | **Marginal effect** |
|---|---|---|---|---|
| Constant | | 56.690*** | 2.622 | 41.673 |
| Age of child | $X_1$ | 0.916*** | 2.501 | 0.673 |
| Sex of child | $X_2$ | 0.530** | 2.000 | 0.172 |
| Household size | $X_3$ | 0.215*** | 2.804 | -0.112 |
| Income from child labour | $X_4$ | 3.072* | 1.757 | 1.041 |
| Relationship with household head | $X_5$ | 2.095** | 2.188 | 1.688 |
| Migration status of child labour | $X_6$ | 4.635 | 0.283 | 3.407 |
| Marital Status of household head | $X_7$ | 2.766 | 0.930 | 2.033 |
| Educational level of the child | $X_8$ | 10.734** | 2.292 | 7.891 |
| Major occupation of household head | $X_9$ | -1.740 | -0.227 | -1.279 |
| Sigma σ value | | 0.027 | | |
| Log likelihood function | | 626.145** | | |
| Pseudo $R^2$ | | 62.894 | | |
| Number of observations | | 120 | | |

Source: Field data, 2021. ***p<0.01, **p<0.05 and *p<0.10

## CONCLUSION AND RECOMMENDATION

The findings show that 60.8% of the child workers were below 14 years-old implying a high incidence of child labour. About 55.0% were either school dropouts or had no formal education. This indicates that child labour had negative consequences on the education of the child workers. The range of income from child labour was ₦525.53 - ₦5,417.02 per week revealing that the involving households were likely poor. The significant determinants of child labour in the area include large household size (0.215), income from child worker (3.072), low child's education (10.734), sex (0.530) and relationship of child with household head (2.095).

Therefore, it is recommended that more awareness should be created to educate parents and guardians about the long-term effects of child labour so as to reduce the menaces in the society. Government should also make concerted efforts to provide and enforce free education for children below 18 years of age so as to increase the level of literacy which was low at 6.7%.

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# Accessibility and Usage of Information and Communication Technologies Among Agricultural Extension Officers in Edo State, Nigeria

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**ABSTRACT**

The study examined the access and utilization of ICT by agricultural extension officers in Edo State. Seventy-five (75) Extension officers of the Edo State Agricultural Development Programme (Edo ADP) were sampled for the study using structured questionnaire. The data analysis used both descriptive and inferential statistical approaches. According to access to ICT, 18.7% of employees have access to a official computer, 8% of employees can connect their official computers to the internet, and 89.3% of employees use their mobile phones as their primary method of internet access. Inadequate ICT tool provision by employers (3.64), high ICT equipment costs (3.05), and high internet access costs (2.80) are the constraints preventing access to and usage of ICT in the study area. It is recommended that the provision of ICT tools and equipment should be a priority by the management of Edo ADP; this is essential to improve access to ICT by the extension workers.

**Keywords**: access to ICT, extension officers, agricultural extension, Edo ADP

## INTRODUCTION

The emergence of ICTs in poor nations presents fresh possibilities that could contribute to the achievement of the global Sustainable Development Goals (SDGs). ICTs play a vital role in improving the delivery of public services such as agriculture, education, and health services, which are key drivers of development (Aker, 2011; Baumüller, 2018; Tata and McNamara, 2018). According to Goyal (2011), Karthikeyan (2012), and the World Bank (2016), Information and Communication Technologies (ICTs) have the ability to offer agricultural extension information more quickly, accurately, and easily. All around the world, these technologies are reviving agricultural extension and consultancy services (World Bank, 2016).

ICTs offer enormous potential to enhance the provision of agricultural extension services, specifically in regard to reducing information asymmetry, costs, and time; which subsequently facilitates the diffusion and uptake of agricultural technologies (Arinloye *et al*., 2015; Deichmann *et al.*, 2016). Evidence from the literature has shown that ICTs for agricultural extension have a positive impact on yields, productivity, food security, and ultimately rural incomes ( Casaburi *et al.*, 2014; Cole and Fernando, 2016).

Agricultural technology generation and dissemination in Nigeria is majorly through top-down approach usually through agricultural extension officers (Sennuga, 2019)**,** who are still few in number with low extension agents to farmers' ratio. While the Food and Agricultural Organization (FAO) recommends one extension agent to 800 farmers, the ratio in Nigeria ranges from 1:1000 in Imo State to 1:10,568 in Bayelsa State with the national average of 1:3011 (Olaitan *et al*., 2017). The agricultural extension service whose core mandate is information dissemination among farmers is an area where ICTs can contribute significantly. This is because ICTs have the ability to intensify the linkage between extension, research, and farmer (Nyarko & Kozari , 2021).

Despite the fact that ICT technologies have a significant potential to enhance the delivery of agricultural extension services, their accessibility and availability in many public extension agencies have not yet been adequately evaluated. In light of this, Edo State agricultural extension officers' access to ICT was examined. The study's specific objectives were to, assess the type of ICT owned by the extension officers, examine the accessibility to ICT by the extension officers, identify the sources of ICT accessed but not owned by the respondents, and ascertain the constraints to the usage of ICT by the extension officers.

Hypothesis ($HO_1$): There is no significant relationship between some selected socioeconomic characteristics and the respondents' accessibility to ICT.

## METHODOLOGY

This study was carried out in Edo State, Nigeria. Edo State is in South-South part of Nigeria (N $6^0$ 32'37.716'', E $5^0$ 53'55.3704''). Extension officers from the Edo State Agricultural Development Programme (ESADP) make up the study's population. Due to the restricted number of extension officers in the study area, complete enumeration technique was employed to sample the population for the study. Hence, seventy five extension workers of Edo Agricultural Development Project (ESADP) were sampled for the study. Proportionate sampling was used to select the sample for the study, hence, thirty (30) respondents from Edo Central, twenty five (24)

respondents from Edo South and twenty (21) respondents from Edo North were sampled; this was because that there were an unequal number of extension officers throughout the agricultural zones, totaling 75 respondents for the survey. The primary data for this study were gathered using a structured questionnaire. The data were analyzed using both descriptive and inferential statistical tools, including frequency count, percentages, mean, and chi-square.

## RESULTS AND DISCUSSION

### Socio-economic characteristics of the Respondents

The results in Table 1 show that, 42.29 years is the mean age of extension officers in the study area. This may suggest that the respondents are still in their productive years this should assist in their dissemination of useful and practical information to farmers. This result is similar to Sennuga (2019) that younger people tend to be more productive than their older counterparts. In the study area, there are 64.0% more male extension officers than female extension officers. This supports Ezeh's (2013) finding that there were fewer female extension agents than there were male extension agents. 44.0% of those surveyed had a bachelor's degree. According to Olaitan et al. (2020), 43.3% of the extension officers in the state of Kwara possess a bachelor's degree. Additionally, the average length of employment for extension officers in the study area was 14.85 years.

This may suggest that the respondents have been involved in extension services for quite a number of years and should be sufficiently experienced in communicating improved agricultural information from researcher centers to end-users. A mean salary of ₦ 100, 659 was enjoyed by the respondents; it may indicate a reasonable salary structure is being enjoyed by the respondents

### Accessibility and Use of Information and Communication Technology among Agricultural Extension Officers in Edo State, Nigeria

**Table 1: Socio-economic characteristics of the Respondents**

| Variables | Frequency | Percentage | Mean |
|---|---|---|---|
| **Sex** | | | |
| Male | 48 | 64 | |
| Female | 27 | 36 | |
| **Age** | | | 42.29years |
| 21-30 years | 23 | 30.7 | |
| 31-40 years | 13 | 17.3 | |
| 41-50 years | 11 | 14.7 | |
| 51 years and above | 28 | 37.3 | |
| **Marital status** | | | |
| Single | 23 | 30.7 | |
| Married | 50 | 66.7 | |
| Divorced | 1 | 1.3 | |
| Widowed | 1 | 1.3 | |
| **Level of education** | | | |
| OND | 25 | 33.3 | |
| HND | 15 | 20.0 | |
| B. Sc | 33 | 44.0 | |
| M.Sc | 2 | 2.7 | |
| **Work experience** | | | |
| Less than 10 years | 34 | 45.3 | 14.85years |
| 11-20 years | 11 | 14.7 | |
| 21-30 years | 27 | 36.0 | |
| 31-40 years | 3 | 4.0 | |
| Salary per month (₦) | | | |
| Less than 50,000 | 6 | 8.0 | ₦100,659 |
| 51,000- 100,000 | 31 | 41.3 | |
| 101,000-150,000 | 21 | 28.0 | |
| 151,000-200,000 | 17 | 22.7 | |

**Source: Field survey, 2022**

**Types of ICT owned -** Table 2 shows that majority of the respondents have a mobile phone (100%), followed by social media (90.7%), television (88%) and radio (80%). The availability of social media is a good development since this may improve information dissemination to clientele because of its affordability and it is cheap, quick spread, and prompt delivery of information to various audiences. This is in line with Ishola *et al.*, (2018) that many households own Television and mobile phone to source information.

**Table 2: Types of ICT owned by Respondents**

| ICT tools | Frequency | Percentage |
|---|---|---|
| Radio | 60 | 80 |
| Television | 66 | 88 |
| Mobile phone | 75 | 100 |
| Internet connected computer | 21 | 28 |
| Social media tools | 68 | 90.7 |
| Global Positioning system(GPS) | 2 | 2.7 |
| Modem | 10 | 13.3 |
| Camera | 12 | 16 |
| Projector | 0 | 0 |

**Source: Field survey, 2022**
***multiple responses**

**Accessibility to ICT -** Findings show that majority (81.3%) of the respondents do not have access to official computers, while only 42.7% of the respondents have access privately owned computer just 40.0% of the respondents had access to internet connectivity on their privately owned computers. This shows a not-too-impressive effort by the government on the provision of computers and internet for official work. This implies a low access to official computers but a below average accessibility to private computers by the extension officers. This is a challenge needs to must addressed considering the benefits ICT can bring to extension information delivery as opined by Nyarko & Kozari, (2021) that, an excellent ICT extension delivery initiative may assist to reach scores of farmers at the same time and in addition overcome the geographical challenges of extension delivery.

**Table 3: Access of respondents to ICT**

| Variables | Frequency | Percentage |
|---|---|---|
| Access to official computer | 14 | 18.7 |
| Connectivity of official computer to the internet | 6 | 8 |
| Private ownership of computer | 32 | 42.7 |
| Connectivity of private computer to the internet | 30 | 40 |
| Mode of internet access<br>Modem | 24 | 32 |
| Mobile phone | 67 | 89.3 |
| Cyber café | 42 | 56 |

**Source: Field survey, 2022**

**Sources of the ICT tools which are not-owned but there is access -** Table 4 the respondents who did not own certain ICT tools, but had access through other means. The results show that the

majority of respondents who did not own projector (96%), modem (36%), and GPS (86.7%) accessed them through their employers. This implies that employers also enabled access to some ICT facilities for extension officers who did not own them, this could be premised on the fact that projector and GPS are expensive devices, while, internet connected computer not owned by the respondents is majorly accessed through cybercafé (62.6%), which suggests that the officers are diligent in their work and incur extra expenses to access the internet.

**Table 4: Sources of the ICT tools which are not-owned but there is access**

| Source of ICT | Frequency | Percentage |
|---|---|---|
| **Internet connected computer** | | |
| Cybercafe | 47 | 62.6 |
| Friend | 11 | 14.7 |
| Family member | 14 | 18.7 |
| Employer | 3 | 4.0 |
| **GPS** | | |
| Open market | 1 | 1.3 |
| Friend | 5 | 6.7 |
| Employer | 65 | 86.7 |
| Family member | 4 | 5.3 |
| **Modem** | | |
| Employer | 27 | 36.0 |
| Family member | 23 | 30.7 |
| Friend | 25 | 33.3 |
| **Projector** | | |
| Employer | 72 | 96.0 |
| Friend | 2 | 2.7 |
| Family member | 1 | 1.3 |

**Source: Field survey, 2022**

**Constraints to ICT usage by respondent -** Table 5 reveals that inadequate provision of ICT tools by employer (3.46), high cost of ICT equipment (3.05), high cost of internet access (2.80), poor electricity (2.74), and poor internet coverage (2.39) were major constraints affecting respondents' access to ICT. This is in line with Bamiwuye *et al.,* (2020), that high cost of acquiring ICT equipment, slow internet access speed, poor access to ICT facilities in the library, and irregular power supply as major constraints. This result also bring to the fore that employers of the Extension officers should make available ICT tools and equipments and information and communication sector regulators such as Nigerian Communications Commission (NCC) should ensure better internet connection and reduction of charges of internet access.

**Table 5: Constraints faced to ICT usage by respondent**

| Constraints | Mean |
|---|---|
| Inadequate financial capacity | 1.76 |
| Poor electricity | 2.74 |
| Poor technical know-how | 1.68 |
| Poor internet coverage | 2.39 |
| Inadequate availability of internet-enabled GSM phones | 1.77 |
| High cost of internet access | 2.80 |
| Inadequate provision of ICT tools by employer | 3.46 |
| Poor training on ICT | 1.68 |
| High cost of ICT Equipments | 3.05 |

**Source: Field survey, 2022**

**Relationship between socioeconomic characteristics of respondents and accessibility to ICT -** Table 6 demonstrates a correlation between age ($\chi 2$ =11.06, p=0.01), experience ($\chi 2$=10.57, p=0.01), education level ($\chi 2$=19.556, p=0.00), salary ($\chi 2$=11.27, p=0.01) and ICT accessibility. This means that when the extension workers' age, work experience, level of education, and salary increases,

there may be a greater accessibility to ICT technologies. The implication is that as respondents get older, they tend to have more access to ICT and understand its relevance. A further motivation for an extension officer to enhance their access to ICT tools is the need to better serve their clients as a result of increased job experience.

Education is known to increase the access to ICT, while increased salary can increase the purchasing power of the extension officers to acquire ICT tools.

**Table 6: Relationship between socioeconomic characteristics of respondents and access to ICT (Chi-Square), p = 0.05**

| Variables | $\chi 2$ | Df | p-value | Decision |
|---|---|---|---|---|
| Age | 11.066 | 3 | 0.01 | S |
| Experience | 10.574 | 3 | 0.01 | S |
| Level of Education | 19.556 | 3 | 0.00 | S |
| Salary | 11.276 | 3 | 0.01 | S |

**df= degree of freedom. S= Significant. $\chi 2$= Chi-square**
**Source: Field survey, 2022**

## CONCLUSION

This study revealed that inadequate provision of ICT tools and equipment by employer is a major constraint to ICT access in the study area. The fact that there is very limited access to official computers and their internet connectivity is more concerning. This is due to the fact that the extension officers' skills and knowledge will have an impact on the caliber of information provided to farmers

## RECOMMENDATIONS

Based on the study's findings, it is advised that management in the Edo state ADP offer ICT tools and equipment to increase the extension officers' capacity and message delivery. To increase access to internet service, regulators like the Nigerian Communications Commission should make sure there is improved internet coverage and lower internet access fees

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# Effects Of Employees Motivation and Reward System on Job Satisfaction in Ogun State Agricultural Development Program (OGADEP)

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ABSTRACT
This study examined effects of employees' motivation and reward system on job satisfaction in Ogun state agricultural development program. A simple random sampling techniques was used to select one hundred and twenty 120 respondents. A validated questionnaire was used to collect data on respondents' socioeconomic characteristics while motivational factors, reward packages and employee's job satisfaction were measured using standardized statement rated on Likert-type scale. Data collected were analysed with frequency, percentage, means, chi-square and PPMC. Results revealed that majority (32.2%) of the respondents were between age range of 31-40 years old, while more than half of the respondents were female (52.2%). Results also revealed that 74.8% of the respondents were married, 54.8% were Christians, 47.7% had B.Sc Degrees, 64.3% were senior staff and the average income earned was ₦ 62,473.90. Hypothesis tested revealed that gender ($\chi^2 = 12.3$), educational level ($\chi^2 = 15.7$), marital status ($\chi^2 = 20.7$) and rank ($\chi^2 = 15.6$) were significantly associated with job satisfaction. PPMC revealed that age ($r = 0.34$, $p<0.05$) and income ($r = 0.22$, $p<0.05$) were positively and significantly associated with job satisfaction. PPMC results also revealed significant relationship between employees' motivation ($r =0.55$, $p<0.05$), reward system ($r =0.56$, $p<0.05$) and job satisfaction. The study concludes that motivation and rewards system influence employee's job satisfaction. In the organisation, the level of employees' job satisfaction was high. It is recommended that Management should prioritize implementation of both motivational factors and reward system to increase both employee's job satisfaction and organisational performance.

**Keywords:** Motivational factors, reward system and employees' job satisfaction

## INTRODUCTION

In recent time, the major concern for most organisation is to create a work environment that promote employee satisfaction and more engaged work force. Employees are essential factor that contributes to the success of the organisation using their knowledge, skills, experience, expertise to achieve organisational goal and enhance performance. If the workplace condition meets the expectation and demands of the employee, it is expected that the level of job satisfaction would be high. Therefore, satisfied employee are indeed great asset owned by the organisation because they demonstrate loyalty, commitment, diligence, engaged and stay up in the organisation. Literarily, job satisfaction mean the degree to which employee liked their job or the way the employee feels about the job in terms of the good career component of the job that makes on feel valued and fulfilled. However, considering job satisfaction in relative terms means that it is dependent on individual's perception of the job while overall job satisfaction may be assessed through outcome parameters such as productivity, performance, attrition rate, motivation, and work-life balance among several others. According to Aziri (2011) while reviewing literatures on job satisfaction observed that authors like Hoppock defined job satisfaction as any combination of psychological, physiological and environmental circumstances that cause a person truthfully to say I am satisfied with my job. Robbins and Judge, (2018) described job satisfaction as a positive feelings about a job, resulting from an evaluation of its characteristics. In line with these definitions, job satisfaction may be viewed from two angles namely; intrinsic and extrinsic job satisfaction. The intrinsic job satisfaction focuses on what kind of job is being carried out, the tasks and duties that make up the job while extrinsic job satisfaction focuses on work conditions, such as the environment, supervisor, pay and coworkers. Job satisfaction can therefore be measured in behavioral, cognitive and affective components. Several research on employee job satisfaction revealed that indicators such as leadership style, motivation practices, reward management system, employee job expectations and working environment have enormous influence on employees' job satisfaction. Antwi *et al.*, (2016) observed that employees' motivation is one of the human resource management component practiced in most organisations which is beneficial to both employee and employers as it keeps employees satisfied and aroused towards organisational goal attainment. According to Mulyani, *et al.*, (2019) employee motivation is defined as the trigger that pushes employees to accomplish a set of activities that in return leads to the achievement of specific goals. Sabbagha, Ledimo, and Martins, (2018) noted that motivation is influenced by intrinsic factors which are internal influences within the employee that pushes them forward to perfectly accomplish a task and extrinsic factors which are materialistic or external financial reward provided by the employer such as pay, promotion and praise. Similarly, Johnnie, (2002) posits that two sources of motivation exist in the workplace, the first source is that the job is an end in itself, while the other is that the job is the means to an end. Stemming from this

argument are the concept of intrinsic satisfaction; which implies that employee satisfaction is derived from the job and not from instrumental or material rewards and the concept of extrinsic satisfaction; which implies that employee derives satisfaction of his needs using work as a means to an end. Similarly, Ifinedo, (2022) had earlier reported that a highly motivated employee is able to contribute more in order to achieve organisations desired outcomes and that such employee is mostly satisfied with the job too. Therefore, job satisfaction is recognised as a part of motivational process while motivation is principally concerned with the goal directed behavior, and the job satisfaction related to the fulfillment, which is acquire through different rewards and job related activities. Also, developing a reward system that meets the needs of every employee is extremely crucial since the rewards system is used as a tool to enhance employee's performance. According to Malhota and Ahmed (2008) defined reward any type of financial returns, tangible services and benefit employee receives to justify employment relationship in other words, reward is whatever extrinsically or intrinsically reinforced maintains and improves employees' behavior in an organisation. Oboreh and Arukaroha (2021) informed that an employee reward system comprises of an organisation's coherent strategies, procedures and system for recognizing the employee in terms of their involvement, skills, potential and their market value. He went further to identify two types of rewards; intrinsic and extrinsic which combines to help keep the employees engaged and motivated at work. According to them intrinsic rewards or non-financial rewards are not specifically related to a task and its administration is not determined by the actions of another individual. Intrinsic reward therefore includes the feeling of being appreciated or a job well done. On the other hand, extrinsic reward refers to financial rewards given by an external agent in form of financial motivations such as money, retirement benefits, health insurance scheme, compensation, salary, bonus and others. Pinto and dos Santos, (2018) observed that increase in salaries and wages which is a monetary aspect of motivation often constitute the main reward system implemented in most organisations, therefore, the structure of the organisation's reward beliefs, strategies, and policies created should be robust enough to attract retain and motivate the workforce since every employee needs a good salary package plus other benefits like bonuses, allowances, medical claims among others. Bhattacharya and Mukherjee, (2009) observed that when the staff feels they are justly rewarded for their ability, expertise, intellect, and involvement, they are considered to be satisfied with their job, resulting, they perform better at their job. This satisfaction of work helps to retain the staff and reduce employee turnover. Corroborating this findings Ngwa *et al.*, (2019) stated that, equal distribution of rewards and appreciation improves employee performance perpetually and provides them with a sense of accomplishment as well as creates a path for career growth. It is against this backdrop that this research evolved to assess the motivational factors and reward system and the effects on employee job satisfaction in Ogun state Agricultural Development Program.

**Table 1: Distribution of Respondents by Department.**

| S/N | Department | Population of Employees | Sampled Employees (44%) |
|---|---|---|---|
| 1 | Extension | 134 | 59 |
| 2 | Technical services | 49 | 22 |
| 3 | Research and training | 5 | 2 |
| 4 | Engineering | 11 | 5 |
| 5 | Project Monitoring and Evaluation | 24 | 11 |
| 6 | Finance | 12 | 5 |
| 7 | Administration | 36 | 16 |
| | Total | 271 | 120 |

Personnel Division, OGADEP, 2022

**METHODOLOGY**

The research was conducted in Ogun State Agricultural Development Program. A simple random sampling techniques was used to select one hundred and twenty 120 respondents from the population of 271 employees across 7 departments in the

organisation. A structured questionnaire comprising of five sections and validated at Cronbach Alpha Coefficient of 0.87 was used to collect data. Socioeconomic characteristics of the respondents was measured on nominal and ordinal levels while motivational factors, reward packages and employee's job satisfaction were measured using standardized statement rated on Likert-type scale. Data collected were analysed with descriptive statistics such as frequency counts, percentages and mean scores while hypotheses formulated for the study were tested using inferential statistics such as Chi-square and Pearson Moment Correlation Analysis (PPMC).

## RESULTS AND DISCUSSIONS

### Socioeconomic Characteristics

The socioeconomic characteristics of the respondents is presented in Table 2. The results revealed that 30.4% of the respondents were below the age of 30 years, 32.2% were in the age range of 31- 40 years, 31.3% were in the range of 41-50 years while 6.1% were above 50 years of age and with a mean age of 41.73years. The study shows that larger percentage of the respondents in the study area are still in their active and productive age which implies that they are still able to contribute to organisation performance and productivity. This assertion is supported by Ayinde *et al.* who stated that the economic active age group of 40-50 years have strength, responsiveness and receptiveness to agricultural related jobs. Also, Kahn *et al.,* (2013) reported that employees tend to have more sense of obligation and becomes more effective when at active age. Similarly, Ayansina *et al.,* (2020) observed that most respondents in their youthful age have strength to perform better on their job. On the sex distribution the results showed that more than half 52.2% of the respondents were female while 47.8% were male. This implies that more female employees participated in the study than male employees. Going by the results on educational level of respondents it indicated that majority (47.8%) of the respondents holds Bachelor Degree which is predominant in the organisation, 28.7% of the respondents hold HND qualification, 14.8% of the respondents have OND, 8.7% of the respondents have MSc qualification. This implies that respondents in the study area are highly educated. According to Abiona, (2015) workers with high level of education have capacity for appropriate innovativeness. The marital status of the respondent revealed that majority (74.8%) are married, 14.8% are single, 0.9% were divorced while 9.6% were widow. This indicate that most of the employees in the study area were married since marriage institution is considered in this part of the world to confer some level of responsibility and commitment on individuals that are married (Fakoya, *et al.,* 2000). Result in Table 2 on the religion of the respondent revealed that 54.8% were Christians while 45.2% were Islam. This implies that Christianity is the predominant religion among the respondents in the organisation. Table 2 depicts the ranking level of the respondent in the organisation and this revealed that 64.5% of the respondents were senior staff while 35.7% of the respondent were junior staff. Results on the years of experience of respondents it was revealed that 61.7% of the respondent has spent less than 10 years, 21.7% of the respondent have spent 11-20 years and 16.5% of the respondent have spent 21 years and above. The mean years of working experience was 11 years. This result connote that most of the employees have spent a reasonable numbers of years working in the study area and they would have acquired enough experience on the job which would enhance their performance. This is in line with the findings of Adeniji, (2001) who reported that majority of employees of agro-based organisations are experienced and efficient in their duties. The mean income of the respondent in the study area was ₦62,473.91 per month, with 49.6% earning less than ₦10,000 Naira per month. 49.6% received between ₦60,000- ₦80,000 and that 0.9% of the respondents were earning above ₦80,000 per month.

**Table 2: Distribution of Respondents by their Socioeconomic characteristics (n=115)**

| VARIABLES | FREQUENCY | PERCENTAGE | MEAN | SD |
|---|---|---|---|---|
| Age | | | | |
| <=30 | 35 | 30.4 | | |
| 31-40 | 37 | 32.2 | 41.73 | 9.17 |
| 41-50 | 36 | 31.3 | | |
| Above 50 | 7 | 6.1 | | |
| Gender | | | | |
| Male | 55 | 47.8 | | |
| Female | 60 | 52.2 | | |
| Educational Level | | | | |
| OND | 17 | 14.8 | | |
| HND | 33 | 28.7 | | |
| BSc | 55 | 47.8 | | |

| | | | | |
|---|---|---|---|---|
| MSC | 10 | 8.7 | | |
| Marital Status | | | | |
| Single | 17 | 14.8 | | |
| Married | 86 | 74.8 | | |
| Divorced | 1 | 0.9 | | |
| Widow | 11 | 9.6 | | |
| Religion | | | | |
| Christianity | 63 | 54.8 | | |
| Islam | 52 | 45.2 | | |
| Rank | | | | |
| Junior | 41 | 35.7 | | |
| Senior | 74 | 64.3 | | |
| Year of Experience | | | | |
| <=10 | 71 | 61.7 | | |
| 11-20 | 25 | 21.7 | | |
| 21years and above | 19 | 16.5 | 10.65 | 8.542 |
| Income | | | | |
| <=60,000 | 57 | 49.6 | | |
| 60,000-80,000 | 57 | 49.6 | 62473.91 | 10101.425 |
| 80,000 and above | 1 | 0.9 | | |

**Motivational Factors**

The results in Table 3 shows the types of motivational factors in place for employees in the study area. Motivational factors items and the corresponding mean scores indicates that encouragement is received from superiors in the organisation ($\bar{x}$ = 4.13), encouragement received from subordinate ($\bar{x}$ = 4.07), effective recognition at work ($\bar{x}$ = 4.04) proper organisation structure ($\bar{x}$ = 3.90), appreciation for work well done ($\bar{x}$ = 3.83), promotion in the organisation ($\bar{x}$ =3.82), conductive performance appraisal method ($\bar{x}$ = 3.81), good working environment ($\bar{x}$ = 3.80), salary scheme ($\bar{x}$ = 3.66), training and development program available ($\bar{x}$ = 3.61), bonus administration ($\bar{x}$ = 3.60), good health and safety ($\bar{x}$ = 3.57), democratic management style ($\bar{x}$ = 3.54), good compensation package ($\bar{x}$ = 3.51), improved retirement pension scheme ($\bar{x}$ = 3.43). This implies that the respondents acknowledged the presence of desirable motivational factors in the study area. This is in line with the observation of Antwi *et al.,* (2016) that employees' motivation is one of the human resource management component practiced in most organisations which is beneficial to both employee and employers as it keeps employees satisfied and aroused towards organisational goal attainment. Also Sabbagha, Ledimo, and Martins, (2018) noted that motivation is influenced by intrinsic factors which are internal influences within the employee that pushes them forward to perfectly accomplish a task and extrinsic factors which are materialistic or external financial reward provided by the employer such as pay, promotion and praise.

**Table 3: Motivational Factors in place for Employees in the Study Area (n=115)**

| FACTORS | SA | A | I | D | SD | Mean | S.D |
|---|---|---|---|---|---|---|---|
| Encouragement received from superiors | 38(33.0) | 62(53.9) | 8(7.0) | 6(5.2) | 1(0.9) | 4.13 | 0.822 |
| Encouragement received from subordinate | 25(21.7) | 77(67.0) | 9(7.8) | 4(3.5) | 1(0.9) | 4.07 | 0.659 |
| Effective recognition at workplace | 34(29.6) | 60(52.2) | 14(12.2) | 6(5.2) | 1(0.9) | 4.04 | 0.842 |
| Proper organization structure | 28(24.3) | 60(52.2) | 17(14.8) | 8(7.0) | 2(1.7) | 3.90 | 0.908 |
| Appreciation for work well done | 31(27.0) | 48(41.7) | 22(19.1) | 13(11.3) | 1(0.9) | 3.83 | 0.985 |
| Promotion in the organization | 30(26.1) | 53(46.1) | 19(16.5) | 7(6.1) | 6(5.2) | 3.82 | 1.056 |
| Conductive performance appraisal method | 30(26.1) | 53(46.1) | 16(13.9) | 12(10.4) | 4(3.5) | 3.81 | 1.050 |
| Good working environment | 34(29.6) | 51(44.3) | 10(8.7) | 13(11.3) | 7(6.1) | 3.80 | 1.164 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Salary scheme | 31(27.0) | 42(36.5) | 20(17.4) | 16(13.9) | 6(5.2) | 3.66 | 1.169 |
| Training and development programs available | 21(18.3) | 59(51.3) | 14(12.2) | 11(9.6) | 10(8.7) | 3.61 | 1.152 |
| Bonus Administration | 29(25.2) | 42(36.5) | 19(16.5) | 19(16.5) | 6(5.2) | 3.60 | 1.183 |
| Good health and safety scheme | 29(25.2) | 42(36.5) | 19(16.5) | 12(10.4) | 4(3.5) | 3.57 | 1.229 |
| Democratic management style | 21(18.3) | 47(40.9) | 24(20.9) | 19(16.5) | 4(3.5) | 3.54 | 1.078 |
| Good compensation package | 26(22.6) | 44(38.3) | 18(15.7) | 17(14.8) | 10(8.7) | 3.51 | 1.238 |
| Improved retirement pension scheme | 27(23.5) | 38(33.0) | 19(16.5) | 19(16.5) | 12(10.4) | 3.43 | 1.298 |

SA=strongly agree; A=agree; I=indifference; D=disagree; SD=strongly disagree; S.D= standard deviation.

**Reward Package in place for Employees in the study area.**

The reward packages put in place for employees in the study area is presented in Table 4. Reward packages items and the corresponding mean scores of respondents shows that respondent opined that their work environment is secured and support proper performance ($\bar{x}$ = 4.12), performance appraisal based on individual performance is usually carried out ($\bar{x}$ = 4.01), managers always acknowledge achievement of goals by expression of appreciation ($\bar{x}$ = 3.95), there is general increment structure set up on salary of staff members in the organisation ($\bar{x}$ = 3.77), the organisation motivate and encourage staff members during festive period ($\bar{x}$ = 3.75), productive performance attract bonuses and promotion periodically ($\bar{x}$ = 3.62), a level of ownership state is being rewarded to employees for goal achievement in the organisation ($\bar{x}$ = 3.59), performance appraisal is done in group accomplishment of performance ($\bar{x}$ = 3.58), medical allowance are available to employees in the organisation ($\bar{x}$ = 3.49), special bonuses are used to attract and retain employees in the organisation ($\bar{x}$ = 3.44), goal achievements tends to attract increase in payment in the organisation ($\bar{x}$ = 3.44), I have special workforce as a reward for my performance and task accomplishments ($\bar{x}$ = 3.37), I am getting paid enough for my job ($\bar{x}$ = 3.37), the organisation offer cost-of-living allowance to the employees ($\bar{x}$ = 3.39), club membership are opened to sponsorship in the organisation ($\bar{x}$ = 3.23). The results implies that there are quality reward packages for employees provided by the organisation.

**Table 4: Reward Package in place for Employees**

| VARIABLES | SA | A | I | D | SD | MEAN | S.D |
|---|---|---|---|---|---|---|---|
| My work environment is secured and support proper performance | 40(34.7) | 58(50.4) | 9(7.8) | 7(6.1) | 1(0.9) | 4.12 | 0.860 |
| Performance appraisal based on individual performance is usually carried out | 41(35.7) | 50(43.5) | 10(8.7) | 12(10.4) | 2(1.7) | 4.01 | 1.013 |
| Managers/leaders always acknowledge achievements of goals by expression of appreciation | 27(23.5) | 69(60.0) | 7(6.1) | 10(8.7) | 2(1.7) | 3.95 | 0.897 |
| There is general increment structure set up on salary of staff members in the organization | 31(27.0) | 50(43.5) | 18(15.7) | 9(7.8) | 7(6.1) | 3.77 | 1.117 |
| The organization motivate and encourage staff members during festive period | 29(25.2) | 52(45.2) | 14(12.2) | 16(13.9) | 4(3.5) | 3.75 | 1.091 |
| Productive performance attract bonuses and promotions periodically | 25(21.7) | 51(44.3) | 16(13.9) | 16(13.9) | 7(6.1) | 3.62 | 1.152 |
| A level of ownership state is being rewarded to employees for goal achievement in the organization | 28(24.3) | 39(33.9) | 26(22.6) | 17(14.8) | 5(4.3) | 3.59 | 1.139 |
| Performance appraisal is done in group accomplishments or performance | 25(21.7) | 45(39.1) | 20(17.4) | 22(19.1) | 3(2.6) | 3.58 | 1.108 |
| Medical allowance are available to employees in the organization | 28(24.3) | 39(33.9) | 22(19.1) | 13(11.3) | 13(11.3) | 3.49 | 1.287 |
| Special bonuses are used to attract and retain employees in the organization | 23(20.0) | 45(39.1) | 18(15.7) | 18(15.7) | 11(9.6) | 3.44 | 1.244 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Goals achievements tends to attract increase in payments in the organization | 28(24.3) | 33(28.7) | 24(20.9) | 22(19.1) | 8(7.0) | 3.44 | 1.244 |
| The organization offer cost-of-living allowance to the staff | 21(18.3 | 38(33.0) | 28(24.3 | 21(18.3) | 7(6.1) | 3.39 | 1.160 |
| I am getting paid enough for my job | 19(16.5) | 47(40.9) | 19(16.5) | 18(15.7) | 12(10.4) | 3.37 | 1.232 |
| I have special workspace as a reward for my performance and task accomplishments | 16(13.9) | 45(39.1) | 26(22.6) | 22(19.1) | 6(5.2) | 3.37 | 1.117 |
| Club membership are opened to sponsorship in the organization | 18(15.7) | 37(37.2) | 24(20.9) | 26(22.6) | 10(8.7) | 3.23 | 1.216 |

SA=strongly agree; A=agree; I=indifference; D=disagree; SD=strongly disagree; S.D= standard deviation.

The results of responses to statements on effects of motivational factors and reward system on employee job satisfaction in the study area indicated that the employees wants to be the best at their work ($\bar{x}$ = 4.22), while at work I am 100% focus on my work ($\bar{x}$ = 4.12,) good working environment makes me satisfied with my work ($\bar{x}$ = 4.08), my work environment is secured and support proper performance ($\bar{x}$ = 4.06), I am doing my job better ($\bar{x}$ = 3.99), appreciation from my superiors influence my work productivity ($\bar{x}$ = 3.97). I am excited to go to work every day ($\bar{x}$ = 3.95), I am satisfied with the support from the HR department ($\bar{x}$ = 3.93), incentives and other benefits influence my job satisfaction ($\bar{x}$ = 3.90), my job gives me a good status ($\bar{x}$ = 3.86), I have a sense of accomplishments on my job ($\bar{x}$ = =3.78), I am encouraged to come up with new and better ways of doing things ($\bar{x}$ = 3.74), I can recommend a job here to a friend ($\bar{x}$ = 3.74), my pay and benefits energies me to do better ($\bar{x}$ = 3.73). The findings implies that employees perceived that there are favourable motivational factors and reward system in place in the organisation and they are satisfied with their job. This is in line with the findings of Ngwa *et al.*, (2019) who stated that, equal distribution of rewards and appreciation improves employee performance perpetually and provides them with a sense of accomplishment as well as creates a path for career growth. Also, Ifinedo, (2022) reported that a

highly motivated employee is able to contribute more in order to achieve organisations desired outcomes and that such employee is mostly satisfied with the job too.

**Effects of Motivation and Reward System on Employees Job Satisfaction**

**Table 5: Effects of Motivation and Reward System on Employee's Job Satisfaction**

| STATEMENT | SA | A | I | D | SD | MEAN | S.D |
|---|---|---|---|---|---|---|---|
| I want to be the best at my job | 52(45.2) | 47(40.9) | 7(6.1) | 7(6.1) | 2(1.7) | 4.22 | 0.935 |
| While at work I am 100% focus on my work | 41(37.7) | 56(48.7 | 11(9.6) | 5(4.3) | 2(1.7) | 4.12 | 0.880 |
| Good working environment makes me satisfied with my work | 40(34.8) | 56(48.7) | 10(8.7) | 6(5.2) | 3(2.6) | 4.08 | 0.938 |
| My work environment is secured and support proper performance | 38(33.0) | 55(47.8) | 14(12.2) | 7(6.1) | 1(0.9) | 4.06 | 0.881 |
| I am doing my job better | 28(24.3) | 66(57.4) | 14(12.2) | 6(5.2) | 1(0.9) | 3.99 | 0.811 |
| Appreciation from my superiors influence my work productivity | 29(25.2) | 64(55.7) | 13(11.3) | 7(6.1) | 2(1.7) | 3.97 | 0.878 |
| I am excited to go to work everyday | 33(28.7) | 54(48.0) | 19(16.5) | 7(6.1) | 2(1.7) | 3.95 | 0.926 |
| I am satisfied with the support from the HR department | 35(30.4) | 52(45.2) | 16(13.9) | 9(7.8) | 3(2.6) | 3.93 | 0.998 |
| Incentives and other benefits influence my job satisfaction | 32(27.8) | 53(46.1) | 18(15.7) | 10(8.7) | 2(1.7) | 3.90 | 0.968 |
| My job gives me a good status | 24(20.9) | 66(57.4) | 15;13.0) | 5(4.3) | 5(4.3) | 3.86 | 0.945 |
| I have a sense of accomplishments on my job | 22(19.1) | 62(53.9) | 17(14.8) | 12(10.4) | 2(1.7) | 3.78 | 0.935 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| I am encouraged to come up with new and better ways of doing things | 29(25.2) | 49(42.6) | 20(17.4) | 12(10.4) | 5(4.3) | 3.74 | 1.085 |
| I can recommend a job here to a friend | 22(19.1) | 63(54.8) | 13(11.3) | 12(10.4) | 5(4.3) | 3.74 | 1.027 |
| My pay and benefits energies me to do better | 23(20.0) | 60(52.2) | 13(11.3) | 16(13.9) | 3(2.6) | 3.73 | 1.020 |

SA=strongly agree, A= agree, I=indifference, D=disagree, SD=strongly disagree, S.D=standard deviation

**Level of Job Satisfaction among the Respondents**

The results in Table 6 on the level of employee's job satisfaction in the study area indicates that the co-workers cooperate with each other ($\bar{x}$ = 4.21), my boss is competent in decision making ($\bar{x}$ = 4.04), the way my work is provide employment for me ($\bar{x}$ = 4.02), my colleague get along with each other ($\bar{x}$ = 4.01), relationships with my superiors are satisfying ($\bar{x}$ =3.95), I have praise and credit for a job well done ($\bar{x}$ = 3.92. I am satisfied with the way my boss handles the work ($\bar{x}$ = 3.91), my work gives me sense of accomplishments ($\bar{x}$ = 3.87), my work environment satisfy me ($\bar{x}$ = 3.82) , my workplace has a fair promotion policy ($\bar{x}$ = 3.80), I am satisfied with my working conditions ($\bar{x}$ = 3.70), my workplace has a good promotion policy ($\bar{x}$ = 3.68), my pay and benefits are satisfying ($\bar{x}$ =3.63), my opportunities for making advancements is limited ($\bar{x}$ = 3.50). Table 7 is the categorization of the level job satisfaction of respondents in the study area and the results revealed that 4.3% of the respondents were low on job satisfaction level while 95.7% of the respondents were high in their job satisfaction level. The results implies that a large percentage of employees of this organisation are satisfied with their job and this would enhance achievement of organisational goal and productivity in the study area. This assertion is supported by the findings of Bhattacharya and Mukherjee, (2009) who observed that when the staff feels they are justly rewarded for their ability, expertise, intellect, and involvement, they are considered to be satisfied with their job, resulting, they perform better at their job. This satisfaction of work often helps to retain the staff and reduce employee turnover.

**Table 6: Level of Job Satisfaction among the Respondents**

| STATEMENT | SA | A | U | D | SD | MEAN | S.D |
|---|---|---|---|---|---|---|---|
| My coworkers cooperate with me | 38(32.0) | 65(56.5) | 10(8.7) | 2(1.7) | ..... | 4.21 | 0.669 |
| My boss is competent in decision making | 33(28.7) | 59(51.3) | 19(16.5) | 3(2.6) | 1(0.9) | 4.04 | 0.799 |
| The way my work is provide employment for me | 32(27.8) | 62(53.9) | 13(11.3) | 7(6.1) | 1(0.9) | 4.02 | 0.848 |
| My colleague get along with each other | 39(33.9) | 48(41.7) | 19(16.5) | 8(7.0) | 1(0.9) | 4.01 | 0.932 |
| Relationships with my superiors are satisfying | 24(20.9) | 70(60.9) | 13(11.3) | 7(6.1) | 1(0.9) | 3.95 | 0.804 |
| I have praise and credit for a job well done | 26(22.6) | 68(59.1) | 9(7.8) | 10(8.7) | 2(1.7) | 3.92 | 0.900 |
| My work gives me sense of accomplishments | 20(17.4) | 69(60.0) | 18(16.7) | 7(6.1) | 1(0.9) | 3.87 | 0.800 |
| My work environment satisfy me | 27(23.5) | 56(48.7) | 17(14.8) | 14(12.2) | 1(0.9) | 3.82 | 0.960 |
| My workplace has a fair promotion policy | 26(22.6) | 59(51.3) | 14(12.2) | 13(11.3) | 3(2.6) | 3.80 | 1.002 |
| I am satisfied with my working conditions | 24(20.9) | 58(50.4) | 13(11.3) | 15(13.0) | 5(4.3) | 3.70 | 1.076 |
| My workplace has a good promotion policy | 28(24.3) | 49(42.6) | 19(16.5) | 11(9.6) | 8(7.0) | 3.68 | 1.151 |
| My pay and benefits are satisfying | 27(23.5) | 51(44.3) | 13(11.3) | 15(13.0) | 5(4.3) | 3.70 | 1.076 |
| My opportunities for making advancements is limited | 26(22.6) | 36(31.3) | 27(23.5) | 21(18.3) | 5(4.3) | 3.50 | 1.158 |

SA=strongly agree, A= agree, U=undecided, D=disagree, SD=strongly disagree, S.D = standard deviation

**Table 7: Categorization of Level of Job Satisfaction.**

| Categorization | Frequency | Percentage |
|---|---|---|
| Low | 5 | 4.3 |
| High | 110 | 95.7 |

**Research Hypotheses**

The result of this hypothesis 'there is no significant relationship between employees socio-economic characteristics and their job satisfaction was tested using Chi-square ($\chi^2$) for variables measured at nominal and ordinal levels, while Pearson Product Moment Correlation (PPMC) was used for variables measured at interval level and the results are presented in Tables 8 and 9 respectively. The Chi-square analysis showed significant ($p<0.05$) association between respondents' gender ($\chi^2 = 12.31$, df = 1), educational level ($\chi^2 = 15.70$, df = 3), marital status ($\chi^2 = 20.66$, df = 3), rank ($\chi^2 = 15.56$, df = 1) and their job satisfaction. This implies that the level of job satisfaction of respondents varies based on the differences in employee's socioeconomic characteristics. The PPMC analysis showed positive and significant ($p<0.05$) relationship between respondents' age ($r = 0.34$), monthly income ($r = 0.22$) and job satisfaction. This implies that increase in age and monthly income of employees lead to increased level of job satisfaction.

**Test of relationship between the respondents' socioeconomic characteristics and job satisfaction**

**Table 8: Test of significant association between the socioeconomic characteristics and job satisfaction**

| Variables | chi-square | df | p-value | Decision |
|---|---|---|---|---|
| Gender | 12.31 | 1 | 0.00 | S |
| Educational Level | 15.70 | 3 | 0.00 | S |
| Marital status | 20.66 | 3 | 0.00 | S |
| Religion | 0.46 | 1 | 0.50 | NS |
| Rank | 15.56 | 1 | 0.00 | S |

P value <0.05 =significant P value >0.05 = not significant

**Table 9: Test of significant association between the socioeconomic characteristics and job satisfaction**

| Variables | r - value | p-value | Decision |
|---|---|---|---|
| Age | 0.34 | 0.00 | S |
| Years of Experience | -0.05 | 0.61 | NS |
| Income | 0.22 | 0.00 | S |

p.value <0.05 =significant p.value >0.05 = not significant

The hypothesis was tested using Pearson Product Moment Correlation (PPMC). Table 10 revealed a significant ($p<0.05$) relationship between employee's motivation and job satisfaction ($r = 0.55$). It can be inferred from the result that employee's motivation is a predictor of job satisfaction. Also, the correlation value is positive and relatively strong. This implies that the higher the motivation of the employees, the higher their level of job satisfaction.

**Test of relationship between employees motivation and job satisfaction**

**Table 10: Test of relationship between employees motivation and job satisfaction**

| Variable | r - value | p-value | Decision |
|---|---|---|---|
| Employees motivation and job satisfaction | 0.594 | 0.000 | S |

p.value <0.05 =significant

The hypothesis was tested using Pearson Product Moment Correlation (PPMC). Table 11 revealed a significant positive ($p<0.05$) relationship between employees' reward system and job satisfaction ($r = 0.56$). It infers that employees' reward system is a predictor of job satisfaction. Also, the correlation value is positive and relatively strong. This implies that the higher the reward system of the employees, the higher their level of job satisfaction.

**Test of relationship between employees' reward system and job satisfaction**

Table 11: Test of relationship between employees' reward system and job satisfaction

| Variables | r-value | p-value | Decision |
|---|---|---|---|
| Employees reward system and job satisfaction | 0.559 | 0.000 | S |

p.value <0.05 =significant

## CONCLUSION

The motivational factors and reward system in place in any organisation places a significant role in influencing employee job satisfaction. The research work evolved from the need to establish the link between motivational factors, reward system and employee job satisfaction at Ogun State Agricultural Development Program. A simple randomize sampling technique was used to select 120 respondents from a population of 271 and data was collected with the aid of structured and validated questionnaire. Encouragement received from superiors in the organization, encouragement received from subordinate, effective recognition at work were the major motivational factors put in place for employees. The major reward package put in place for employees were work environment that is secured and support proper performance, and performance appraisal based on individual performance is usually carried out. Motivation and reward system have effects on employee's job satisfaction as the employees wants to be the best at their work, while at work they are 100% focus on their work. Most of the respondents had high level of job satisfaction as co-workers cooperate with each other, and the boss is competent in decision making. In conclusion, respondents' gender, educational level, marital status, rank, age, monthly income, employee's motivation, employees' reward system are significantly related to job satisfaction. It is recommended that Management should prioritize implementation of both motivational factors and reward system to increase both employee's job satisfaction and organisational performance. Lastly, the management of the board should work to ensure that promotion policy of organization is fair and equitable, there being fairness and equity in the organizations compensation practices as job satisfaction in the organization is being affected by the rewards which the employees were being given.

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# Influence of Livelihood Strategies in Reducing Vulnerability In Danko/Wasagu Local Government Area of Kebbi State, Nigeria

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**ABSTRACT**

This study investigates the impact of livelihood options on vulnerability reduction in the Danko/Wasagu Local Government Area of Kebbi State, Nigeria. Four communities in Danko/Wasagu were specifically targeted, focusing on individuals engaged in agricultural operations and small-scale enterprises. The utilisation of Focus Group Discussion was employed to investigate the existing livelihood strategies among these areas. A deliberate sampling of 12 individuals from each of the four communities was conducted. Two sessions, each lasting 3-4 hours, were conducted to facilitate group conversations within each community. Overall, the communities' livelihood strategies indicated a growing dependence on the informal sector as a source of income, highlighting a significant level of vulnerability due to unemployment and a lack of opportunities for skill development. Consequently, there is a lack of options to enhance livelihood resilience. The livelihood strategies are depending upon government poverty intervention programmes and informal economic activities for generating money. In order to enhance the livelihood of the participants in Danko/Wasagu, it is imperative for the Local Government Authorities (LGAs) to establish a market that fosters entrepreneurship activities, hence promoting development chances.

**Key words:** Livelihood strategy, Vulnerability, Community development

## INTRODUCTION

Rural livelihood strategies encompass the various methods adopted by rural individuals to adapt to evolving social, economic, and environmental circumstances in order to secure household income and sustenance (Stephen & Lenihan, 2010). African rural communities partake in several kinds of activities to ensure their survival and enhance their overall welfare (Ellis, 2000). In addition to relying on agricultural practices like as crop cultivation, livestock rearing, and fishing as their main source of incomes, they also participate in supplementary activities to enhance their primary source of revenue (Adepoju & Obayelu, 2013). Agricultural pursuits as a means of subsistence are linked to significant hazards, including those related to climate, pests and diseases, as well as price fluctuations and regulatory changes. Rural populations in Africa, which are involved in agricultural production, have been increasingly looking for ways to mitigate these risks by diversifying their businesses both within and outside the farming sector. The main focus is to address mainly the deficiencies in their income and food security (Bernard et al., 2014). Ensuring a diversified livelihood is crucial for mitigating the impact of seasonal fluctuations in agricultural activities, increasing income and assets, and reducing risk and vulnerability among impoverished individuals, ultimately leading to improved livelihood outcomes (Davies, 1996; Dimova & Sen, 2010).

The adoption of a diverse livelihoods approach is crucial for the survival of rural communities in Nigeria (Adepoju & Obayelu, 2013; Faburoso et al., 2010). Hence, it is imperative to pursue diversification in order to generate additional income by participating in trading and economic activities to address urgent requirements such as food, shelter, healthcare, and educational expenses (Oyinbo & Olaleye, 2016 & Dimova & Sen, 2010). Approximately half of the income in rural areas is derived from agricultural activities, while other sources include earnings earned from agricultural activity outside the farm, self-employment in non-agricultural sectors like trading, and money sent by family members working in urban areas (Babatunde, 2013). The rural communities in Nigeria have various factors that contribute to the diversification of activities, such as having high family sizes, dealing with marginal land, experiencing weak agricultural yield, and facing the seasonal nature of farm produce (Adepoju & Obayelu, 2013). The cyclical nature of agriculture leads to periods of inactivity during the dry season, allowing rural individuals to engage in alternative occupations, particularly those unrelated to farming, and make use of their labour capacity.

Another rationale for engaging in livelihood diversification is the presence of both push and pull factors, as identified by Barrett et al. (2001). Push factors, such as unemployment, poor income, and deterioration of natural resources, compel rural families to engage in diversification. Conversely, pull factors, such as appealing income, favourable market circumstances, and the opportunity for high profit, entice individuals to pursue diversification. In addition, the educational level of the household heads were found to be advantageous in obtaining well-compensated employment and gaining access to credit facilities (Agyeman et al., 2014).

Danko/Wasagu, despite its abundance of natural resources, continues to suffer from pervasive poverty. The reason for this is the economic and socio-political instability that the country has been facing (Gabriel & Hillary, 2014). The communities are predominantly undeveloped due to limited access to roads, inadequate healthcare facilities, high unemployment rates, and a lack of other essential social amenities (Emmanuel, 2015). Individuals frequently relocate to urban regions due to imagined job prospects. Numerous communities face challenges in their survival as a result of a growing scarcity of social and economic prospects. The social and economic vulnerability faced by individuals is worsened due to irregular income, limited capital accumulation, decreasing agricultural production, and weather circumstances. This study assessed the impact of livelihood options on reducing vulnerability in Danko/Wasagu LGA of Kebbi State, in order to address these issues. The study aims to specifically achieve the following objectives:

i. provide a detailed description of the different livelihood strategies employed by the respondents.
ii. determine the primary sector of the economy that respondents engage in for livelihood outcomes.

## METHODOLOGY

### Study area

The research was carried out in the Danko/Wasagu Local Government Area of Kebbi State, Nigeria. All selected communities have the traits of underdevelopment and remoteness, and they have formed a legally recognised organisation for community development. The location is situated at a latitude of 110 degrees 22 minutes north and a longitude of 50 degrees 47 minutes east from the equator (Fig 1). Danko/Wasagu exhibits a level terrain with rich soil that is highly conducive to agricultural activities. The region experiences an average annual rainfall of 720mm with a temperature range spanning from 15°C to 38°C. Agriculture is the primary occupation of the inhabitants. Their livelihoods mostly rely on food farming, animal husbandry, and fishing (NPC, 2015).

### Sampling of Communities and Participants for the Focus Group Discussion

Danko/Wasagu LGA consists of twenty four (24) settlements. The researcher and the Desk Officer of the LGA engaged in a telephone chat to identify these communities. This inquiry focused on four specific communities: Dseme, Kanya, Maga, and Shengel. Twelve (12) respondents were deliberately chosen from each of the selected communities to take part in the Focus Group. These individuals were selected based on their active involvement in community development association (CDA) as well as their participation in diverse economic activities such as farming, fishing, livestock keeping, and small-scale businesses.

### Data collection

Data collection was conducted through a field visit that involved focus group discussions. The focus group data obtained through interactive contact with respondents centres on rural livelihood strategies, in which participants utilise assets and engage in activities to sustain their livelihoods (Onyeiwu & Liu, 2011). Individual focus groups were performed, with one group dedicated to each community. The procedure was executed with the researcher assuming the responsibility of elucidating each component of the process to participants, facilitating group involvement and discussion, and documenting information. Each focus group underwent a morning session followed by an evening session. Each session had a duration of 3 to 4 hours.

### Data treatment and analysis

The researcher recorded the information from the textual and coded versions of the replies for each category of the four (4) focus group in an Excel spreadsheet. The data analysis for the focus group in this study utilised a qualitative technique that focused on examining the meaningful and symbolic content of the qualitative data. This approach facilitates the comprehension of the connections between developing themes and patterns by making qualitative inferences. It also enables the examination of the similarities and differences that support or contradict the findings utilised in this study.

## RESULTS AND DISCUSSION

**Livelihood strategies**: The focus group discussion centered on livelihood strategies pertaining to land ownership, food acquisition, housing, clothing, and access to services. There are numerous responses identified in communities when different types of assets are used to achieve favourable livelihood outcomes. The respondents demonstrated a significant dependence on the informal sector for acquiring income, food, and clothing (Table 1). The majority of livelihood options involve the focus of these people on acquiring both income and food. This occurrence was expected in a rural region of Nigeria that is plagued by the issue of poverty. The acquisition of land is another significant livelihood strategy in the communities. The communities derived their income from several sources, including informal enterprises, trade, and support from government and non-governmental organisations (Table 1). These features are suggestive of poverty, dependence on the informal economy, and

susceptibility to livelihood challenges. Land is primarily acquired through the means of purchasing and inheriting. Four Focus Groups said that land acquisition was achieved through purchase, while two Focus Groups highlighted inheritance as a way of gaining land (Table.1).

The livelihood methods stated have been compiled in Table 2. All members in the communities engaged in trading commodities and services (such as selling firewood, vegetables, and fruits) as a means of making income. The majority of these operations occur inside the local community and from residential properties, demonstrating a significant reliance on the informal market. The earnings derived from these approaches are solely intended for consumption. The communities employed a collaborative approach to construct houses, utilising both traditional and modern building materials sourced locally by the group members. Social capital is a valuable resource that was extensively utilised by all members of the communities. Strategies utilising social capital included the utilisation of cooperation and contributions from family and friends to support the development of a community, as well as receiving social grants, both in money and non-monetary forms, from philanthropists and non-governmental organisations. Hence, it is evident that the strategies utilised by the participants portray poverty and absence of resources such as micro-finance and business acumen. The income derived from agricultural and informal commercial activities in Danko/Wasagu is mostly characterised by opportunism, rather than a consistent increase in the quality of life for the people.

**Assets acquisition:** The informal sector was identified as the main source of income, as seen in Table 1. The Local Government Authority (LGA) was responsible for providing essential physical and social infrastructures, including education and health services. Housing was primarily obtained through informal means. The public sector did not provide any official lodgings. The participants utilised collective efforts, employing readily accessible indigenous resources for constructing homes. The summary indicated that the participants acquired land mostly for agricultural purposes such as farming and livestock keeping, as well as for constructing homes or establishing small-scale companies. The predominant method of obtaining land has been by engaging in negotiations with community leaders. The custodians of the communities have been granted the authority by the Local Government to lease and allot land to community members. In addition, certain individuals acquired land through legal inheritance from their parents or by purchasing it from another community member who had lawfully inherited it, with the intention of using it for their livelihood.

Several methods were a technique of making cash. In the research area, the communities mostly relied on dry season farming (the growing of fruits and vegetables), selling firewood for cooking, and selling items at the end of the harvest period as the main sources of making cash. Women generated additional revenue by selling surplus or intentionally produced goods from their households. The items included vegetables, fruits, eggs, and fowl, all of which were grown in the backyard garden. The Maga community listed government jobs, including salary and pensions, as another source of income (Table 1). According to two focus groups, members were involved in various specialised skills such as auto-mechanic, carpentry, block making, building, weaving, knitting, blacksmithing, and tailoring in order to earn money. A single focus group, consisting of members from the Maga community, had the opportunity to interact with a donor who had provided financial support for their computer centre business venture (Table 1). The predominant methods of acquiring clothing for the participants involved purchasing new and used garments, as well as receiving gifts from relatives and acquaintances. Only a single focus group cited sewing as a method of acquiring apparel, as indicated in Table 1. The Local Government Authority has made investments in the provision of public services, including the establishment of borehole water systems, schools, health centres, and roads in Danko/Wasagu. The LGA ensured security by deploying police personnel. The LGA also addressed the concept of community policing, which involves vigilantism. Electricity was not accessible in all the communities during the course of this investigation (Table 1).

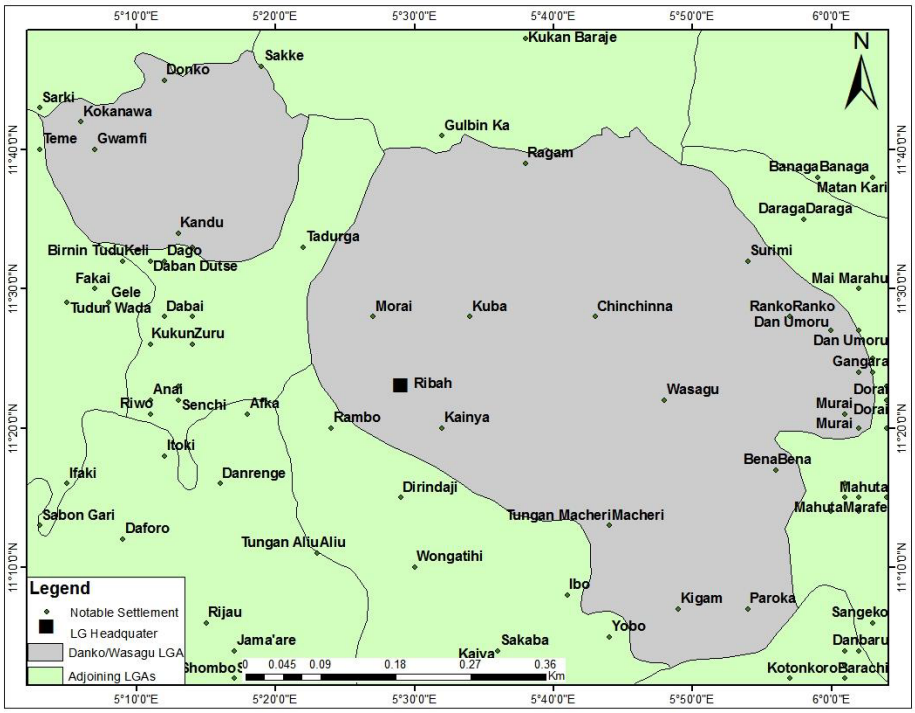


**Figure 1. Map of Danko/Wasagu Local Government Area Showing the Study Area (NPC, 2015).**

**Table.1 Livelihood mechanisms reported in focus group discussion**

| The level at which mechanisms were used H = Household C = Community | | | Sector of the economy used to obtain asset | Livelihood strategies identified specifically by the community | Dseme | Kanya | Maga | Shengel | Total |
|---|---|---|---|---|---|---|---|---|---|
| H | C | Asset obtained | | | | | | | |
| ✓ | | Land | | Inheritance | ✓ | | | ✓ | 2 |
| ✓ | ✓ | | | Buying | ✓ | ✓ | ✓ | ✓ | 4 |
| ✓ | ✓ | | | Negotiating with community leaders | ✓ | ✓ | ✓ | ✓ | 4 |
| ✓ | | Money | | Formal employment | | | ✓ | | 1 |
| ✓ | ✓ | | | Self-employment from special skillsa | ✓ | ✓ | ✓ | ✓ | 4 |
| ✓ | ✓ | | Informal sector | Selling farm produce/livestock | ✓ | ✓ | ✓ | ✓ | 4 |
| ✓ | ✓ | | | Vegetables and fruits | ✓ | ✓ | | ✓ | 3 |
| ✓ | ✓ | | | Trading, selling firewood, livestock, and poultry, carpentry and brick making | ✓ | | ✓ | ✓ | 3 |
| | ✓ | | Social sector | gift from philanthropist | | | | ✓ | 1 |
| | ✓ | | | Donation from NGOs | | | ✓ | ✓ | 2 |
| ✓ | ✓ | | | Gift from family and friends | | ✓ | | ✓ | 2 |
| ✓ | ✓ | | | Social grant | | | | | 1 |
| ✓ | ✓ | Food | | We produce our food e.g. grains | ✓ | ✓ | ✓ | ✓ | 4 |
| ✓ | ✓ | | | We produce vegetables and fruits | ✓ | ✓ | ✓ | ✓ | 4 |
| ✓ | | | | Buy food from the market | ✓ | ✓ | ✓ | | 3 |
| ✓ | ✓ | | | Gift of food from friends and relatives | ✓ | ✓ | | ✓ | 3 |
| ✓ | | Clothing | | We buy new and second-hand cloth | ✓ | ✓ | ✓ | ✓ | 4 |
| ✓ | | | | Gift from family and friends | ✓ | ✓ | | ✓ | 3 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | | | | We sew our cloth | | | ✓ | | 1 |
| ✓ | | | | Tailor sewn our cloth | ✓ | ✓ | | ✓ | 3 |
| ✓ | ✓ | Housing | Self-build houses/ inheritance | We build our houses in the group using both local and modern materials | ✓ | ✓ | ✓ | ✓ | 4 |
| ✓ | | | | We inherited our houses | ✓ | ✓ | ✓ | ✓ | 4 |
| ✓ | ✓ | Services | Public sector | Water, drainages, culverts by LGA | ✓ | ✓ | ✓ | ✓ | 4 |
| ✓ | ✓ | | | Pit latrines, dispensary by LGA | ✓ | | ✓ | ✓ | 3 |
| ✓<br>✓ | ✓<br>✓ | | | Environmental management, school facilities by and roads rehabilitation by LGA | ✓ | ✓ | | ✓ | 3 |
| | | | | No electricity | ✓ | ✓ | ✓ | ✓ | 4 |
| | ✓ | Education | Local Government | Primary and secondary school | ✓ | ✓ | ✓ | ✓ | 4 |
| | ✓ | | | Adult and nomadic education | ✓ | ✓ | ✓ | ✓ | 4 |

**Table. 2 Common livelihood strategies practice by the communities**

| **Livelihood requirements** | **Livelihood strategy** | **Number of communities indicated using this strategy** |
|---|---|---|
| Income | Trading, selling firewood, brick making and vegetables | 3 |
| | Informal business/self-employment | 4 |
| | Formal employment | 1 |
| | Selling excess agricultural produce and livestock | 4 |
| | Selling specialized skills | 3 |
| Housing/Land | Obtaining land through purchase | 4 |
| | Obtaining land through inheritance | 2 |
| | Building house in group from local and modern raw materials | 4 |
| Food and vegetables | Preparing our food and vegetables | 4 |
| | Buying food in bulk on weekly market days | 3 |
| | Gift of food from friends and relatives | 3 |
| Clothing | We sew our cloth | 1 |
| | Tailors sew our cloth and from donations | 3 |
| | We buy second hand cloth | 4 |

## CONCLUSION AND RECOMMENDATION

The participants' expressed livelihood strategies indicated a growing dependence on the informal sector as a source of income, highlighting significant levels of vulnerability (as shown in Table 1). This situation is exacerbated by poverty and a lack of opportunities for skill learning, with no viable means to enhance livelihood resilience. The livelihood strategies are contingent upon government poverty intervention programmes and informal economic activities for generating money. The primary determinant of participants' livelihood outcomes is their fulfilment of basic livelihood needs, including enhanced physical, social, and financial assistance for the development of small-scale enterprises. Nevertheless, this has not led to the creation of sustainable job prospects which can effectively withstand unexpected economic downturns and adverse circumstances experienced in the studied region. Hence, the research suggests that Local Government Areas (LGAs) should provide prospects and cultivate a market to enhance entrepreneurial endeavours, thereby enhancing the quality of life for individuals in Danko/Wasagu. Furthermore, establishing a productive collaboration among farmers

and marketers would greatly contribute to the development of a social network of connections that can offer many possibilities. In addition, it is crucial to encourage the development of informal activities for sustenance that align with the existing employment opportunities in the areas under investigation.

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# Utilization Of Extension Services Among Arable Crop Farmers in Obafemi Owode Local Government Area, Ogun State, Nigeria

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## ABSTRACT
Extension services play critical role in dissemination of agricultural information and innovation to promote food security. The study examined the utilization of agricultural extension services among arable crop farmers in Obafemi Owode Local Government Area of Ogun State. Data were collected using a pretested instrument administered on 97 farmers selected through simple random sampling technique. Data were analyzed using descriptive and inferential (Chi-square and Pearson Product Moment Correlation) statistics. Results showed that 52.6 % of the farmers were below 41 years with mean age of 40 years, while majority (76.3%) were married. The mean household size was 7 persons. Findings further revealed that technical agricultural advice ($\bar{x}$=4.28**),** group formation ($\bar{x}$=3.90)**,** soil health ($\bar{x}$=3.76) were the major agricultural extension services that were accessible to the farmers. Furthermore, bad road network ($\bar{x}$=2.87), long distance ($\bar{x}$= 2.85), lack of financial resources ($\bar{x}$= 2.79) were the major factors that affected utilization of agricultural extension services with majority (72.0%) of the farmers having low level utilization of extension services. Study showed a significant relationship (r=0.206, P ≤ 0.05) between socio-economic characteristics of the respondents and utilization of extension services. Also, there is significant relationship (r=0.989, p≤0.01) between the respondents' accessibility to extension services and utilization of extension services. Based on the findings, extension services were accessible, but some factors hindered the utilization of extension services. The study therefore recommended that efforts should be made to provide good road network to enhance more access of the extension officers to arable crop farmers.

**Keywords:** Extension services, Accessibility, Utilization, Arable Crop Farmer

## INTRODUCTION
Globally, agriculture accounted for 22.5% of the Gross Domestic Product, while allied activities in Nigeria accounted for 42% of total employment in 2020 (Ministry of Agriculture and Farmer welfare, 2021; World Bank, 2021). The productivity of agriculture is threatened by the world's growing population due to rising human activity and the requirement for food for the sustainability of life. Agriculture needs to be continually enhanced and maintained to keep the nature on her feet. Therefore, it is imperative to continually find ways to increase food production without harming the environment. In-order to maintain agricultural productivity and sustainability, agricultural services and inputs from government and stakeholders can be delivered to the targeted farmers through extension agents. The primary aim of the extension agents is to introduce technology equipment or improve agricultural practices and teach the farmers through different means for acceptability and utilization of extension services to improve food security, farmer's livelihood outcomes, boost economic growth and for agricultural sustenance.

Danso-Abbeam *et al.* (2018) opined that extension services among arable crop farmers in developing countries require a multi-faceted approach that addresses issues of participation, training, technology, demonstration, communication, feedback, and access to credit and markets. Extension services play a critical role in improving the resilience of agricultural systems. Agricultural extension services can be accessed through a variety of platforms, such as field demonstrations, farmer field schools, advisory services, mobile phone applications, radio, and television programs, among others (Swanson, 2017).

Adepoju *et al.* (2021) affirmed that effective utilization of extension services among arable crop farmers depends on a range of factors, including access to extension services, the quality and relevance of the services, the availability of inputs and resources, and the farmers' willingness to adopt new practices. According to Olagunju and Agbamu (2021), it was observed that effective utilization of extension services among arable crop farmers involves successful adoption and application of new agricultural technologies and practices. Utilization of agricultural extension services has been an essential strategy for the development of the agricultural sector and the improvement of farmers' livelihoods, particularly in developing countries (Ogundiran, 2021; El-Bilali *et al.*, 2022).

Mwesigwa (2021) suggested some strategies to boost the effective utilization of extension services among arable crop farmers: participatory approach,

farmer field school, technology demonstration, and extension worker training. Oladejo and Ojo (2020) identified some challenges that make accessibility and utilization of extension services difficult among arable crop farmers. These include: lack of awareness of the extension services, lack of knowledge of the subject matter, limited access to quality or right information about the extension services, ineffective communication channels, poor transportation infrastructure, limited accessibility to the extension services, lack of trust in extension agents and credibility of past extension programs, inadequate number of experts, inadequate training opportunities, limited gender inclusiveness, language barriers, and cultural barriers. Translation of extension information to the local languages could stand as a barrier to the targeted audience, and this can limit the knowledge and utilization of the extension services.

Small-scale farmers with limited financial resources may not be able to access and utilize extension services effectively. Some agricultural extension services (technological equipment or improving practices) may be too costly, the training fee may not be affordable, there may be a lack of access to reliable internet connectivity, and communication devices may not be available or accessible (Ntshangase and Mudhara, 2020).

This study suggested that in order to increase utilization rates, extension agents need better financing, the best channels of communication, and the provision of infrastructural facilities. Several studies had been carried out on the effects of extension services on perennial crop production in Ogun State (Adegboye, 2011; Iyabo and Adesiji, 2011 and Akinbile *et al.*, 2016). This study therefore examined the utilization of agricultural extension services among arable crop farmers in Obafemi Owode Local Government Area of Ogun State, with specific objectives to: describe the socioeconomic characteristics of the respondents; ascertain the accessibility to extension services; ascertain the extent of the utilization level of extension services; and examine the factors affecting the utilization of extension services. The study tested the relationship between accessibility and utilization of extension services.

## METHODOLOGY

This research was conducted in Obafemi/Owode Local Government Area, which is one of the 20 local government areas in Ogun State. It lies between longitudes of 2° 45' and 3° 55' and latitudes of 7° 01' and 7°. It shares common boundaries with the following local government areas: Odeda Local Government (North), Sagamu (East), and Ifo (South) (Ogunsanwo *et al.*, 2019). The economy of the study area primarily depends on arable crop production like maize, cassava, yam, and vegetables. According to the Ogun State Agricultural Development Programme (OGADEP) (2022), there are 3428 registered arable crop farmers in Obafemi Owode Local Government Area. A total of 97 arable crop farmers were randomly selected from this list using the Taro Yamane formula at the 0.05 level of significance.

Accessibility to extension services was measured at the ordinal level using a 5-point rating scale as always, often, sometimes, rarely, and never accessible, with assigned scores of 4, 3, 2, 1, and 0, respectively. Factors affecting the utilization of extension services were measured at the ordinal level using the pentatonic scale as major, minor, not a factor, with assigned scores of 2, 1, and 0, respectively. Primary data was employed to achieve the objectives of the study, and these were analyzed using descriptive statistics such as frequency, percentage, and mean. Pearson Product Moment Correlation was used to test the accessibility and utilization of extension services among arable crop farmers.

## RESULTS AND DISCUSSION

Results in Table 1 showed that about 57% of the respondents were male and 76.3% of the respondents were married, with a mean household size of 7 people. This implies that there is no gender discrimination in arable crop production, despite the tedious nature of farming activities. This is in line with Mensah and Fosu-Mensah (2020), who stated that gender roles are dynamic, but the contribution of women to agricultural growth and development remains fuzzy due to their dependence on men. It was also observed that the respondents had relatively large households.

The large size of the household is advantageous because the household members are expected to assist in farm activities to increase agricultural production. This result is in agreement with the findings of Odoemenem and Anyanwu (2016) and Oladeji *et al.* (2017), who reported that household size had a significant positive impact on arable crop production in Imo and Oyo State, respectively. The mean age of the respondents was 40 years; this indicated that farmers were active, young, energetic, and vibrant to carry out the activities in arable crop production. This study is in line with Elenwa and Emodi (2019) and Gbigbi (2020), who observed that the majority of arable crop farmers were youth and productive in River and Osun States.

Most (66.1%) of the farmers were involved in non-farming activities as their secondary occupation; some of the activities were trading of non-agricultural products, artisan activities, public services, teaching, transportation business, etc. This

shows that the respondents had an alternative source of livelihood to augment the income generated from arable crop farming. Most (66.9%) of the respondents had formal education, which implies that arable crop farmers can write, read, and learn through various instructional materials on improved agricultural practices to improve their crop production yields. This result supports the findings of Adepoju and Salau (2018) that education is one of the important factors that influence farmers decisions to utilize technological agricultural practices and modern information sources. The mean farm size in the study area was 1.3 hectares. This implies that all registered arable crop farmers operate on a small scale, and their utilization of extension services could improve food security and their livelihood outcomes. This finding is in consonance with Ojuekaiye (2018) and Kassie *et al.* (2018), who found that small-scale farmers' are key stakeholders in food security and rural development. In addition, the mean farming experience of the arable crop farmers was 17 years; this indicated that they have been into this livelihood activity for a long time and could have relatively high farming skills and knowledge in arable crop production. This result is in line with the findings of Doss et al. (2020) and Chaudhury and Rahaman (2021), who posited that arable crop farmers who have been engaged in livelihood activities for a long time often possess significant farming skills and knowledge in arable crop production. The mean monthly income of the respondents was ₦79237.11k. This implies that arable crop production is lucrative, and farmers with higher incomes could be willing to fully utilize the technological agricultural practices and modern agricultural information acquired. This is in consonance with Theme *et al.* (2018), who asserted that farmers' income influences their willingness to invest in agricultural input to boost utilization.

**Table 1: Socio-economic Characteristic of Arable Crop Farmers**

| Socio-economic Characteristics | Frequency (f) | Percentage (%) | Mean ($\bar{x}$) |
|---|---|---|---|
| **Sex** | | | |
| Male | 55 | 56.7 | |
| Female | 42 | 43.3 | |
| **Age** | | | |
| 10-30 | 18 | 18.6 | |
| 31-40 | 33 | 34.0 | 40.00 years |
| 41-50 | 30 | 30.9 | |
| 51-60 | 14 | 14.4 | |
| 61-70 | 2 | 2.1 | |
| **Marital Status** | | | |
| Single | 14 | 14.4 | |
| Married | 74 | 76.3 | |
| Separated | 7 | 7.2 | |
| Widower | 1 | 1.0 | |
| Divorced | 1 | 1.0 | |
| **Household Size** | | | |
| 1-5 | 28 | 28.9 | |
| 6-10 | 56 | 57.7 | 7 persons |
| 11-15 | 11 | 11.3 | |
| 16-20 | 1 | 1.0 | |
| 21-30 | 1 | 1.0 | |
| **Educational Status** | | | |
| No Formal Education | 17 | 17.5 | |
| Informal Education | 15 | 15.5 | |
| Primary Education | 37 | 38.1 | |
| Secondary Education | 24 | 24.7 | |
| Tertiary Education | 4 | 4.1 | |
| **Secondary Occupation** | | | |
| Animal farming | 24 | 24.7 | |
| Trading | 29 | 29.9 | |
| Artisan | 18 | 18.6 | |
| Public Service | 2 | 2.1 | |
| Transportation | 11 | 11.3 | |

| | | | |
|---|---|---|---|
| Teaching | 2 | 2.1 | |
| Others | 2 | 2.1 | |
| **Farm Size (Hectares)** | | | |
| 0-1 | 31 | 32.0 | |
| 1.01-2 | 58 | 59.8 | 1.3ha |
| 2.01-3 | 7 | 7.2 | |
| 3.01-4 | 1 | 1.0 | |
| **Farming Experience (Years)** | | | |
| 1-10 | 33 | 34.0 | |
| 11-20 | 38 | 39.2 | 17 years |
| 21-30 | 14 | 14.4 | |
| 31-40 | 11 | 11.3 | |
| 41-50 | 1 | 1.0 | |
| **Average Income (Naira)** | | | |
| 5000 – 50000 | 24 | 24.7 | |
| 50001-100000 | 56 | 57.7 | ₦79237.11k |
| 100001-150000 | 17 | 17.5 | |

**Source: Field Survey, 2022**

Findings in Table 2 showed that cassava (94.7%) and maize (89.7%) were the dominant crops cultivated by the arable crop farmers. This implies that these crops are likely to be the most dominant crops consumed in the study area. Akwada (2022) reported that cassava production will continue to gain prominence among farmers because its demand keeps increasing. In addition, vegetables are an essential category of food; they address malnutrition, especially among women and children, and contribute to food security and income generation. This finding supports the work of Beddington (2021), who reported that vegetables have potential for increasing nutrition security and improving livelihoods.

**Table 2: Arable crops cultivated by the respondents**

| Crops | f (%) |
|---|---|
| Cocoyam | 28(28.9) |
| Rice | 7(7.2) |
| Maize | 87(89.7) |
| Cassava | 92(94.8) |
| Tomatoes | 50(51.5) |
| Plantain | 38(39.2) |
| Leaf vegetables | 52(53.6) |
| Sugarcane | 3(3.1) |
| Hot pepper(*rodo*) | 51(52.6) |
| Potatoes | 16(16.5) |
| Yam | 38(39.2) |
| Soybeans | 0(0.0) |

***Multiple response.** **Source: Field Survey, 2022.**

Results in Table 3 revealed the extension services that were accessible to arable crop farmers; out of the 23 extension services listed, 12 were more accessible to arable crop farmers. The mean of extension service above the mean was taken to be more accessible to the farmers, while the mean score below the grand mean was less accessible. This result showed that technical agricultural advice ($\bar{x}$=4.28**),** group formation ($\bar{x}$=3.90), communication assistance (phone and message, $\bar{x}$=3.71), weather forecast analysis ($\bar{x}$=3.68), strategic planning ($\bar{x}$=3.50), subject matter extension ($\bar{x}$=3.46), integrated pest management ($\bar{x}$=3.38), home management ($\bar{x}$=3.30), cooperative services ($\bar{x}$=2.97), post-harvest handling ($\bar{x}$=2.64), and crop processing ($\bar{x}$=2.58) were the extension services that were more accessible to the arable crop farmers. This implies that extension services play a crucial role in assisting small-holder farmers to enhance their productivity, resilience, and sustainability; thus, this could influence their productivity and improve their income. Furthermore, farmers had access to communication aid because it is vital and important for arable crop farmers to exchange crucial information and get urgent

agricultural advice from the extension agents. Likewise, weather forecasts contributed positively to arable crop production because it helped arable crop farmers plan their schedule properly. The service helps the farmers have access to reliable information on weather and helps them optimize their resources to overcome production challenges and risks in the production cycle. Strategic planning involves crop selection, input management, and marketing strategies; this also supports the farmers in identifying resources and developing plans to get the maximum production. This is in agreement with Nwankwo (2020) and Ogundiran (2021), who stated that farmers who have access to extension services get better agricultural production.

**Table 3: Accessibility of Extension Services to Arable Crop Farmers (n=97)**

| Variables | Mean ($\bar{x}$) |
|---|---|
| Input supply | 2.27 |
| Sale and marketing | 1.73 |
| Government assistance | 1.36 |
| Technical agricultural advice | 4.28 |
| Financial linkage assistance | 2.26 |
| Strategic planning | 3.50 |
| Integrated pest management | 3.38 |
| Soil health | 3.76 |
| Non- Governmental Organization | 1.37 |
| Communication (phone and message)assistance | 3.71 |
| ICT provider | 1.15 |
| Institutional assistance | 2.14 |
| Cooperative services | 2.97 |
| Weather Forecast analysis | 3.68 |
| Irrigation system | 1.36 |
| Drainage system | 1.47 |
| Farm insurance | 1.06 |
| Storage system | 1.51 |
| Subject Matter | 3.46 |
| Group formation | 3.90 |
| Home economics/ home management | 3.30 |
| Post-harvest handling | 2.64 |
| Crop processing | 2.58 |

**Source: Field Survey, 2022** **Grand mean: 2.56**

Results in Table 4 showed that out of the 23 extension services listed, only 12 were utilized among the arable crop farmers in the study area. Any extension service whose mean score was above the grand mean was considered to be more utilized among the arable crop farmers, while those whose mean score was below the grand mean were less utilized. This implies that the arable crop farmers utilized the extension services that were accessible to them. This means that the accessibility of extension services is directly proportional to their utilization. The rate of utilization of extension services strongly depends on their accessibility. This signifies that there is a strong indication that arable crop farmers will utilize any extension services that are accessible, and it also suggests that there is a high probability for arable crop farmers to adopt or accept any innovation or improved agricultural practices from the extension agent. This showed the positive contribution of extension agents' efforts in agriculture. The result also revealed that technical agricultural advice and group formation are very essential extension services for arable crop farmers.

**Table 4: Utilization of Extension Services to Arable Crop Farmers (n=97)**

| Variables | Mean $(\bar{x})$ |
|---|---|
| Input supply | 2.25 |
| Sale and marketing | 1.72 |
| Government assistance | 1.38 |
| Technical agricultural advice | 4.23 |
| Financial linkage assistance | 2.28 |
| Strategic planning | 3.46 |
| Integrated pest management | 3.39 |
| Soil health | 3.64 |
| NGO | 1.42 |
| Communication (phone and message) assistance | 3.67 |
| ICT provider | 1.19 |
| Institutional assistance | 2.16 |
| Cooperative services | 3.02 |
| Weather Forecast analysis | 3.60 |
| Irrigation system | 1.34 |
| Drainage system | 1.45 |
| Farm insurance | 1.06 |
| Storage system | 1.48 |
| Subject Matter Specialist(SMS) | 3.37 |
| Group formation | 3.78 |
| Home economics/ home management | 3.29 |
| Post-harvest handling | 2.63 |
| Crop processing | 2.60 |

**Source: Field Survey, 2022. Grand mean: 2.54**

Furthermore, results in Table 4b revealed that the majority (73.2%) of the respondents had low utilization of extension services. This implies that most of the respondents hardly made use of the extension services or information because the extension services may not be the immediate service they needed or may be complex or expensive. In addition, a low level of utilization might also be traced to a low extension-farmer ratio and some other constraints affecting extension agents' performance. This finding is in line with Adekoya (2021), who revealed that the low performance of extension agents contributes to low utilization by farmers.

**Table 4b: Categorization of Utilization of Extension Services to Arable Crop Farmers (n=97)**

| Categorization | Frequency | Percentages (%) |
|---|---|---|
| Low (23-68) | 71 | 73.2 |
| High (69-138) | 26 | 26.8 |

**Source: Field Survey, 2022**

Results in Table 5 showed the factors affecting the utilization of extension services by arable crop farmers in the study area. Mean score above the grand mean ($\bar{x}$2.00) is considered a high factor, while a mean score below the grand mean is considered a low factor. Out of the 19 variables listed in this study, nine were considered high-risk factors affecting the utilization of extension services by arable crop farmers. The factors include: poor road network ($\bar{x}$=2.87), long distance from extension offices ($\bar{x}$= 2.85), availability of resources and communication ($\bar{x}$= 2.79), fund ($\bar{x}$=2.62), infrastructural facilities ($\bar{x}$=2.60), equipment available ($\bar{x}$=2.59), training materials ($\bar{x}$=2.39) and technical skills ($\bar{x}$=2.31). This is an indication that a good road network is an essential factor for mobilizing the extension agents to reach the arable crop farmers for effective dissemination of extension services. A good road network could help arable crop farmers have better access to extension services. This has a direct relationship with the production level of able crops and could have a positive influence on food security in the study area. Farm distance and the availability of extension services and extension agents are also relevant factors in the utilization of extension services. Distance can be a barrier to having access to extension services.

**Table 5: Factors Affecting utilizations of extension services among arable crop farmers (n=97)**

| Variables | Mean($\bar{x}$) |
|---|---|
| Road network | 2.87 |
| Distance to farm | 2.85 |
| Culture of the villagers | 1.04 |
| Infrastructural facilities | 2.60 |
| Result demonstration | 1.82 |
| Farmers fund to access the services | 2.62 |
| Availability of resource | 2.79 |
| Communication | 1.50 |
| Equipment possession | 2.59 |
| Relationship between extension agent and farmer | 1.34 |
| Needs of the farmer | 1.80 |
| Availability of farmers time | 1.26 |
| Availability of Extension time | 1.25 |
| Trained of extension workers | 1.65 |
| Incentives e.g. money, seeds, fertilizer | 2.25 |
| Mentoring and Monitoring | 1.24 |
| Technical skills | 2.31 |
| Responsiveness to farmers needs | 1.88 |
| Training Materials | 2.39 |

**Source: Field Survey, 2022** Grand Mean: 2.00

The results in Table 6 presented a significant relationship (r = 0.989, p<0.01) between the accessibility of extension services and their utilization by arable crop farmers in the study area. This was tested using Pearson Product Moment Correlation (PPMC). This implies that the accessibility of extension services had an influence on the respondents' utilization of extension services by arable crop farmers in the study area. This result confirmed the finding of Agwu (2021) that there is a significant relationship between accessibility of extension services and utilization of extension messages among arable crop farmers in Abia State, Nigeria.

**Table 6: Test of relationship between the accessibility of extension services and utilization of extension services by arable crop farmers.**

| Variable | r- value | p-value | Decision |
|---|---|---|---|
| Accessibility of extension services to arable crop farmers and utilization of extension services by arable crop farmers in the study area | 0.989** | 0.000 | S |

**Source: Field Survey, 2022** **Note: S=Significant**

## CONCLUSION AND RECOMMENDATIONS

The study concluded that arable crop farmers were in their productive age, married with a relative high household size, the production activities were not gender biased, and most of the arable crops cultivated were cassava, maize, and chili pepper (rodo). Out of the 23 extension services listed in this study, only 12 were more accessible and utilized by arable crop farmers. Some of the extension services include technical agricultural advice, group formation, weather forecast analysis, and communication assistance. Also, poor road networks and distance to the farm were the major factors that influenced the utilization of extension services. Accessibility of extension services was significantly related to utilization of extension services in the study area. Therefore, the study recommended that effort be put into top gear by extension agents and relevant stakeholders to ameliorate the identified constraints to extension service utilization by arable crop farmers.

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# Digital Agriculture: A Classic Tool in Agricultural Value Chain in Lagos State, Nigeria

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**ABSTRACT**

Enhancing agripreneurs involvement and productivity in the agricultural value chain necessitates the use of digital agriculture. This study investigated the utilization of digital devices in the agricultural value chain in Lagos State, Nigeria. Multi-stage random sampling procedure was used to select 90 respondents who had active agribusiness under the value chains of input supplies, primary production, processing, wholesaling, and retailing. Structured questionnaires were administered through survey interviews for data collection, descriptive and non-parametric inferential statistics were used for data analysis. The study revealed respondents' mean age was 38 years, most respondents were males and 74.4% had tertiary education. The average monthly income was ₦71,300.00, while livestock production was the major activity engaged with. Information sharing and sales of produce are featured mostly in each of the value chain activities. The study revealed an association between the socioeconomic characteristics of the respondents and the utilization of digital agriculture. The study recommends that agripreneurs should acquire more training on the use of digital agriculture and combine resources as a group to acquire some of the technologies that are capital intensive to increase their use of digital agriculture.

**Key words**: Digital agriculture, agripreneurs, utilization, and value chain.

## INTRODUCTION

Enhancing agripreneurs involvement and productivity in the agricultural value chain necessitates the use of digital agriculture. Digital agriculture is a set of technologies for communication, information storage, and analysis that allows farmers to plan, monitor, and manage the operational and strategic activities of the agriculture production systems, from pre-production, in-production, and post-production. The main purpose of digital technologies is to form a connection between individuals rapidly, effortlessly, and cost-effectively. Through digitalization, all parts of the agri-food production chain that sustain the economy will be modified, since connectivity and the processing of large amounts of information in an instant support more efficient work, greater economic return, greater environmental benefits, and better working conditions in the field (Édson Luis Bolfe, 2020). Whether low or high-tech, implemented by users or by external service providers, the main incentive for adopting digital technologies lies in the expectations of users to find solutions to existing or emerging challenges (Jouanjean, 2019).

Agripreneurs in agribusiness who play a key role in food production, ranging from one value chain to another, are in a drive to increase production, distribution, and sales of agricultural commodities by way of contributing immensely to ensuring an increasing sustainable economy. However, a search for building a robust system to accommodate this increasing demand for food production is a transition from traditional agriculture into a more technology-driven headway known as digital agriculture. This form of agriculture has the greater advantage of providing relevant data such as the market structure, product stability/durability, seed viability, transport systems, market locations, and target market/audience for different value chains over conventional methods.

Agriculture as an enterprise is going through a transition globally. It is assuming a new shape and scope and is no more mere cultivation of crops and rearing of animals or an enterprise for the rural population. Agripreneurship is the option to adopt in the quest to make agriculture an enterprise of appeal in contemporary business engagements. The concept of agripreneurship is the combination of agriculture and entrepreneurship. The application and practice of entrepreneurship in agriculture will generate a wide range of benefits such as increased productivity, development of new agribusiness ventures that will lead to job creation, reduction in poverty index, innovations in products and service delivery, and increase in wealth (Birwa *et al.,* 2014). Aligning agriculture alongside the value-chain framework has emerged as one of the strategies to make the agricultural sector more efficient. Value chains are all about human interactions. They are about linkages between people and businesses who transfer or exchange products, money, knowledge, and information. In an effective value chain, people at different stages of the chain actively support each other. Value chain is a term used for all goods and services involved in the transition of an agricultural product from farm to consumer.

With the global population projected to grow from 7.6 billion in 2018 to over 9.6 billion in

2050, there will be a significant increase in the demand for food (United Nations Department of Economic and Social Affairs (UNDESA), 2019). At the same time, the availability of natural resources such as fresh water and productive arable land is becoming increasingly constrained. There are entrepreneurs in both urban and rural settlements who desire to run an agribusiness with little or no data to make informed decisions. This has led to little or no productivity and failure of so many agribusinesses which is also contributing to the dwindling economic growth of the country. Innovation is and will remain essential in the food and agribusiness sector to respond to the critical concerns of society such as climate change and global warming, food/energy scarcity and security, environmental challenges, and resource use/sustainability. (Graff *et al*. 2003). The willingness and readiness of these agricultural entrepreneurs to adopt and further utilize these innovations in the form of digitally-driven agriculture may be challenging due to their level of education, their access to digital devices, or other factors that could hinder the utilization of such digital platforms. It is against this background that this research was designed to answer the following research questions:

1. What are the socio-economic characteristics of the respondents?
2. What aspects of the agricultural value chain are the respondents involved in?
3. What digital agriculture technologies do the respondents utilize along the value chain?
4. What are the activities in which respondents engage in digital agriculture? and;
5. What is the perception of the respondents about digital agriculture?

**The specific objectives of the study were to**

1. Describe the socio-economic characteristics of the respondents;
2. Identify the aspects of the agricultural value chain the respondents are involved with;
3. Identify the digital agriculture technologies the respondents utilize along the value chain;
4. Identify the activities in which respondents engage in digital agriculture and;
5. Examine the perception of the respondents about digital agriculture

## RESEARCH METHODOLOGY

The study was conducted in Lagos state, Nigeria, which is arguably the most economically important state in the country. Lying approximately on longitude 20 42'E and 32 2'E respectively, and between latitude 60 22'N and 60 2'N. The area was selected based on the level of industrialization in the agricultural sector in which digital technologies are supposedly utilized. The State's strength is in the midstream and downstream sectors of all agricultural value chains, however, it also has a comparative ecological and socio-economic advantage in the upstream sector of Fisheries, Poultry, Piggery, Coconut, and Vegetables. Presently, the State has over 600,000 farming families along the value chains (producers, processors, marketers, and service providers). The scope of this research was targeted at entrepreneurs who were input suppliers, primary producers, wholesalers (agents or traders), processors of agricultural commodities, manufacturers, and retailers in the agriculture space (otherwise known as agripreneurs) whose ventures are in any branch of the agricultural value chain. Hence random sampling technique was employed in selecting 90 respondents along these value chains because of similarities in the activities of the actors in the value chain. The Perception of respondents about digital agriculture was determined on a 3-point Likert-type scale of agreed -3, undecided -2, and disagreed – 1. This scoring was reversed for negative statements. Using mean statistics a mean score of 2 was obtained. Statements above the mean were regarded as favorable while those below the mean were regarded as negative.

## RESULTS AND DISCUSSIONS

### Socio-economic Characteristics of Agripreneurs in the Study Area

#### Sex of Respondents

The study shows in Table 1 that the majority (61.1%) of the respondents were males while 38.8% were females. This indicates that most agripreneurs along the agricultural value chain were males. This corroborates the findings of Shajahan, (2021), that women are less likely to adopt and utilize agricultural technologies when compared to their male counterparts.

**Table 1. Distribution of respondents according to socio-economic characteristic**

| Variables | Frequency (n=240) | Percentage | Mean |
|---|---|---|---|
| **Sex** | | | |

| | | | |
|---|---|---|---|
| Male | 55 | 61.1 | |
| Female | 35 | 38.9 | |
| **Age (years)** | | | |
| Below 30 | 29 | 32.2 | 29.1 |
| 31 – 40 | 30 | 33.4 | |
| 41 – 50 | 18 | 20 | |
| > 50 | 13 | 14.4 | |
| **Level of Education** | | | |
| Primary | 10 | 11.1 | |
| Secondary | 13 | 14.4 | |
| Tertiary | 67 | 74.4 | |
| **Monthly Income (₦)** | | | |
| ≤ 30,000.00 (Low income) | 8 | 8.9 | |
| 30,001.00 – 50,000.00 (Moderate Income) | 13 | 14.5 | |
| 50,001.00 – 70,000.00 (High Income) | 17 | 18.9 | 71, 300.00 |
| > 70,000.00 (Very High income) | 52 | 57.8 | |

Source: Field survey, 2022

**Age of Respondents -** Table 1 reveals that 32.2% of the respondents were below 30 years, 17.8% were within the age of 31-35 years, while only 14.4% were above 50 years. The mean age of the respondents was 29.1 years. This indicates that most agripreneurs in the study area were youths. According to Oladeji et al. (2017), youth age is categorized between 15-35 years in Nigeria. The implication of this is that high productivity and embrace of technology are almost guaranteed as youths are more energetic and predisposed to utilization of technologies which aligns with the findings of Ngeywo et al. (2015) that age is a key factor in productivity and performance. Youth's participation in agriculture is important to the development of any agrarian nation (Owolabi et al., 2019)

**Educational Attainment of Respondents -** Table 1 shows that the majority (74.4%) of the respondents had tertiary education with only 7.8% not having any formal education. This shows a good representative of the respondents had tertiary education which should enable them to read and interpret technology manuals which would go a long way in helping them handle technicalities in digital agriculture. According to Ayodele et al. (2017) educated farmers are expected to be more receptive to technologies.

**Monthly Income -** Agripreneurs in the study area were categorized into four income categories as presented in Table 1. The study shows that only 8.9% of the respondents earned below a monthly income of ₦30,000, while the largest percentage earned above ₦ 70,000 with the average monthly income calculated to be ₦ 71,300 This implies that the respondents earned above the minimum wage of 30,000 in Nigeria and this could equally encourage youths to go into farm production. This shows that agripreneurs who were actors in the agricultural value chain earned a good income from agricultural activities. This is contrary to the findings of Owolabi *et al.*, 2019, that most household heads in the study area of Ekiti State were low-income earners.

**Agricultural Value Chains Engagement of the Respondents -** From the result in Figure 1, 24.2% of the respondents were into crop production, 20% were into agricultural marketing, 5.6% were into input supply, 35.6% were into livestock production, 4.4% were processors of agricultural commodities and 10% were into linkage services. This indicates that livestock production has the highest level of engagement in the agricultural value chain activities of the agripreneurs.

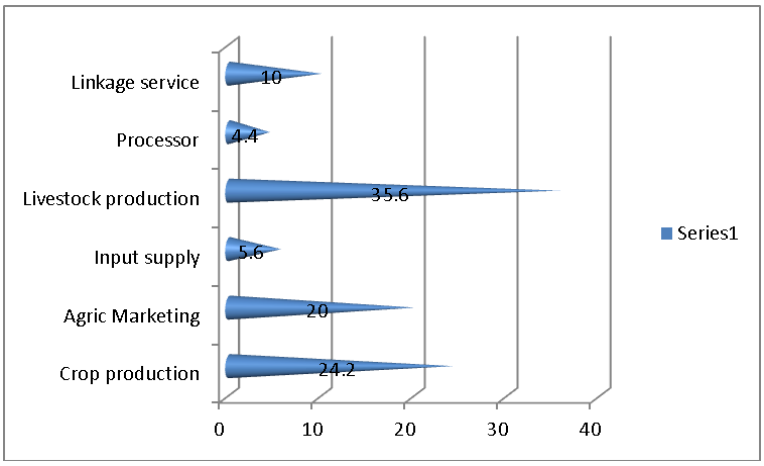


Figure 1: Distribution of respondents according to aspects of agricultural engagement.

Source: Field survey, 2022

**Types of Digital Agriculture Utilized -** Types of digital agriculture utilized are presented in Table 2 in the order of usage. Phone calls were the most used form of digital technology. All the respondents used phones to make calls. More than half (> 52%) of the respondents used mobile APPs, SMS/USSD, e-commerce, digital marketing, and digital crowd-farming platforms along the value chain. That shows these forms of digital agriculture were accessible to the farmers. In addition, analytics; cloud computing; big data, digital maps proximal and field sensors; Internet of things/wireless connectivity; and drone technology were seen to be gradually gaining ground in the study area.

However, only 1.1% which represents only one person used robotics and automation; and remote sensors embedded electronics forms of digital agriculture. This could be attributed to the high cost and technicalities involved in its acquisition.

**Table 2: Type of Digital Agriculture utilized**

| Type | Yes (%) |
|---|---|
| Phone calls | 100.0 |
| Mobile Apps | 91.7 |
| SMS/USSD | 84.7 |
| E-commerce | 73.6 |
| Digital Marketing | 59.7 |
| Digital Crowd Farming platform | 52.8 |
| Analytics | 44.4 |
| Cloud Computing, Big Data | 24.4 |
| Digital Maps Proximal and Field Sensors | 22.2 |
| Internet of Things (wireless connectivity) | 21.1 |
| Drone Technology | 13.3 |
| Robotics and Automation | 1.1 |
| Remote Sensors Embedded Electronics | 1.1 |

Source: Field survey, 2022

**Agripreneurs Perception about Digital Agriculture** - The agripreneurs perception of digital agriculture is presented in Table 3 using the mean score to arrange in order of magnitude. The perception that digital agriculture is highly capital-extensive ranks the highest ($\bar{x}$ = 2.83), followed by the perception that digital agriculture is necessary for the agricultural value chain ($\bar{x}$ = 2.68) while digital agriculture is too complex to practice, thus it requires highly technicalities ($\bar{x}$ = 2.43) ranks third. The results show that agripreneurs have a positive perception towards digital agriculture with all the statements having a mean score greater than 2 except for only youths can successfully practice digital agriculture ($\bar{x}$ = 1.7) and there is nothing done with digital agriculture that cannot be achieved traditionally ($\bar{x}$ = 1.32). That could explain the high utilization of digital agriculture in the study area as revealed earlier in the study.

**Table 3: Distribution of agripreneurs showing their perception of digital agriculture**

| Perception statement | Agreed | Undecided | Disagreed | Mean |
|---|---|---|---|---|
| Digital agriculture is highly capital-extensive | 75(83.3) | 10(11.1) | 5(5.6) | 2.83 |
| Digital agriculture is necessary in the value chain | 66(73.3) | 20(22.2) | 4(4.4) | 2.68 |
| Digital agriculture is too complex to practice, thus it requires high technicalities | 43(47.8) | 43(47.8) | 4(4.4) | 2.43 |
| Digital agriculture is the way out of the dwindling economy | 46(51.1) | 30(33.3) | 14(15.6) | 2.36 |
| Never wish to practice traditional agriculture alongside digital agriculture | 17(18.9) | 73(81.1) | - | 2.19 |
| It is practically impossible to be a successful agripreneur without digital agriculture | 23(25.6) | 58(64.4) | 9(2.1) | 2.16 |
| Digital agriculture can only be practiced by rich agripreneurs | 34(37.8) | 33(36.7) | 23(25.6) | 2.12 |
| Digital agriculture can only be practiced by educated agripreneurs | 30(33.3) | 33(36.7) | 26(28.9) | 2.02 |
| Only youths can successfully practice digital agriculture | 10(11.1) | 43(47.8) | 37(41.1) | 1.7 |
| There is nothing done with digital agriculture that cannot be achieved traditionally | 6(6.7) | 17(18.9) | 67(74.4) | 1.32 |

Source: Field survey, 2022. Figures in parentheses are in percentages

**Activities engaged with Digital Agriculture**

Figure 3 shows that agripreneurs mostly (48.6%) utilized digital agriculture for information sharing and 26.4% used it for sales of agricultural output. Digital agriculture was equally utilized in decision-making. This is in tandem with Édson Luis Bolfe, 2020, that instant information for decision-making can be shared using digital agriculture.

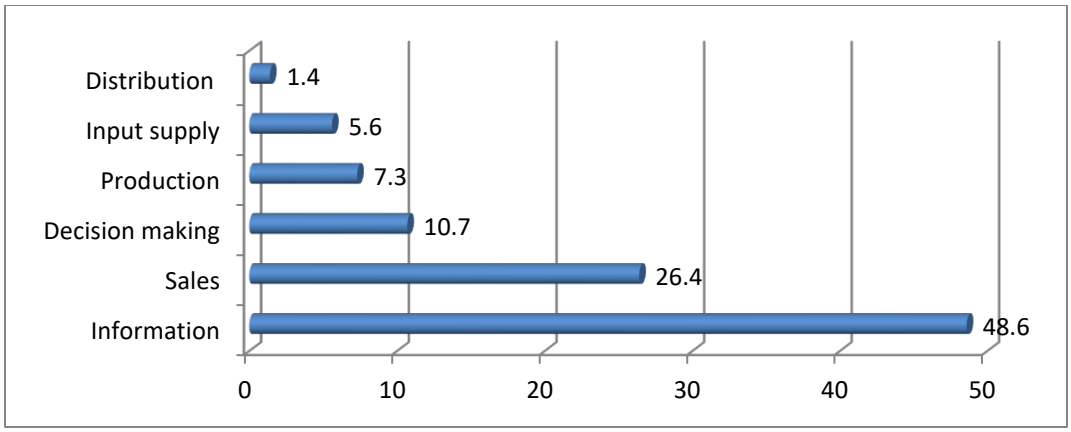


Figure 3: Distribution of respondents according to activities engaged with digital agriculture

**Relationship between type of digital agriculture utilized and value chain activity engaged in**

Table 4 shows the result of the tested hypothesis $H_{01}$ at a 5% level of significance states that there is no significant relationship between the type of digital agriculture utilized and value chain activity engaged in. This hypothesis will be rejected for all except for robotics automation, and remote sensors embedded electronics forms of digital agriculture that have no significant relationship with the value chain activities engaged in by the agripreneurs. This could be explained by the low utilization recorded in the study for these two forms of digital agriculture.

**Table 4: Relationship between the type of digital agriculture utilized and value chain activity engaged in**

| Digital Agriculture Technology | X2 | p-value | Decision |
|---|---|---|---|
| Phone call | 122.541 | 0.000 | Sig |
| Mobile Apps | 133.212 | 0.000 | Sig |
| SMS/USSD | 99.323 | 0.000 | Sig |
| E-commerce | 79.143 | 0.000 | Sig |
| Digital Marketing | 81.078 | 0.000 | Sig |
| Crowd Farming | 105.197 | 0.000 | Sig |
| Analytics | 66.366 | 0.000 | Sig |
| Drone Technology | 58.386 | 0.001 | Sig |
| Digital Maps Proximal and Field Sensors | 62.019 | 0.000 | Sig |
| Remote Sensors | 9.898 | 0.643 | Not sig |
| Robotics and Automation | 21.420 | 0.614 | Not sig |
| Internet of Things | 53.366 | 0.001 | Sig |
| Cloud computing and Big Data | 74.790 | 0.000 | Sig |

Source: Field survey, 2022

## CONCLUSION AND RECOMMENDATIONS

The majority of the respondents utilized phone calls as medium for seeking information across the agricultural value chain with livestock production having the highest number of engagements in the agriculture value chain in the study area. There existed a significant relationship between the type of digital agriculture utilized and the type of engagement in the agricultural value chain. There is a positive perception of the agripreneurs about digital agriculture and the study shows that most agripreneurs in the study area were youths with a mean age of 29.1 years. Agripreneurs along the value chain equally earned good income well above the minimum wage in the country. There were more males in the agricultural

value chain than women and most respondents had high educational attainment. The study recommends the integration of youths in the agricultural value chain as an important factor to be considered for the development of the agricultural sector due to their innovative behavior, predisposition to technologies, and their greater physical strength.

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# Perceived Effects of Post-Covid-19 Lockdown on Rural Livelihoods in Odogbolu Local Government Area, Ogun State, Nigeria

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## ABSTRACT

Households' ability to engage in agriculture and other rural livelihood activities for a living has been severely impacted by the global COVID-19 epidemic. This study examines the perceived effects of post COVID-19 lockdown on the livelihood activities of rural household heads in Odogbolu Local Government Area of Ogun State, Nigeria. An interview schedule was used to collect primary data from 120 household heads. Data collected was analysed using frequency count, percentage, and Chi-Square tools. Findings showed that average household size of respondents was approximately 5±1.9 persons with 72.5% having at least primary school education. All (100.0%) were engaged in farming while significant rural household heads were engaged in artisan work (50.0%), business/trading (35.8%), and marketing of agricultural produce (30.8%). COVID-19 lockdown mainly affects rural livelihoods by bringing about more survival strategies ($\bar{x}$=3.52), inflation of good and services ($\bar{x}$=3.49) and increase in price of food commodity ($\bar{x}$=3.58). *Majority (68.3%) of the respondents used personal savings before lockdown to cope with the effects of COVID-19. Chi-square test showed that* sex ($\chi 2$=33.935, p≤0.05), religion ($\chi 2$=164.412; p≤0.05), education ($\chi 2$=106.917; p≤0.05) showed significant association with perceived effects of post COVID-19 lockdown on the livelihood activities of the respondents. The study concluded that the COVID-19 lockdown had a substantial impact on all aspects of livelihood operations in the study area.

**Keywords**: COVID-19 pandemic, rural livelihoods, farming, agricultural activities, recovery efforts

## INTRODUCTION

In 2019, a viral illness epidemic (Coronavirus: COVID-19) in Wuhan, China, garnered international attention as a public health emergency. According to studies, SARS-CoV-2 is the causative agent of COVID-19, making it a highly infectious disease (World Health Organisation [WHO], 2020). On March 11, 2020, the World Health Organisation (WHO) declared the COVID-19 outbreak a pandemic, the highest category of health emergency worldwide (WHO, 2020). This is despite the fact that the newly found Coronavirus has spread to almost all nations and all continents. The outbreak of the disease has lead countries across the world to restrict movement of people as a measure to curtail its spread (Onyeaka et al., 2021). The restriction and lockdown has further cripple economic activities of people in developed and developing countries where farming is their major source of livelihood (Bolarin et al., 2022). Therefore, most emerging governments throughout the world, including Nigeria, have kept maintaining sustainable sources of income for rural inhabitants as a primary priority. Food, essential resources for agro-allied enterprises, and markets for items produced in other areas of the economy are all provided by these rural regions, which contribute significantly to the overall growth of the country (Naseer et al., 2023).

Rural lives, as well as the national, international, and rural economies, are intertwined. In contrast, complex networks of trade, migration, and remittance movements link rural communities to local, regional, and global markets. These relationships make rural regions and rural family livelihoods more vulnerable to the adverse economic repercussions of the pandemic, in addition to the higher levels of pre-pandemic food insecurity and poverty.

Apart from the immediate negative effect on rural production and incomes, it has also negatively affected the planning for the next farming season. Profit derived from agricultural production contributes essentially to cushioning the rising wave of poverty in rural communities (Izuogu *et al*, 2020). Unfortunately,

the restriction of movements, the prohibition of meetings, greater aid towards the health crisis, and international support to agriculture in Nigeria has been interrupted (Onyeaka et al., 2021).

Also, rural farmers are usually older and more vulnerable to the impact of pandemics especially considering their lack of access to health services. This makes them exposed to the destructive impacts of the pandemics (Izuogu *et al*, 2020). Unfortunately, the implementation of programs to contain the transmission of pandemics tends to concentrate within the urban centers while the rural areas are neglected. There may be more persons affected by these pandemics in rural areas with inadequate healthcare facilities than in metropolitan ones (Izuogu et al., 2020). Furthermore, informality is an important part of rural life in many countries. Contributory social insurance (such as health insurance and unemployment compensation) and other programmes that help mitigate the risks to rural inhabitants' way of life presented by the pandemic are thus less likely to be available to them.

In order to guide COVID-19 recovery and mitigation policy actions, it is necessary to understand the magnitude of the economic consequences of the pandemic on the livelihood activities of rural people and how they differ between countries. Many rural populations rely on agricultural production, allied employment, and entrepreneurial activities to support their families, making them particularly susceptible to the pandemic because of the environment in which they live.

Based on the aforementioned, this study was carried out to examine the perceived effects of post COVID-19 lockdown on the livelihood activities of rural household heads in Odogbolu Local Government Area of Ogun State. The specific objectives of this study were to:

i. assess the livelihood activities of the respondents in the study area.
ii. examine the perceived effects of post COVID-19 lockdown on identified livelihood activities.
iii. identify the coping strategies used by household heads during the pandemic in the study area.

Null hypothesis ($H_{01}$) - There is no significant relationship between the respondents' socio-economic characteristics and the perceived effects of post COVID-19 lockdown on their livelihood activities.

## METHODOLOGY

The research was place in the Odogbolu LGA of the state of Ogun in southwestern Nigeria. Leaders of rural households make up the study's population. Researchers employed a multi-stage sampling strategy to choose participants. Out of the LGA's total of 15 wards, 5 were selected at random as being the most rural. Ibefun, Idowa, Imodi, Imosan, and Ososa were the chosen wards. A total of 120 respondents were utilised for the research, drawn at random from the second stage's selection of two rural villages from each of the chosen wards, and the third stage's selection of twelve household heads from each community.

Primary data was collected from a sample of rural household heads using an interview schedule based on the study's aims. On a scale from 1 (strongly disagree) to 5 (strongly agree), respondents were asked to rate how they felt about the potential impacts of the COVID-19 lockdown. Descriptive statistics like frequency distributions and percentages were used to the data we gathered in order to explain our study's goals, while inferential statistics like Pearson Product Moment Correlation (PPMC) and Chi-Square were used to test our preconceived notions about the study's results.

## RESULTS AND DISCUSSION

### Socio-Economic Characteristics of Respondents

Findings in Table 1 show that the mean age of the farmers in the study area was 44.0±8.23 years. This shows that the rural household heads were still in their active age and are expected to be agile in performing the activities involved in their various livelihood sources. However, the household heads may have little or no experience of contagious disease outbreak such as COVID-19, the knowledge of possible effects to access livelihood assets and coping strategies. Majority (84.2%) of the respondents were male. This indicates the dominance of the male folks among the household heads in the study area. This conformed with African tradition where men in the household were taken as the head of the households (Ashagidigbi et al., 2022).

Majority (76.7%) of the respondents in the study area were married. This implies that most of the household heads in the study area were married.

Marriage among men is one of criteria to be considered as household head in tradition African settings. The average household size of approximately 5±1.9 persons indicates that the household heads had family responsibilities that may escalate the intensity of the effects of COVI-19 lockdown that hinders smooth movement and access to needed resources to conduct rural economic activities. According Gillies et al., (2022), household with more than 3 persons experienced more severe effects of COVID-19 lockdown. Furthermore, majority (72.5%) of the respondents were educated, with the exception of 27.5% of them who were disadvantaged of formal education. The average annual income was ₦1,711,933.

**Table 1: Socio-economic characteristics of the respondents (n=120)**

| Variables | Frequency | Percentage | Mean | Standard Deviation |
|---|---|---|---|---|
| Age (years) | | | | |
| 20-30 | 4 | 3.3 | | |
| 31-40 | 41 | 34.2 | 44.0 | 8.23 |
| 41-50 | 56 | 46.7 | | |
| ≥51 | 19 | 15.9 | | |
| Sex | | | | |
| Male | 101 | 84.2 | | |
| Female | 19 | 15.8 | | |
| Marital Status | | | | |
| Single | 8 | 6.7 | | |
| Married | 92 | 76.7 | | |
| Widowed | 10 | 8.3 | | |
| Separated | 9 | 7.5 | | |
| Divorced | 1 | 8 | | |
| Educational Level | | | | |
| No formal Education | 33 | 27.5 | | |
| Primary Education | 40 | 33.3 | | |
| Secondary Education | 29 | 24.2 | | |
| Tertiary Education | 18 | 15.0 | | |
| Household size (persons) | | | | |
| 1-5 | 23 | 19.17 | | |
| 6-10 | 54 | 45 | 4.9 | 1.96 |
| 11-15 | 20 | 16.67 | | |
| >15 | 23 | 19.17 | | |
| Income (Naira) | | | | |
| <500,000 | 1 | 0.83 | | |
| 500,001-1,000,000 | 10 | 8.33 | | |
| 1,000,001-1,500,000 | 28 | 23.33 | 171,1933.33 | 99,695.903 |
| 1,500,001-2,000,000 | 46 | 38.33 | | |
| 2,000,001-2,500,000 | 33 | 27.5 | | |
| >2,500,000 | 2 | 1.67 | | |

Field Survey, 2023

**Livelihood Activities of Respondents**

Livelihood activities of respondents were presented in Table 2. Findings showed that all (100.0%) were engaged in farming while significant rural household heads were engaged in artisan work (50.0%), business/trading (35.8%), and marketing of agricultural produce (30.8%). Few of the respondents were engaged in transportation (17.5%), mechanical engineering (11.7%), meat butchering (6.7%), and blacksmithing (5.0%). These findings imply that

farming, artisan work, business/trading and marketing of agricultural produce were the main livelihood activities of rural household heads in the study area. This conforms with studies that found that farming, petty trade, and agricultural marketing were the main sources of livelihood in the rural areas of Nigeria (Komolafe et al., 2022).

**Table 2: Household heads livelihood activities**

| Livelihood Activities | Yes | |
|---|---|---|
| | Frequency* | % |
| **Farming** | 120 | 100.0 |
| **Business/trading** | 43 | 35.8 |
| **Blacksmithing** | 6 | 5.0 |
| **Artisanship** | 60 | 50.0 |
| **Transportation** | 21 | 17.5 |
| **Meat Butchering** | 8 | 6.7 |
| **Mechanical Engineering** | 14 | 11.7 |
| **Buying and selling of agricultural produce** | 37 | 30.8 |
| **Civil service** | 10 | 8.3 |
| **Food stuff vendoring** | 6 | 5.0 |
| **Others** | 5 | 4.2 |

Field Survey, 2023 *Multiple responses

**Perceived Effects of Post COVID-19 on Livelihood Activities**

Results in Table 3 revealed the perceived effects of post COVID-19 on the livelihood activities of respondents. Findings revealed that post COVID-19 bringing about more survival strategies ($\bar{x}$=3.52) ranked the highest. This implies that the incidence COVID-19 had made the rural dwellers to think out-of-box in order to survive the lockdown. This assertion conform with the finding by Ibidunni et al. (2022) who found the disruption caused by COVID-19 made business owners to be resilient while they adopted alternative strategies to keep their business floating.

Furthermore, inflation of good and services ($\bar{x}$=3.49) ranked second position. Inflation of good and services may be attributed to reduced production of goods for household consumption and generally Gross Domestic Products during the lockdown, which may resulted to limited supply, then demand and inflation increases (Inegbedion, 2021).

Table 3 also indicated that increase in price of food commodity ($\bar{x}$=3.58) ranked third position, increase in family running cost ($\bar{x}$=3.52) while engaging loans for livelihood resiliencies ($\bar{x}$=2.22) ranked the tenth position as the least effects indicated by the respondents. These findings indicate that survival strategies, inflation of good and services, and increase in price of food commodity were the leading perceived effects of COVID-19 on livelihood activities of rural households in the study area.

**Table 3: Perceived Effects of Post Covid-19 on Livelihood Activities (n=120)**

| Perceptual Statements | Very high | High | Low | Very low | $\bar{x}$ | $\Sigma$ | *Rank* |
|---|---|---|---|---|---|---|---|
| Post covid-19 brings about more survival strategies | 81(67.5) | 24(20.0) | 11(9.2) | 4(3.3) | 3.52 | 0.799 | 1st |
| Inflation of good and services | 81(67.5) | 23(19.2) | 10(8.3) | 6(5.0) | 3.49 | 0.850 | 2nd |
| Incessant increase in price on virtually everything | 80(66.7) | 31(25.8) | 8(6.7) | 1(0.8) | 3.58 | 0.656 | 3rd |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Increase in family running cost | 80(66.7) | 27(22.5) | 8(6.7) | 5(4.2) | 3.52 | 0.799 | 4th |
| Unstable market for both consumable and non-consumable goods | 75(62.5) | 31(25.8) | 3(2.5) | 11(9.2) | 3.42 | 0.922 | 5th |
| Government policies after covid-19 lockdown are not masses friendly | 48(40.0) | 46(38.3) | 20(16.7) | 6(5.0) | 3.13 | 0.869 | 6th |
| Increase in unemployment rate | 46(38.3) | 40(33.3) | 26(21.7) | 8(6.7) | 3.03 | 0.934 | 7th |
| Enforce more business diversification | 35(29.2) | 13(10.8) | 46(38.3) | 26(21.7) | 2.48 | 1.130 | 8th |
| Reduction of labour as a coping strategy | 30(25.0) | 23(19.2) | 35(29.2) | 32(26.7) | 2.43 | 1.135 | 9th |
| Engaging loans for livelihood resiliencies | 25(20.8) | 16(13.3) | 39(32.5) | 40(33.3) | 2.22 | 1.124 | 10th |

Field survey, 2023

**Household heads' Coping Strategies towards Post COVID-19 Pandemic**

Results in Table 4 showed the household heads' coping strategies towards post COVID-19 pandemic. Findings revealed that majority (68.3%) used personal savings before lockdown to cope with the effects of COVID-19. This showed *that personal* savings accumulated by rural dwellers played significant roles in coping with the effects of COVID-19 lockdown. This finding is in line with report by Loko et al. (2022) who found that private savings was mainly used by households heads to survive COVID-19 lockdown in Sub-Saharan African countries.

Another significant number (32.5%) indicated reduction of number of labourers as a way to cope with the effects of COVID-19. This strategy has direct implication in the size of livelihood activity. For instance, reduced number of farm labour means reduce size of farm in hectares. This will consequently reduce goods and services as well as income. To the labourers, job loss will reduce income and increased vulnerability to poverty may escalate in the study area. According to International Labour Organization [ILO] (2020), nearly half of workforces were at risk of losing livelihoods while hours of job done were reduced for many.

**Table 4: Household heads' Coping Strategies towards Post COVID-19 Pandemic**

| **Coping Strategies** | **Yes** | |
|---|---|---|
| | **Freq.** | **%** |
| Changing from high side in business to relatively affordable options | 25 | 20.8 |
| Contingency fund from financial institution for livelihood activities | 3 | 2.5 |
| Diversification of business | 33 | 27.5 |
| Looking for available and cheapest business raw material | 27 | 22.5 |
| Reduction of number of labourers/staff/employee | 39 | 32.5 |
| Personal savings before lockdown | 82 | 68.3 |
| Employed family labour for farming | 33 | 27.5 |
| Loan from cooperative | 29 | 24.2 |

Field survey, 2023

**Hypotheses Testing**

**Test of association between Socio-Economic Characteristics of the Respondents and the Perceived Effects of Post Covid-19 Lockdown on the Livelihood Activities.**

Hypothesis one: There is no significant relationship between the respondents' socio-economic characteristics and the perceived effects of post COVID-19 lockdown on their livelihood activities. This hypothesis was tested using chi-square for variables measured at nominal and Pearson Product Moment Correlation (PPMC) for variables measured at interval levels. The results were presented in Table 5 and 6. For the chi-square analysis, it revealed that there is a significant association between Sex ($X^2$=33.935; P ≤ 0.05), Religion ($X^2$=164.412; P ≤ 0.05), Education ($X^2$=106.917; P ≤ 0.05) and perceived effects of post COVID-19 lockdown on the livelihood activities of the respondents. This implies that Sex, Religion and Education of the respondents had influence on the perceived effects of post COVID-19 lockdown on their livelihood activities.

Furthermore, variables considered for PPMC were age, education, income and household size. Findings reveal no significant relationship between the respondents' age, income, household size and perceived effects of post COVID-19 lockdown on their livelihood activities. This implies that irrespective of the respondents' age, income and household size, most of them would still have felt the effect of post COVID-19 lockdow

**Table 5: Test of association between socio-economic characteristics and perceived effects of post covid-19 lockdown on the livelihood activities of the respondents**

| Socio-economic characteristics | Chi-Square ($X^2$) | Df | P-Value | Decision |
|---|---|---|---|---|
| **Sex** | 33.935 | 4 | 0.037 | Significant |
| **Marital Status** | 69.189 | 2 | 0.878 | Not Significant |
| **Religion** | 164.412 | 3 | 0.000 | Significant |
| **Education** | 106.917 | 4 | 0.000 | Significant |

Field survey, 2023

Decision Criteria: Reject null hypothesis if P ≤ 0.05, Accept null hypothesis if p > 0.05

**CONCLUSION AND RECOMMENDATIONS**

COVID-19 pandemic is a global phenomenon that has far-reaching impact on the lives, livelihoods, and the wellbeing of the entire human populace. However, how it affects certain populations and industries varies. In the study area, artisanal work, farming, business, buying and selling (agricultural produce), and transportation are the dominant livelihood activities, among others. It can be concluded that the pandemic had a substantial impact on all aspects of livelihood operations in the study area. The pandemic did not only temporarily pause income sources, but also momentarily halted economic sources.

The following recommendations were made:

1. By utilizing social security programs and other revolving funding sources, the government and other donor organizations should concentrate on short and long-term intervention measures to restore the most impacted households.
2. Private sector organizations, such as agribusiness companies and financial institutions, can play a role in supporting the livelihood activities of rural household heads. This could include providing access to credit, market linkage, and technical assistance.
3. Community-based organizations, such as farmers' organizations, women's groups, and youth groups, can play a key role in supporting the livelihood activities of rural household heads. This could include providing training and support on new skills and business opportunities, as well as advocacy and representation.

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# Use of Weather Information for Agricultural Decision Making among Small Scale Farmers in Kwara State, Nigeria

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**ABSTRACT**
This study examined the use of weather information for agricultural decision making among small scale farmers in Kwara State. The specific objectives of the study were to describe the socio-economic characteristic of the respondents, identify sources information available to farmers, examine farmers' awareness about weather information and determine the extent to which farmers utilize weather information for decision making among farmers. Multistage sampling techniques were used in selecting 120 respondents for the study. Descriptive statistics was used for data analysis while Pearson Product Moment Correlation (PPMC) was used to test the hypothesis. The result indicated that 82.0% respondents were male while 18.0% were female. The average age was 41years. About 84.7% were married. 56.7% of the respondents attained secondary school with household size of 8 persons. Also results revealed that radio is the major source of information available to the farmers with mean score of 2.40. Rainfall prediction with the mean score of 3.29 as the major weather information for farmers' awareness. The result affirms humidity as mainly used by respondents in utilizing weather information and has the highest mean score of 3.01. It was concluded that rainfall prediction, flood and wind prediction were the major weather information services available to the farmers in the study area. It was recommended that the importance of weather information services should be communicated to the rural farmers by the extension agent. Also, farmers should be further trained on how to utilize internet to access weather information.
**Key words: Weather information, Agricultural, Decision making, respondents**

## INTRODUCTION

The agricultural production system in Nigeria is predominantly rain-fed. In such a case, extreme rainfall patterns and/or variability becomes a critical production risk. The rain-fed agricultural production system is vulnerable to seasonal variability which affects the livelihood outcomes of the farmers and landless laborers who depend on this system of agricultural production (Vermeulen*et al*., 2012). While climate change presents relatively new challenges to smallholder farming systems, seasonal climate variability has been a significant hazard for agriculture producers across the globe. As a result, of this menace farmers have developed strategies to make crucial decisions about what, when, and where to plant. These strategies draw on unique mixes of individual resources, planning, experimentation, and improvisation, and they can combine situated knowledge and external expertise (Carr and Onzere, 2017; Crane *et al*., 2009; Orlove *et al*., 2010; Roudier *et al*., 2022). In so doing, farmers match their decisions to their expectations of future rainfall (Roncoli, *et al*., 2022). Yet, despite their best efforts, erratic rainfall frequently has a direct negative effect on crop production (Ray *et al*., 2015), particularly in rain-fed systems, as well as an indirect effect via the influence of rainfall on pests and diseases (Avelino *et al*., 2015). Both pathways undermine farm yields, reduce food availability, and lower income. The use of weather information in agricultural decision-making has been largely explored in two main branches of research. One branch focuses on the role of local knowledge in farm management. The second focuses on the use of technical information in agricultural risk management, most often in the form of seasonal rainfall forecasts produced by national meteorological services and the World Meteorological Organization (WMO) regional climate centers.

From time immemorial sources of weather information has been from Radio, Television, Extension Workers, Cooperative Societies, Friends and Colleagues, Magazines, Newspapers, Institutes and Library and other sources (Aderinoye &Abdulbaki,2021). While assessing the value of weather information is a discrete-continuous choice problem. First, there is the discrete choice of whether to use any weather information. If so, continuous problems include the intensity and returns to information use. Much of the literature on the value of weather information focuses on estimating the benefits of information use, given that the choice of use is already made. However, study find that a significant proportion of potential respondents in Kwara State do not use meteorological services in decision-making (Aderinoye &Abdulbaki,2021). The effective use of weather information for agricultural practices is not effective in Kwara State because majority of potential farmers in Kwara State are rural dwellers with no much education attainment. Other factors involved in not using weather information for agricultural practices among respondents in Kwara State is due to cultural belief, religion and socio-economic factors (Aderinoye &Abdulbaki,2021). This study critically looked into the causes and possible solution to why farmers in Kwara State still need to make use of weather information before embarking on agricultural practices.

For instance, in Kwara State most especially in Obbo a town in Ekiti Local Government Area of Kwara State maize is good for planting during the period of between May and June. Farmers in this town who didn't know about the weather forecast in Obbo may be planting his maize in the period of April which may not yield a better result i.e low yield due to little or no rainfall during this period. Therefore, source of information for such farmers can either be an extension

agent, radio and but not limited to postal or other information gadget. Farmers' perception of the risk to their farms from weather/climate variability is another issue affecting how they consider and use climate and weather information. Apata (2011) cited Hansen (2002) as saying that ''The primary motivation for individual farmers is an awareness of some level of vulnerability to impacts of climate variability, and opportunity to reduce that vulnerability through appropriate use of forecasts information' Fifteen articles included some discussion of how respondents manage or minimize risks to their operations from weather or climate variability. According to Choo (2012) who found that respondents know they cannot avoid all weather-related risks to their farm operation, and thus ''employ management strategies ensuring some yield during most years and under most conditions.

**Statement of the Problem**

Information is an indispensable factor in the development of any nation. Choo (2012) has affirmed that people use information to create knowledge, but not just in the sense of data and facts but the form of representations that provide meaning and the context for purposive action. Information service provision to farmers in Kwara state has been ineffective for the production of varieties of food and, raw materials for sustenance of the people. Majority of our rural farmers depend on indigenous or local knowledge for improved farming systems. Such knowledge (indigenous or local knowledge) refers to skills and experiences gained through oral tradition and practice over many generations but the use of such primitive skills by our rural respondents, especially those in Kwara State, Nigeria, has not substantially helped to improve yield. Agriculture depends on rainfall only, subjected to vagaries whereby absence of rainfall can affect crop production. Agricultural information is meant to get to rural respondents via extension workers, community libraries, radio, television, film shows, agricultural pamphlets, state government agricultural agencies. However, rural respondents in their efforts to access these agricultural knowledge and information from available sources for better farming system and improved agricultural yield are confronted with certain constraints. This constitutes the gap in research this study is designed to fill. Therefore, this study is carried out to examine uses of weather information for agricultural decision making among small scale respondents in Kwara State.

**Objectives of the Study**

The broad objective of this study was to examine the uses of weather information for agricultural decision making among small scale farmers in Kwara State. The specific objectives of the study were to:

(i) describe the socio-economic characteristic of the respondents in the students

(ii) identify the weather information sources available to respondents in Kwara State.

(iii) examine the respondent's awareness about weather information services.

(iii) determine the extent to which respondents utilize weather information sources for decision making.

**Hypothesis**

**$Ho_1$:** There is no significant relationship between sources and use of weather information by respondents for decisions making.

**METHODOLOGY**

The study was conducted in Kwara State, Nigeria. Kwara State lies between latitude $5^o12$ and $5_o56$ North of the equator and longitude of 6 38 and 7 25 East of the Greenwich meridian (Kwara State Annual Gazette, 2002) Kwara state falls within the rainforest zone of Nigeria with the various characteristics of tropical rainforest zone. The state located in north central Nigeria; Kwara State occupies 36,825 square kilometers. Have an average population density of about 90 persons per square kilometer and its total population density of about population of 2006 National Census was 3,192,893. The Kwara State north central it is bounded by Benin to the west and by the Nigerian states of Niger to the north, Kogi to the east and Ekiti, Osun and Oyo to the south. Kwara state consists mostly of wooded savanna, but there are forested regions in the south.

The study made use of multi-stage random sampling techniques. From the 16 Local Government Areas in Kwara State, four (4) Local Government Areas were selected randomly, one each from four agricultural zones (Kaima, Patigi, Ilorin East and Ekiti) Thirty (30) respondents were randomly selected from each of the four Local Government Areas How? Do the zones have equal number of LGAs, and the LGAs having equal number of communities and population? If not the sample method is wrong. This made a total of hundred and twenty (120) small scale respondents which constitute the sample size of the study. Primary data were collected for this study. The primary data were collected using a structured questionnaire (are the farmers literate?) from small scale farmers and analyzed with both descriptive and inferential statistics. Frequency count, percentage, mean and standard deviation were used in presenting data while PPMC was used in testing the hypothesis.

**Results and Discussion**

**Socio-economic characteristics of the respondents**

**Table 1.1. Socio-economic characteristics of respondents (n=150?) this does not tally with your sample size.**

| Variables | Classes | Frequency | Percentage | Mean | Standard deviation |
|---|---|---|---|---|---|
| Sex | Male | 103 | 68.7 | | |
| | Female | 47 =150 | 31.3 | | |
| Age | 21-30 | 11 | 7.3 | 41 | 7.1008 |
| | 31-40 | 28 | 18.7 | | |
| | 41-50 | 53 | 35.3 | | |
| | 51-60 | 45 | 30.0 | | |
| | Above 60 | 13 =150 | 8.7 | | |
| Marital status | Single | 10 | 6.7 | | |
| | Married | 127 | 84.7 | | |
| | Divorced | 9 | 6.0 | | |
| | Widow | 4 =150 | 2.7 | | |
| Education | Illiterate | 9 | 6.0 | | |
| | Primary | 12 | 8.0 | | |
| | Secondary | 25 | 16.7 | | |
| | Tertiary | 85 | 56.7 | | |
| | Arabic | 19=150 | 12.7 | | |
| Household size | 1-3 | 29 | 19.3 | 8 | 2.3 |
| | 4-6 | 60 | 40.0 | | |
| | 7-9 | 34 | 22.7 | | |
| | 10-12 | 25 | 16.7 | | |
| | Above 12 | 2 | 1.3 | | |
| Years of experience | Below 5 | 18 | 12.0 | 9 | 2.0 |
| | 6-10 | 48 | 32.0 | | |
| | 11-15 | 26 | 17.3 | | |
| | 16-20 | 7 | 4.7 | | |
| | Above20 | 51 | 34.0 | | |

**Source: Field Survey, 2022**

**Sex:** Result from Table 1 above shows that majority (68.7%) of the respondents were male in the study area while just only (31.3%) of the respondents were female. This result implies that there were more male respondents than female in the study area. This agrees with the work of Apata (2011) that farming activities is majorly practiced by the males.

**Age**: The age distribution of the respondents revealed that only (7.3%) of the respondents were within the age group of 21-30 years. 18.7 percent of respondents were within the age of 31-40 years. While, majority (65.3%) of the respondents were within the age group 41-50 years. This finding implies that (65%) of the respondents were mostly youth and they are in active and production age. The average age of the respondents was 41 years which indicated that most of the respondents are still within their active and productive age. This negate the work of Churi *et al* (2012) which opined that respondents in the rural areas may be a bit old, they are still within their active years.

**Marital Status:** Table 1 shows the respondents' marital status in the study area. It can be deduced from the result that majority (84.7%) of the respondents in the study area were married. This shows that most of the respondents in the study area were married. Only about (6.7%) of the respondents were single, 6.0 percent were divorced, and about (2.7%) were widow. This corroborates the work of Umar (2016) which opined that most rural respondents are married and have children.

**Education**: The result of the analysis shows that only (6.0%) of the respondents attained no formal education, 8.0percent of the respondents attained primary education, 16.7 percent attained secondary education and 56.7 percent had tertiary education, while few (12.7%) attained Arabic education. The finding implies that majority of the respondents' attained certain level formal education. This is in line with the work of Umar (2016) which stated that some rural respondents might have little formal education. The implication is that adoption of appropriate technologies will not be difficult for the literate people.

**Household Size**: Majority (40.0%) of the respondents in the study area had between 4and 6 members in their family, as well as few (22.7%) of the respondents had between 7 and 9 members just very few (1.3%) had their house size above 12 members. The average household size is 8 which indicated that respondents have a fairly

large household size. This is supported by the work of Oladele *et al* (2019) which indicates that most respondents prefer to have fairly large household so as to be able to use them as family source of labour.

**Sources of Weather Information Available for Respondents in the Study Area**

Table 2 shows the sources of weather information available for respondents in the study area. The result shows radio as the major source of information available for respondents in the study area with the mean score of 2.40. This is followed by extension agent, newspaper and meteorological station with the mean scores of 2.35, 2.24 and 1.99, respectively. Next to these was internet and magazine with the mean score of 1.81 and 1.73, respectively while the least source of weather information available for the respondents as reported by them was TV station. This finding aligned with Fadiji (2021) who ascertained that the role played by weather forecaster stimulate the agricultural productivity. The respondents who do not have access to such information about weather forecast can supplement it with information obtained via radio and television which are good medium for supplying relevant information.

**Table 2: Sources of Weather Information available to the Respondents in the study Area**

| Farmer's Information sources | Always | Sometimes | Rarely | Never | Mean | Std | Rank |
|---|---|---|---|---|---|---|---|
| Radio | 43(28.7) | 25(16.7) | 31(20.7) | 51(34.0) | 2.40 | 1.22 | 1st |
| Extension Agent | 36(24.0) | 52(34.7) | 21(14.0) | 41(27.3) | 2.35 | 1.29 | 2nd |
| Newspaper | 32(21.3) | 34(22.7) | 22(14.7) | 62(41.3) | 2.24 | 1.20 | 3rd |
| Meteorological station(NIMET) | 12(8.0) | 39(26.0) | 34(22.7) | 65(43.3) | 1.99 | 1.01 | 4th |
| Internet | 24(16.0) | 19(12.7) | 12(8.0) | 95(63.3) | 1.81 | 1.17 | 5th |
| Magazine | 12(8.0) | 21(14.0) | 31(20.7) | 86(57.3) | 1.73 | 0.98 | 6th |
| TV station | 19(12.7) | 14(9.3) | 21(14.0) | 96(64.0) | 1.71 | 1.07 | 7th |

**Source: Field Survey, 2022**

**The Respondents Awareness about Weather Information Services**

Table 3 shows the respondents awareness about weather information services. The respondents were aware that weather information sources were majorly used for rainfall prediction with the mean score of 3.29. Also, respondents were aware of weather information services like flood occurrence, wind direction, early warning signal outbreak against diseases with the mean scores of 3.03, 3.01 and 2.93, respectively. Next to the aforementioned ones were early warning signal against pest, soil moisture, and extreme weather indicator with the mean scores of 2.87, 2.73 and 2.65, respectively. These were followed by temperature and drought detection with the lowest mean scores of 2.59 and 2.59, respectively. The finding shows that all services provided by weather information have mean scores above the benchmark (2.5) which implies that the respondents were adequately aware of the all services of weather information in the study area. The finding confirmed the assertion that weather information is vital for increased production and marketing of agricultural products, plays an important role in agricultural production and it has a great influence on the growth and development of crops and livestock and certainly the most important factor determining the success or failure of any agricultural enterprise (Ejionueme, 2007).

**Table 3: The Respondents Awareness about Weather Information Services**

| Available weather information service | Always | Sometimes | Rarely | Never | Mean | Std | Ranking |
|---|---|---|---|---|---|---|---|
| Rainfall prediction | 80(53.3) | 43(28.7) | 17(11.3) | 10(6.7) | 3.29 | .92 | 1st |
| Flood | 82(54.7) | 20(13.3) | 19(12.7) | 29(19.3) | 3.03 | 1.21 | 2nd |
| Wind direction | 77(51.3) | 25(16.7) | 21(14.0) | 27(18.0) | 3.01 | 1.18 | 3rd |
| Early warning signals outbreak against diseases | 54(36.0) | 56(37.3) | 16(10.7) | 24(16.0) | 2.93 | 1.05 | 4th |
| Early warning signals against pest | 40(26.7) | 68(45.3) | 24(16.0) | 18(12.0) | 2.87 | .95 | 5th |
| Soil moisture | 20(13.3) | 87(58.0) | 25(16.7) | 18(12.0) | 2.73 | .84 | 6th |
| Extreme weather indicator(drought) | 32(21.3) | 61(40.7) | 30(20.0) | 27(18.0) | 2.65 | 1.01 | 7th |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Drought detection | 17(11.3) | 72(48.0) | 44(29.3) | 17(11.3) | 2.59 | .84 | 8th |
| Temperature | 25(16.7) | 71(47.3) | 21(14.0) | 33(22.0) | 2.59 | 1.01 | 8th |

**Source: Field Survey, 2022**

**The extent to which respondents utilize weather information for decision making**

Table 4 shows the extent to which respondents utilize weather information sources for decision making. The result of the analysis shows that humidity was majorly used by respondents in preparing for planting with the highest mean score of 3.01. This implies that the respondents always made use of humidity for decision making which was relevant for preparing plant. Also, next to this is precipitation for soil content indices, usage of meteorological information to determine planting activities, use of relative humidity in harvesting decision and use of information for harvesting water against dry season with the mean scores of 2.97, 2.95, 2.90 and 2.86, respectively. These are followed by temperature for soil, use of temperature information in harvesting timing decision with the mean scores of 2.74 and 2.68, respectively. The lowest mean score of 2.56 shows that use of wind speed in guiding of pesticide application was rarely utilized for decision making by the respondents. The finding implies that humidity was always used by respondents for decision making. The cumulative overall means score of (2.83) of the respondents which is above the benchmark of (2.50) clearly shows that the respondents usually utilize the weather information for decision making.

**Table 4: The extent to which respondents utilize weather information for decision making**

| Weather Information | Always | Sometimes | Rarely | Never | Mean | Std | Rank |
|---|---|---|---|---|---|---|---|
| Humidity in preparing for planting | 57(38.0) | 55(36.7) | 20(13.3) | 18(12.0) | 3.01 | 1.01 | 1st |
| Precipitation (rainfall) for soil content indices | 54(36.0) | 53(35.3) | 27(18.0) | 16(10.7) | 2.97 | .99 | 2nd |
| Usage of meteorological information to determine planting activities | 33(22.0) | 89(59.3) | 16(10.7) | 12(8.0) | 2.95 | .81 | 3rd |
| Use of relative humidity in harvesting decision | 45(30.0) | 63(42.0) | 24(16.0) | 18(12.0) | 2.90 | .97 | 4th |
| Use of information for harvesting water against dry season | 45(30.0) | 57(38.0) | 30(20.0) | 18(12.0) | 2.86 | .98 | 5th |
| Temperature for soil moisture content | 31(20.7) | 68(45.3) | 32(21.3) | 19(12.7) | 2.74 | .93 | 6th |
| Use of temperature information in harvesting timing decision | 23(15.3) | 81(54.0) | 21(14.0) | 25(16.7) | 2.68 | .93 | 7th |
| Use of wind speed in guiding of pesticide application | 33(22.0) | 44(29.3) | 47(31.3) | 26(17.3 | 2.56 | 1.02 | 8th |

**Source: Field Survey, 2022**

**Respondents' perceptions on the use of weather information services for decision making**

Table 5 shows the respondents' perception on the use of weather information services for decision making in Kwara state. The highest mean score 4.47 shows that the respondents perceived majorly the use of weather information services helps to guide when to plant. Furthermore, it was agreed by the respondents that it helped them determine suitable temperature when to plant, determine soil moisture, determine wind direction and guide pest and herbicide application with the mean scores of 4.12, 3.87 and 3.71, respectively. Next to the aforementioned are Extension officers provide regular information on rainfall and Extension agent provide regular information on temperature with the same mean score of 3.67. This negates the finding of Falaki *et al*. (2011) that respondents perceived that climate change and severe weather events such as temperature shocks and declining rainfall often strongly impede sustainable farming development where agriculture is rain fed and when other external shocks such as poverty, poor access to inputs and credit are common.

**Table 5: Distribution of the respondents according to their perception on the use of weather information services for decision making**

| Statements | Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree | Mean | Rank |
|---|---|---|---|---|---|---|---|
| Helps to guide when to plant | 102(68.0) | 32(21.3) | 7(4.7) | 3(2.0) | 6(4.0) | 4.47 | 1st |
| Helps to determine suitability temperature on when to plant | 51(34.0) | 81(54.0) | 6(4.0) | 9(6.0) | 3(2.0) | 4.12 | 2nd |
| Helps to determine soil moisture | 29(19.3) | 87(58.0) | 23(15.3) | 8(5.3) | 3(2.0) | 3.87 | 3rd |
| Determine wind direction and guide pest and herbicide application | 32(21.3) | 68(45.3) | 31(20.7) | 13(8.7) | 6(4.0) | 3.71 | 4th |
| Extension officers provide regular information on rainfall | 32(21.3) | 68(45.3) | 24(16.0) | 20(13.3) | 6(4.0) | 3.67 | 5th |
| Extension agent provide regular information on temperature | 41(27.3) | 53(35.3) | 28(18.7) | 21(14.0) | 7(4.7) | 3.67 | 5th |

**Source: Field survey, 2022.**

**Hypothesis Testing**

**Ho[1]: There is no significant relationship between sources and uses of weather information by respondents for decisions making.**

Table 6 shows the relationship between sources and uses of weather information by respondents for decisions making in the study area. The result in Table 6 shows that there was no relationship between sources of weather information availability and uses of weather information by respondents for decisions making as (r= 0.67>0.05), thus, the hypothesis was accepted. This implies that there was no significant relationship between sources of weather information and it's uses by the respondents for decisions making in the study area. This means that the availability of the sources of information does not determine its' uses for decision making. This aligned with the finding of George and Anand (2013) that access to e-mail had no significant effect on the importance producers placed on weather types or on the use of weather data for management decisions.

**Table 6: Correlation Analysis between Sources and uses of Weather Information by Respondents for Decisions making**

| Variable | r | Decision |
|---|---|---|
| Sources availability | 0.67 | Not significant* |

**p>0.05**

**Source: Field Survey, 2022**

## CONCLUSION AND RECOMMENDATION

There is no doubt that information is very important in all aspects of agricultural development from planning to the production stage. Based on the findings of the study, it can be concluded that weather information services are very vital for farming productivity whereas the major sources of information available for respondents to get weather information services from were radio, extension agent, newspaper meteorological station etc. It is therefore recommended that;

1. The importance of weather information services should be communicated to the rural respondents by the extension agent.
2. Respondents should be trained on how to utilize internet to access weather information.
3. There should always be effective services provision by the weather service provider.
4. There should be relevant weather forecast information by Meteorological station through extension agent (EAs) to the respondents.

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