

# International Journal of Agricultural Economics and Rural Development

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Professor J. O. Ajetomobi





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## Child labour among horticultural households in Bauchi state, Nigeria: A gender perspective

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**Abstract:** Gender dimensions of child labour in horticultural crop production in Bauchi State were examined. One hundred and forty-three horticultural households were selected using multi-stage sampling procedure. Data was collected on child, household and community characteristics using a structured questionnaire; and analyzed with descriptive statistics and multinomial logit regression ( $p=0.05$ ). It was found that more male children participated in work on family farm (74.6%) while females were more involved in household chores (56.7%). In addition, increasing age of both male and female children increases the likelihood of their involvement in child labour. Household ownership of farmland increases the likelihood of male children being child labourers while number of pre-school aged children in the household predisposes female children to child labour. Thus, horticultural households should be sensitized on the benefits of allowing both male and female children aged 5-14 years achieve at least the required 9 years of basic education. Specifically, farm-owning households should be enlightened on the need to ensure that male children are not kept in work on family farm in a way that will hinder their schooling while female children's education should not be compromised on the basis of the number of pre-school aged children in their households.

**Keywords:** Family farm, Child-labour, Child-schooling, Child protection, Household chores.

### INTRODUCTION

Horticultural crops feature prominently in the farming systems of the North East geopolitical zone of Nigeria a region with the largest concentration of fruits and vegetables production. Production of these crops requires intensive cultivation thus creates jobs as it provides twice the amount of employment per hectare compared to cereal crop production (Alli *et al*, 2002). In the rural sector of the Nigerian economy characterized by smallholder farm proprietorship and an imperfect labour market, allocating household labour optimally is a crucial economic problem. Specifically, children in the Northeast zone of Nigeria have been observed to participate in paid employment than any-other region (Badmus, 2008). Also, the study of Ukoha *et al*, 2007 opined that farm households have found children highly useful in agricultural production, processing and marketing activities. It has been noted that agriculture is one of the three most dangerous sectors to work in terms of the number of work-related deaths, non-fatal accidents and cases of occupational diseases and ill-health (ILO, 2000). Moreover, disaggregating data on child labour according to sex is an important starting point for identifying gender dimensions of the child labour phenomenon.

Gender and development programmes are finding their way into the institutional arena but little has been achieved in terms of mainstreaming gender concerns into specific institutional responses to child labour. There is a need to ensure that initiatives for the elimination of child labour are equally effective in reaching boys and girls in child labour as they both deserve to go to school and to be protected from work that is damaging to their health or development (Guarcello *et al*, 2006). This calls for an urgent need

to pay more attention to the early years of children's lives specifically in Bauchi State. This study addressed the following objectives:

1. Profile incidence of child labour in horticultural households by gender of child
2. Profile types of child activities children engage in by gender and;
3. Examine factors that determine child labour among children of horticultural households by gender.

### METHODOLOGY

Bauchi State has a population of 4,676,465 and is located in the Northeastern part of Nigeria, covers 45,837 square kilometres representing about 5.3 per cent of the country's total land mass and spans two distinctive vegetation zones, namely, the Sudan Savannah and the Sahel Savannah. The climatic condition of the State is very hot in the months of April and May, while December and January are the coldest months (Bauchi State of Nigeria, 2009).

A multistage sampling procedure was employed in the collection of data. One local government area was randomly selected from each of the 3 agricultural zones in the State; followed by a random selection of 3 villages from each local government area selected making up a total of 9 villages in the study area. A maximum number of 25 households were selected from each village. Out of the 225 households sampled, data used in the analysis was from 143 household units involved in horticultural crop production (specifically vegetables) and these households contain 417 children. Well structured questionnaire was used to obtain information from the households on some socio-economic /

demographic characteristics, children’s labour and schooling activities and community characteristics.

Descriptive statistics was used to profile the incidence of child labour in the study area and types of activities children participate. This included the use of frequencies, percentages and means. Multinomial logit regression was used to examine the factors affecting child labour in the study area.

In this analysis, the four categories considered are:

1. Going to school and not working (School only)
2. Working and going to school (School and work)
3. Working and not going to school (Work only)
4. Neither schooling nor working (Idle) (base or reference category)

The multinomial logit for choice across S states (s=1, 2, 3) can then be specified as:

$$P(Y = s) = \frac{e^{\beta_j Z}}{1 + \sum_{j=2}^s e^{\beta_j Z}} \quad \text{for } s \text{ not equal to } 1$$

$$P(Y = 1) = \frac{e^{\beta_1 Z}}{1 + \sum_{j=2}^s e^{\beta_j Z}}$$

The parameters  $\beta_i$  will be estimated. An iterative maximum likelihood algorithm will be used to estimate the empirical models in order to obtain asymptotically efficient parameter estimates (Greene, 1992). The log-likelihood function for the multinomial logit model is

$$\ln L = \sum_i \sum_j d_{ij} \ln P_{ij}$$

Where  $P_{ij}$  is the probability

$X_i$  includes these child, household and community characteristics:

**Child characteristics**

$X_1$ = age of child in the household (in years) (age)

$X_2$ = relationship of child to household head (biological=1, 0 otherwise) (Relhh)

**Parents’/ Household characteristics**

$X_3$ = number of pre-school-aged children in the household (Presch)

$X_4$ = number of school-aged children in the household (Schage)

$X_5$ = age of household head (in years)(Agehh)

$X_6$ = years of schooling of household head (Nyhhsch)

$X_7$ = Ownership of land-assets by household (farm-owing household=1, 0 otherwise) (Ownfarm)

$X_8$ = access of household to credit (yes=1, 0 otherwise) (Creaces)

$X_9$ = household’s monthly expenditure (in Naira) (Hhmexp)

**Community characteristics**

$X_{10}$ = distance to primary school (in Kilometers) (Distpri)

$X_{11}$ = access to potable water (1=access, 0 otherwise) (water)

**RESULTS AND DISCUSSION**

**Incidence of child labour:** Table 1 reveals the incidence of child labour. Most of the children combine school with work (48.7%), however male children were more (50.8%) in this activity option than their female counterparts (45.2%). There were also more working males (25.4%) than females (15.9%). In contrast, the result shows that more female children were involved in school only (29.3%) than males (18.9%). Also there were more idle females (9.6%) than males (5.0%). This result is in consonance with the findings of Okpukpara and Odurukwe (2006) that in terms of gender-specific activity options across zones in Nigeria, male participation in full-time schooling dominates that of females except in North East Nigeria where there is a marginal difference in favour of female child education. Two things could be responsible for this. First, there may be less evidence of discrimination in the zone which could be attributed to the effect of Conditional Cash Transfer (CCT) programmes targeted at the poor to invest in the human capital of their children especially females. Secondly and more importantly, nomadic influences may be more prominent in the zone, which favours the migration of male children to other zones.

**Table 1: Incidence of child labour by gender**

| Activity options        | Female     | Male       | Total       |
|-------------------------|------------|------------|-------------|
| School only             | 49 (18.9)  | 46 (29.3)  | 95 (22.8)   |
| School and work         | 132 (50.8) | 71 (45.2)  | 203 (48.7)  |
| Work only               | 66 (25.4)  | 25 (15.9)  | 91 (21.8)   |
| Neither school nor work | 13 (5.0)   | 15 (9.6)   | 28 (6.7)    |
| Total                   | 260 (62.4) | 157 (37.7) | 417 (100.0) |

Source: Field survey, 2011



### Types of children's activities by gender

The result in Table 2 shows that most male children work on the family farm (74.6%); 26.9% of them work on plantation and 29.6% were involved in household chores. On the other hand, most females perform household chores (56.7%), 43.3% work on the family farm. Furthermore, there were more girls

(20.4%) involved in processing of horticultural crops than boys (20.0%) while more boys (12.7%) participated in marketing of these crops than girls (6.4%). These results imply that male children are involved in activities outside the home than the females.

**Table 2: Types of child activities by gender**

| Activities  | Male       | Female    |
|---|------------|-----------|
| Work on family farm   | 194 (74.6) | 68 (43.3) |
| Work on non-family farm   | 32 (12.3)  | 6 (3.8)   |
| Work on plantation  | 70 (26.9)  | 25 (15.9) |
| Household chores involving cleaning, cooking, splitting logs, etc | 77 (29.6)  | 89 (56.7) |
| Processing of horticultural crops                                 | 52 (20.0)  | 32 (20.4) |
| Marketing of horticultural crops                                  | 33 (12.7)  | 10 (6.4)  |

Source: Field survey, 2011

### Time spent in activities of children by gender

The result in Table 3 further confirms the earlier findings that male children are more involved in work outside the home than females. It shows the time spent by the children in the different activities weekly. It has been observed that twenty hours of work per week has been considered as the critical threshold beyond which the education of the child starts being significantly affected (Fallon and Zafiris, 1998). This implies that time children spent in work on family farm and specifically the female children in household chores significantly affect their education. For male children, the effect of work on family farm

(37.8±38.1) was more than that of the females (23.2±37.3 hours). However, for female children, the time they spent in household chores weekly (28.9±31.3) does significantly affect their education than the males (1.6±10.6). This agrees with the findings of Haile and Haile (2008) that male children spend longer hours on market activities (work on farm) than their female counterparts and the female child labourers spend more time in domestic work (household chores) than their male counterparts. In addition, the result shows that girls (17.8±24.3hours) spend more time in school weekly than boys (14.2±10.8hours).

**Table 3: Time spent in child activities by gender**

| Activities/Time spent   | Male |                    | Female |                    |
|---|------|--------------------|--------|--------------------|
|   | Mean | Standard deviation | Mean   | Standard deviation |
| Work on family farm   | 37.8 | 38.1               | 23.2   | 37.3               |
| Work on non-family farm   | 3.9  | 16.2               | 1.2    | 6.6                |
| Work on plantation  | 6.6  | 18.1               | 3.7    | 8.1                |
| Household chores involving cleaning, cooking, splitting logs, etc | 1.6  | 10.6               | 28.9   | 31.3               |
| Processing of horticultural crops                                 | 8.3  | 23.9               | 7.93   | 26.6               |
| Marketing of horticultural crops                                  | 5.4  | 23.1               | 2.3    | 11.9               |
| School attendance   | 14.2 | 10.8               | 17.8   | 24.3               |

Source: Field survey, 2011

### Reasons for participating in work by gender

Reasons why boys and girls of horticultural households work include need to care for siblings at home (14.6% and 29.3% respectively), work on family farm (53.9% and 42.7% respectively), perform household chores (38.1% and 47.1% respectively) and to help fulfil parent's or other household members' piece of work contract (5.8% and 3.8%

respectively) (Table 4). Specifically, most male children (53.9%) work because they need to help on the family farm and 47.1% of the female children work because they need to take part in household chores. This further buttresses earlier findings that more male children are involved in work outside the home than the females.

**Table 4: Reasons for working by gender**

| Reasons   | Male       | Female    |
|---|------------|-----------|
| Need to care for siblings at home   | 38 (14.6)  | 46 (29.3) |
| Take part in household work   | 99 (38.1)  | 74 (47.1) |
| Need to help at family farm   | 140 (53.9) | 67 (42.7) |
| Work needed to fulfil parent's or other household member's piece of work contract | 15 (5.8)   | 6 (3.8)   |

Source: Field Survey, 2011

**Determinants of child labour by gender**

The Tables 5 and 6 summarise the gender estimated results of the multinomial logit of children schooling alone, combining school with work and working only compared to those who are neither schooling nor working. The odd ratios represent the impact of each explanatory variable holding all other variables constant, on the dependent variable. An odd ratio equals to 1 suggests that the explanatory variable leaves the dependent variable unchanged. If it is greater (less) than 1, it implies that the effect of explanatory variable is to increase (reduce) the dependent variable.

**Determinant of child labour for male children**

Table 5 shows that when male children who participate in school only are compared with those neither schooling nor working, their age and household's ownership of farmland are positive and significant at one percent level respectively. This implies that as boys grow older, the likelihood of their participating in school only increases relative to the base category of neither school nor work. However, this result negates the findings of Patrinos and Psacharapoulous (1997) in Peru where a negative relationship was found between age and schooling. Also household's ownership of farmland increases the likelihood of male children participating in school only. Ownership of assets indicates that a household is relatively wealthy and should decrease the likelihood of child labour and increase the likelihood of schooling (Chamarbagwala, 2004). In addition, household's monthly expenditure is positive and significant at five percent level relative to those in the neither school nor work activity option. However, the odds ratio is 1.0 thus; increasing household's

monthly expenditure does not change the activity option for boys in horticultural households. Male children who combine school and work have their age and household's ownership of farmland as positively and significantly determining the likelihood of being in this activity option relative to the neither school nor work group. The implication of this result is that as boys grow older, the likelihood of combining school with work increases ( $p < 0.01$ ). Also, for male children in households that own farmland, the likelihood of combining school with work is positive. This agrees with the observation of Ravallion and Wodon (2000) that parents with larger holdings (such as land) may well have larger demand for male children's labour time in helping to supervise hired labour- an activity that is unlikely to be seen as appropriate for girls in rural Bangladesh. Male children working full-time have age, household's ownership of farmland and number of preschool aged children (0-4 years) in the household as positively and significantly determining the odds of being in this activity option. As boys grow older, their participation in full-time work increases ( $p < 0.01$ ). Furthermore, household's ownership of farmland increases the likelihood of boys being full time workers ( $p < 0.01$ ). A unit increase in the number of preschool aged children in a household increases the likelihood of the males working alone. Theory also assumes that the additional number of pre-school aged children tends to withdraw school-age children from schooling to work by the increased demand for child care time or by the increased cost of raising pre-school children (Khanam, 2008). Thus, the observed result may be due to the increased cost of raising pre-school children which predisposes these male children to full-time work.

**Table 5: Determinants of child labour for male children**

| Explanatory variables | School only |            | School and work |            | Work only   |            |
|-----------------------|-------------|------------|-----------------|------------|-------------|------------|
|                       | Coefficient | Odds ratio | Coefficient     | Odds ratio | Coefficient | Odds ratio |
| Relhh                 | 0.2         | 1.3        | 1.1             | 2.9        | -1.0        | 0.4        |
| Agehh                 | -0.1        | 0.9        | -0.0            | 1.0        | -0.0        | 1.0        |
| Nyhhsch               | -0.0        | 1.0        | -0.0            | 1.0        | -0.0        | 1.0        |
| Ownfarm               | 7.6         | 1948.0***  | 6.4             | 609.3***   | 6.9         | 1003.3***  |
| Hhmexp                | 0.0         | 1.0**      | 0.0             | 1.0        | 0.0         | 1.0        |
| Creaces               | -1.3        | 0.3        | -1.1            | 0.3        | -0.8        | 0.52       |
| Distpri               | 1.8         | 5.8        | 2.8             | 16.5       | 3.2         | 24.7       |
| Water                 | -0.2        | 0.8        | -0.5            | 0.6        | -0.2        | 0.8        |

| Explanatory variables | School only |            | School and work |            | Work only   |            |
|-----------------------|-------------|------------|-----------------|------------|-------------|------------|
|                       | Coefficient | Odds ratio | Coefficient     | Odds ratio | Coefficient | Odds ratio |
| Schage                | -0.1        | 0.9        | -0.3            | 0.8        | -0.5        | 0.6        |
| Presch                | 0.4         | 1.5        | 0.6             | 1.8        | 0.7         | 2.0**      |
| Age                   | 1.95        | 6.8***     | 2.2             | 9.1***     | 2.2         | 9.1***     |
| Constant              | -16.0       |            | -20.5           |            | -19.5**     |            |
| Log likelihood        | -230.7      |            |                 |            |             |            |
| LR chi2(33)           |             |            |                 |            |             |            |
| Prob>chi2             | 140.0       |            |                 |            |             |            |
| No. of observations   | 0.0         |            |                 |            |             |            |
|                       | 260         |            |                 |            |             |            |

Source: Computations from Field survey, 2011; (\*\*\*)significant at 1%; \*\*significant at 5%)

### Determinants of child labour for female children

Table 6 shows that age of the female child positively and significantly determines being in the school only option ( $p < 0.01$ ). On the contrary, age of household head negatively and significantly determines their being in the school only option ( $p < 0.05$ ). This implies that an additional year to the age of female children increases their likelihood of being in the school only activity option relative to being idle (neither schooling nor working). This finding agrees with Cockburn (2001) who reported that the probability of a child attending school increases rapidly with age relative to the probabilities of the child working or being inactive. Increase in age of the household head reduces the likelihood of the females attending school only. This is contrary to the findings of Grootaert (1998) who observed that the older the head of the household, the more likely it is that a child will be attending school and not working. However, the result obtained from the study could be due to the increased uncertainty of enjoying the returns from child schooling as the household head grows older (Senbet, 2010). This result implies that increasing age of household head determines female children's schooling and not males', which may be due to the fact that such household heads may not realize the benefits of female-child education. Age of the child, her relationship to the household head and number of years of schooling of household head all positively and significantly determines the likelihood of female children combining school with work in the study area. Thus, increasing the age of these girls increases the likelihood of combining school with work ( $p < 0.01$ ). The results agree with Khanam (2004) who found that the probability of combining school with work increases with the age of the child. For a female biological child of the household head, the probability of combining school with work increases ( $p < 0.05$ ). This agrees with the fact that a son and or daughter of the household head

is likely to combine study and work as opposed to the children of other relatives of the household head. This reflects that household head favours his/her own child at least in combining school with work (Khanam, 2004). Increasing the number of years of schooling of the household head increases the probability of female children combining school with work among horticultural households in the study area. This is consistent with the findings of Nkamleu and Kielland (2006) which observed that household head education had a positive effect on a combination of work and school, at 10% level of significance. This suggests that educated household heads have a better knowledge of the benefits of child education. Girls engaged in full-time work have age, number of preschool aged children in the household and number of school aged children significantly determines their likelihood of being in this activity option relative to being idle. This implies that an addition to the age of girls increases their likelihood of working fulltime. This implies that as girls grow older, the probability to work or to do housework significantly increases (Bonsang and Faye, 2005). Increase in the number of preschool aged children in the household (0-4 years), increases the likelihood of girls working only. The study corroborates findings of Cockburn (1999) which revealed that presence of infants (children aged 0-4 years in the household) significantly and strongly increases the likelihood of a child working (roughly 6.2% for each additional infant), probably due to increased household demand for domestic work or in order to substitute for the mother's other activities. On the other hand, increase in the number of school-aged children (5-14 years) in the household reduces the likelihood of girls working fulltime. This finding could be due to the fact that other school-aged children in the household will help girls in their work portion (household chores or farm work) thus allowing these girls more time to attend school.

**Table 6: Determinant of child labour for female children**

| Explanatory variables | School only |            | School and work |            | Work only   |            |
|-----------------------|-------------|------------|-----------------|------------|-------------|------------|
|                       | Coefficient | Odds ratio | Coefficient     | Odds ratio | Coefficient | Odds ratio |
| Relhh                 | 1.8         | 5.8        | 3.5             | 33.0**     | 21.1        | 1.5e+09    |
| Agehh                 | -0.1        | 0.9**      | -0.0            | 1.0        | -0.0        | 1.0        |
| Nyhhsch               | 0.2         | 1.2        | 0.3             | 1.3***     | 0.2         | 1.3        |
| Ownfarm               | 2.7         | 14.5       | 0.1             | 1.1        | 19.9        | 4.6e+08    |
| Hhmexp                | 0.0         | 1.0        | 1.1e-06         | 1.0        | -0.0        | 1.0        |
| Creaces               | -1.2        | 0.3        | 0.2             | 1.2        | -0.3        | 0.7        |
| Distpri               | 0.0         | 1.0        | 0.2             | 1.2        | 0.5         | 1.6        |
| Water                 | 0.2         | 1.2        | -0.3            | 0.8        | -0.3        | 0.7        |
| Schage                | -0.2        | 0.9        | -0.2            | 0.8        | -0.6        | 0.6**      |
| Presch                | 0.3         | 1.3        | 0.3             | 1.4        | 0.6         | 1.9***     |
| Age                   | 0.7         | 2.0***     | 0.9             | 2.5***     | 1.0         | 2.8***     |
| Constant              | -5.2        |            | -0.5***         |            | -47.6       |            |

Log likelihood = -144.2

LR Chi<sup>2</sup>(33) = 99.6

Prob>Chi<sup>2</sup> = 0.0

No. of observations = 157

Source: Computations from Field survey, 2011; (\*\*\*- significant at 1%, \*\*- significant at 5%)

## CONCLUSION

The study was carried out among children aged 5-14 years of horticultural households in selected areas of Bauchi State. The result shows that boys are more involved in work on family farm while girls perform more of household chores. Factors that influence male children involvement in child labour and schooling were different from that of their female counterparts except age of the child and number of preschool-aged children in the household which was significant for both boys and girls involved in full-time work. Hence, age of both boys and girls was a significant factor increasing child labour and schooling among horticultural households in Bauchi State.

Based on the aforementioned findings, the study recommends the following:

1. Both boys and girls aged 5-14 years should be allowed to stay in school till Junior Secondary School 3 to achieve at least basic education which is the aim of universal primary education – primary plus two or three years of secondary education.
2. Girls participate more in household chores than on the family farm; thus, households should be sensitized on the need to reduce the workload of these children in the home so that they can better face their studies. In the same vein, households should be sensitized on the need to keep these girls in school rather than full-time work due to the increasing number of preschool-aged children in the households. Households owning farmland should be encouraged to keep their boys in school as much as possible instead of

allowing them to work on the family farm in a way that will hinder their schooling.

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**Effects of floriculture enterprise on the well-being of young floriculturists in Ibadan metropolis, Oyo state, Nigeria**

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**Abstract:** Effects of floriculture enterprises on the wellbeing of youth in Ibadan metropolis was investigated. Three Local Government Areas were purposively selected, and random sampling was employed to select 30% of the registered floriculturists from the list of 388 members to give a total of 117 respondents. A structured questionnaire was used to collect data and analysed using descriptive and inferential statistics. Findings reveal 56.4% had a favourable attitude towards floricultural enterprise, while 70.1% had a high level of well-being. Age, marital status and attitude towards floriculture were significantly influenced the wellbeing status of the respondents. The study, therefore, recommended intensification of youth empowerment programmes in floriculture enterprise in the study area.

**Keywords:** Floriculture, youth entrepreneur, well-being

## INTRODUCTION

Youth are important driving forces for social, political and economic development in any country. The National Youth Development Policy (2001) asserts that youths are the foundation of a society; their energies, inventiveness, character and orientation, define the pattern of development and security of a nation. The youth are the most volatile and vulnerable segment of the population in terms of social-economic, emotion and other aspects (Anasi, 2010). Moreover, in Nigeria's context, the National Youth Development Policy (2001) defined youth as people aged between 18 and 35, which constitutes all young males and females in this age bracket. In addition, the National Youth Service Corps defined the concept of youth to comprise all young persons of ages 18 to 30, who are citizens of the Federal Republic of Nigeria. Globally, however, youth is described as the period in an individual's life which runs between the end of childhood and entry into the world of work (Onuekwusi and Effiong, 2002). Meanwhile, agriculture is one of the world's oldest vocations that offer a specific opportunity for self-reliance in different areas such as crop production, animal husbandry, horticulture, fishery, forestry, sericulture and floriculture. Thus, agriculture is a lucrative profession for both youth and adult.

Floriculture is a class of horticulture that deals with the science and practice of cultivating and arranging of ornamental flowering plants for the aesthetic purpose (Acquaah, 2004). It also involves the intensive production of flowers and ornamental shrubs (Muthoka and Muriithi, 2008). Owing to the steady increase in flower demand in the country, floriculture has become one of the important commercial trades in agriculture, an economically viable option in agri-business (Nigeria Economic Summit Group, 2009). The industry has potentials for generating employment for both rural and urban

dwellers directly or indirectly (Usman *et al*, 2002). The direct jobs include those for skilled labour like researchers, teachers, greenhouse managers and nursery managers among others, while the indirect jobs include those of factories that produce chemicals and machinery for the production and processing of floricultural produce (Acquaah, 2004). The demand for fresh flowers has steadily increased not only for decoration but also for many other purposes like essential oils, cosmetics, aroma therapy, dry flowers, natural dyes, medicines, etc (Dewan *et al*, 2016). Thus, the flora industry in Nigeria holds great prospect with immense investments and employment opportunities capable of improving wellbeing and quality of life of producers especially youths. Many previous studies have confirmed the devastating effects of unemployment on individual well-being (Frey and Stutzer, 2002).

Wellbeing is a broad concept that includes people's satisfaction with their life, personal development and social functioning (Marks and Shah 2004). It is related to terms such as happiness, health, the prosperity of people's life situation. Individual wellbeing depends on many things such as job characteristics, labour market status, income, security, leisure, family, moral values, liberty and social relationship (Eurostat, 2012).

Youth unemployment in Nigeria has become one of the most serious social problems confronting the country. According to the National Bureau of Statistics (2012), young people aged between 15 and 24 years account for 52.9 percent of unemployed people while those aged between 25 and 44 years accounted for 41.1 percent. Therefore, those in the age bracket of 15 and 44 years account for 94 percent of the total unemployed persons in Nigeria (Osibanjo, 2006). In the same vein, Nigerian Bureau of Statistics (NBS, 2015), stated that the country's unemployment rate rose from 8.2% in the second quarter to 9.9

percent in the third quarter of 2015, representing a fourth consecutive rise in the unemployment rate since the third quarter of 2014. Every year, thousands of graduates are produced with no jobs in view for majority of them. Nigerian streets are littered with youth hawkers who ordinarily would have found gainful employment in some enterprise (Okafor, 2011). A large number of youths who are unemployed end up constituting political thugs, thieves, vandals, terrorists, militants and prostitutes thus, threatening the security and stability of society and nation. Floriculture enterprise has the potential of creating job opportunities to the youths in order to tackle unemployment rate as well as improving their standard of living. According to Bankole (2002) ornamental plants serve as good source of income generating activities due to its high returns per unit area, short production period and regularity of income. Despite the benefits derivable from ornamental plants, little or no studies have been carried out in this area. In addition, no study has explored youth participation in floriculture cultivation as well as its contribution to their wellbeing. Therefore, the need to examine the effects of floriculture enterprise on the wellbeing of youth becomes necessary to inform policy makers, guide stakeholders involved in formulating programmes and projects targeting youth in floriculture sector and provide lessons that entice the youth to invest their time and funds into floriculture.

The general objective of the study was the assessment of the effects of floriculture enterprise on the well-being status of youths in Ibadan metropolis. The specific objectives of the study are to:

1. determine the socioeconomic characteristics of the respondents
2. examine respondents' attitude towards floriculture enterprise.
3. assess the contribution of floriculture to the well-being status of the respondents.

The hypotheses of the study, stated in null form, are as follows;

H<sub>0</sub>1: There is no significant relationship between the socio-economic characteristics of the respondents and their well-being status.

H<sub>0</sub>2: There is no significant relationship between respondents' attitude towards floriculture enterprise and their well-being status.

## METHODOLOGY

The study was carried out in Ibadan metropolis, Oyo State. Ibadan metropolis has eleven (11) Local Governments Areas (LGAs), out of which five LGAs are within the metropolis and the remaining six are at the periphery of the metropolis. Ibadan is the capital city of Oyo State. The city and its environment are

home to several industries. The main economic activities engaged in by the populace include agriculture, trade, public service etc. Ibadan has a population of 2,550,593, (National Population Commission 2006 Census).

The population of the study consists of all youths engaged in floricultural enterprise in Ibadan metropolis. Three local government areas namely Ibadan North, Ibadan North East and Ibadan South West were purposively selected due to the dominance of floricultural activities in these areas. A list of floriculturists (153, 132 and 103 respectively) was obtained from the floriculturists association in the study area. Systematic random sampling was employed to select 30% of floriculturists (46, 40 and 31 respectively) from the list provided by the association across the selected three local government areas to give a sample size of 117 respondents. Questionnaire was used to gather relevant information from the respondents. The questionnaire was administered as an interview schedule to the illiterate respondents in 2017.

Respondents' attitude towards floriculture enterprise was measured through presentation of nine attitudinal statements with response options of; Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree = 2 and Strongly Disagree = 1 for positive statements and reversed for negative statements. Well-being status was measured as; completely Dissatisfy = 1, Dissatisfy = 2, Neither Satisfy = 3, Satisfy = 4 and Completely Satisfy = 5. Data collected were subjected to both descriptive (frequency, percentages, mean etc) and inferential (Chi-square and PPMC) statistics.

## RESULTS

### Socioeconomic characteristics

Table 1 reveals that majority (90.6%) of the respondents were males. The preponderance of more male is an indication that young males are more involved in floriculture enterprise than their female folks which can be as a result of tediousness of the work involved in floriculture activities such as landscaping. Thus, women might not have the capacity to carrying out some of these activities. About 74.4% of the respondents were married. More married respondents imply that the respondents in the study area shoulder one form of responsibility or the other. This finding however, negates that of Ajaero and Njoku (2005) who reported dominance of singles among youths involved in agriculture. It might also be that floriculture is a lucrative enterprise that can be practice to support/provide family needs.

Age distribution further reveals that more than half (53.0%) of the respondents were between the ages of 31 and 35 years, 36.8% were between 26 and

30 years. The average age of the respondents was 30 years which implies that the respondents are agile and active to withstand the rigours of floriculture activities. Besides, being young might also make them to be innovative (Frederick 2011 and Dick 2017). Majority (82.1%) of the respondents had tertiary education while few (0.9%) had no formal education. High literacy level of respondents might be an indication that floriculture activities also require a bit of education for receptivity to innovations as well as modern ways of improving their enterprise. According to Omonona *et al* (2014), educational attainment is pivotal to making a sensible decision as well as improvement in wellbeing. The mean household size was 2 persons. The plausible reason for low household size could be attributed to the fact that many of the respondents were young couples while some were not married and might still be living with their parents and other siblings. About 44.4% of the respondents had 6-10 years of floricultural experience, with 29.7% had above 10 years of floricultural experience. More than two-third of the respondents (74.1%) had put six years and above experience in floriculture. It is expected that with increasing years of involvement in the floriculture practice, respondents would have gained experience in the art of floriculture, better understanding and increasing productivity which in turn can translate to improve well-being. Majority (72.6%) of the respondents had less than one hectare of garden size, while 0.9% had above 2 hectares. The respondents have low hectares of land under floriculture. This suggests that youths in the study area are small scale floriculturists.

Small scale production sometimes depicts the income being generated from its production and usually less than US \$10,000 while commercial or large scale production usually generated US \$400million annually. Also, cultivations under greenhouse conditions, poly tunnels or netting sometimes depict large scale production while medium and small scale growers either have their cultivations under natural shading (under trees) or use locally available materials such as coir fibre mats, cajans (dried and woven coconut palm leaves) or ropes to provide shade (Dhanasekera, 1998).

In line with the classification of floriculturist based on acre of land, Benzakein (2017) stated that among my flower-farming friends, anyone growing flowers on more than 10 acres is considered one of the “big guys.”

Benzakein (2017) further stated that virtually all new flower farms are taking root on farms with just a

few acres in production. Unlike commodity crops and even vegetables grown on a small scale, flowers are typically planted, cultivated, and harvested all by hand. Very little mechanization beyond field preparation is actually involved, which means production is more often limited by available labour, than by available land. Erin Benzakein (2017).

It might also be because they need an area to showcase part of or sample of their activities while they offer services to the interested customers in their respective houses or farms. This finding is in line with Agwu *et al* (2008) who posited that most farmers in Nigeria operate on a small scale.

About 35.9% of the respondents acquired land for cultivation through lease, 27.4% through inheritance while few (9.4%) acquired through purchase. The ownership of land through lease and inheritance by majority implies that many of the respondents obtained land for their floriculture practice on a temporary basis which can deprive them the opportunity of large scale production or permanent basis of ownership by heredity and small holding due to land fragmentation within the family. Respondents in the study area cultivated both local and exotic floricultural plants (Table 2). *Polyalthia longrifolia* (Ashoka Tree) (1.93), *Aglaonema* (Chinese Evergreen) and Royal palm (*Roystonea regia*) were the major exotic plants cultivated by the respondents in the study area while Single red ixora, Double red ixora, Hibiscus species were prominent among the local variety cultivated by respondents. On the overall, respondents in the study area cultivated more of local variety than the exotic variety probably because of the availability of these varieties and cheapness.

A greater percentage (73.0%) of the respondents stated that associations regulated prices of floricultural plants while others regulated their prices based on self-determination, market situation, scarcity or availability of ornamental plants. On price determination, it was discovered that for uniformity purpose particularly for most of the common ornamental plants, association determines price. Meanwhile, monthly distribution of income shows that 70.1% of the respondents earned between ₦ 100,000.00 and ₦ 150,000.00 while only 6.8% earned less than ₦50,000.00. The average monthly income of respondents from the enterprise was ₦54,238.00 implying that floriculture is a viable enterprise that can help to sustain the wellbeing of young individuals.



**Table 1: Distribution of respondents by socioeconomic characteristics**

| Variable                            | Percent | Mean            |
|-------------------------------------|---------|-----------------|
| <b>Sex</b>                          |         |                 |
| Male                                | 90.6    | N= 117          |
| Female                              | 9.4     |                 |
| <b>Marital status</b>               |         |                 |
| Single                              | 25.6    |                 |
| Married                             | 74.4    |                 |
| <b>Age</b>                          |         |                 |
| 21-35                               | 10.3    | 30 years ± 3.6  |
| 26-30                               | 36.8    |                 |
| 31-35                               | 53.0    |                 |
| <b>Educational qualification</b>    |         |                 |
| No formal                           | 0.9     |                 |
| Primary                             | 1.7     |                 |
| Secondary                           | 15.4    |                 |
| Tertiary                            | 82.1    |                 |
| <b>Religion</b>                     |         |                 |
| Islam                               | 26.5    |                 |
| Christianity                        | 73.5    |                 |
| <b>Household size</b>               |         |                 |
| 1-3 persons                         | 68.4    | 2 persons ± 4.3 |
| 4-6 persons                         | 21.4    |                 |
| >6 persons                          | 10.2    |                 |
| <b>Years of experience</b>          |         |                 |
| 1-5                                 | 39.3    |                 |
| 6-10                                | 44.4    |                 |
| 11-15                               | 13.7    | 8 years ± 4.0   |
| 16-20                               | 2.6     |                 |
| <b>Size of garden</b>               |         |                 |
| < 1hectare                          | 72.6    |                 |
| 1-2 hectares                        | 26.5    | 2.3 acres ± 1.4 |
| Above 2 hectares                    | 0.9     |                 |
| <b>Land acquisition</b>             |         |                 |
| Inheritance                         | 27.4    |                 |
| Communal                            | 11.1    |                 |
| Family                              | 12.0    |                 |
| Lease                               | 35.9    |                 |
| Purchase                            | 9.4     |                 |
| <b>Price regulation</b>             |         |                 |
| Association                         | 73.5    |                 |
| Market situation                    | 16.2    |                 |
| Self determination                  | 14.5    |                 |
| Scarcity/availability of ornamental | 3.4     |                 |
| <b>Estimated income</b>             |         |                 |
| ≤ ₦ 50,000                          | 1.7     |                 |
| ₦50,001- ₦ 100,000                  | 5.1     |                 |
| ₦100,001-₦150,000                   | 70.1    | ₦54, 238        |
| ₦150,001 ₦200,000                   | 5.1     |                 |
| Above ₦200,000                      | 18.0    |                 |

**Table 2: Type and extent of floricultural plants grown by respondents**

| Floricultural Plants                                | Always | Sometimes | Never | Mean |
|---|--------|-----------|-------|------|
| <b>Exotic Variety</b>                               |        |           |       |      |
| Polyalthia longrifolia (Ashoka Tree)                | 94.9   | 3.4       | 1.7   | 1.93 |
| Aglaonema (Chinese Evergreen)                       | 89.7   | 6.0       | 4.3   | 1.85 |
| Royal palm (Roystonea regia)                        | 87.2   | 8.5       | 4.3   | 1.83 |
| Christmas rose (Helleborus)                         | 73.5   | 21.4      | 5.1   | 1.68 |
| Ficus benamina (Ficus tree)                         | 84.6   | 12.8      | 2.6   | 1.82 |
| <b>Local Variety</b>                                |        |           |       |      |
| Single red ixora                                    | 96.6   | 3.4       | 0.0   | 1.97 |
| Double red ixora                                    | 98.3   | 1.7       | 0.0   | 1.97 |
| Duranta Repen species i.e. yellow bush, green bush. | 95.7   | 3.4       | 0.9   | 1.95 |
| Acalypha species                                    | 95.7   | 3.4       | 0.9   | 1.95 |
| Muraya  | 95.7   | 1.7       | 2.6   | 1.93 |
| Hibiscus species                                    | 95.7   | 4.3       | 0.0   | 1.96 |
| Hamelia species                                     | 92.3   | 5.1       | 2.6   | 1.90 |

**Attitude of respondents towards floriculture enterprise**

The distribution of respondents' attitude towards floriculture in Table 3 reveals that the respondents agreed that cultivation of ornamental plants was not a waste of time (mean = 4.46). The implication of this is that respondents derive satisfaction in the enterprise. Respondents also have favourable disposition to the fact that availability of market for ornamental plant all year round has made floriculture a profitable enterprise (mean = 4.32) and many of the respondents would like to invest more in floricultural activities (mean = 3.98). It shows that floriculture is a

profitable venture that could sustain the standard of living and wellbeing of youths. However, disagreement of most respondents to the statement that cultivation of ornamental plant was more difficult than agricultural enterprise (mean = 3.55) suggests that respondents in the study area do not see floricultural activities as an enterprise that requires much stress. The less ranked attitude was a long time before the ornamental plants are ready for sale/ market makes me lose interest in the enterprise (2.25) which means that ornamental plants do not take much time before it is ready for sale.

**Table 3: Distribution of respondents by Attitude towards Floricultural Enterprise**

| Attitudinal Statement  | SA   | A    | U    | D    | SD   | Mean |
|--|------|------|------|------|------|------|
| Availability of market for ornamental plant all year round has made floriculture a profitable enterprise       | 38.5 | 57.3 | 2.6  | 1.7  | 0.0  | 4.32 |
| I would like to invest more in floricultural activities due to its lucrativeness                               | 19.7 | 68.4 | 6.0  | 2.6  | 3.4  | 3.98 |
| I do not need to spend much when venturing into floricultural enterprise such as money, energy                 | 8.5  | 12.8 | 15.4 | 28.5 | 24.8 | 2.42 |
| I see floriculture as an enterprise that involves much risk and uncertainties                                  | 12.8 | 36.8 | 15.4 | 23.9 | 11.1 | 3.16 |
| Cultivation of ornament plants is a waste of time  | 1.7  | 4.3  | 6.0  | 22.2 | 65.8 | 4.46 |
| Both literate and illiterate can manage a floriculture nursery   | 26.5 | 24.8 | 10.3 | 34.2 | 4.3  | 3.35 |
| The long time before the ornamental plants are ready for sale/ market makes me lose interest in the enterprise | 59.8 | 19.7 | 8.5  | 9.4  | 2.6  | 2.25 |
| I find the cultivation of ornamental plants more difficult than any agricultural enterprise                    | 5.1  | 16.2 | 17.9 | 20.5 | 40.2 | 3.55 |
| I do not see floricultural enterprise as being stressful   | 12.8 | 19.7 | 6.0  | 44.4 | 17.1 | 2.67 |

Grand mean = 3.17 SA=Strongly Agree, A=Agree, U=Undecided, D=Disagree, SD=Strongly Disagree

On the overall, Table 4 reveals that 56.4% had favourable attitude towards floricultural enterprise

while 43.6% had unfavourable attitude towards the enterprise.

**Table 4: Categorization of respondents' attitude towards floricultural enterprise**

| Attitude Category    | Freq. | %    | Maximum | Minimum | Mean | SD   |
|----------------------|-------|------|---------|---------|------|------|
| Favourable (32-43)   | 66    | 56.4 | 43      | 23      | 32.0 | 3.77 |
| Unfavourable (23-31) | 51    | 43.6 |         |         |      |      |

Source: Field survey, 2016

**Well-being status of the respondents**

Table 5 shows that amongst the material wellbeing component, source of drinking water (4.00) ranked first, closely followed by telephone services (3.99) and type of toilet facility (3.98). Water is essential to the life of human beings and so is the need for water in a floricultural activity which could be a critical component to profitable floriculture practice and access to a telephone is necessary to maintain social contact and business transaction. Hence, it can be responsible for their possession and recognition as vital to their wellbeing. Based on psychological wellbeing, ability of respondents to stand with their peers (4.11) ranked first which might be because it placed them at the same par with their peers and gave them confidence for handling their work, social event, relationship and family followed by this is the good amount of sleep (4.05) that indicated a sense of rest of mind. Adequate sleep has been found to improve the psychological wellbeing of an individual and the ability to balance floricultural activities with other activities (4.03) ranked third. On social well-being, participation in religious organisation activities (4.26) ranked first which can serve as a market outlet for

their products followed by connection with very important personality in the society (4.25) particularly the elites that know the aesthetic values of ornamental plants. This is expected to have a positive influence on the income and overall wellbeing. On economic well-being, ability to purchase food items (4.08) ranked first as also depicted in the hierarchy of needs because without food there cannot be life and it is also the essence of engagement in any income generating activity. This was followed by ability to pay utility bills (4.07) and ability to pay medical bills (4.06). Lastly, on Health well-being, access to balance food (4.03) rated first, followed by the affordability of fumigants to fumigate respondents' environment to prevent mosquito in gestation (3.97) and access to the insecticidal net to prevent malaria (3.93). This implies that respondents were better off when they are free from malaria that competes with their income and time that are traded to regain their health back in circumstance of falling sick to malaria attack. These findings showed that youths involved in the floriculture enterprise had improved material, psychological, social, economic and health wellbeing.

**Table 5: Distribution by well-being status of the respondents**

| Well-Being Indicators   | CD  | D   | NS   | S    | CS   | Mean |
|---|-----|-----|------|------|------|------|
| <b>Material Well-Being</b>  |     |     |      |      |      |      |
| Source of drinking water  | 4.3 | 0.9 | 7.7  | 65.0 | 22.2 | 4.00 |
| Type of toilet facility   | 2.6 | 1.7 | 13.7 | 59.0 | 23.1 | 3.98 |
| Acquisition of household electronics                              | 1.7 | 3.4 | 13.7 | 66.7 | 14.5 | 3.89 |
| Means of transportation   | 3.4 | 3.4 | 13.7 | 58.1 | 21.4 | 3.91 |
| Telephone services / Facilities                                   | 1.7 | 1.7 | 9.4  | 70.1 | 17.1 | 3.99 |
| Grand Mean = 3.95   |     |     |      |      |      |      |
| <b>Psychological Well-Being</b>                                   |     |     |      |      |      |      |
| Ability to balance floricultural activities with other activities | 0.9 | 2.6 | 6.0  | 73.5 | 17.1 | 4.03 |
| Amount of sleep you get   | 0.9 | 2.6 | 9.4  | 65.0 | 22.2 | 4.05 |
| Ability to stand with my peer                                     | 1.7 | 0.9 | 5.1  | 69.2 | 23.1 | 4.11 |
| Dependency on medication  | 4.3 | 8.5 | 23.9 | 39.3 | 23.9 | 3.70 |
| Grand mean = 3.97   |     |     |      |      |      |      |
| <b>Social Well-Being</b>  |     |     |      |      |      |      |
| Connection with very important personalities in society           | 1.7 | 4.3 | 4.3  | 49.6 | 41.0 | 4.25 |
| Participation in community project                                | 1.7 | 2.6 | 8.5  | 66.7 | 20.5 | 4.02 |
| Participation in religious organization activities                | 0.9 | 2.6 | 8.5  | 46.2 | 41.9 | 4.26 |
| Participation in social group activities                          | 2.6 | 1.7 | 6.8  | 70.1 | 18.8 | 4.00 |
| Grand mean = 4.13   |     |     |      |      |      |      |
| <b>Economic Well-Being</b>  |     |     |      |      |      |      |

| <b>Well-Being Indicators</b>   | <b>CD</b> | <b>D</b> | <b>NS</b> | <b>S</b> | <b>CS</b> | <b>Mean</b> |
|--|-----------|----------|-----------|----------|-----------|-------------|
| Ability to pay children school fees  | 1.7       | 2.6      | 10.3      | 62.4     | 23.1      | 4.03        |
| Ability to pay medical bills   | 0.9       | 3.4      | 7.7       | 65.0     | 23.1      | 4.06        |
| Ability to pay utility bills   | 3.4       | 6.0      | 70.9      | 19.7     |           | 4.07        |
| Ability to purchase food items   | 4.3       | 5.1      | 69.2      | 21.4     |           | 4.08        |
| Ability to support other members of my family  | 1.7       | 12.0     | 67.5      | 18.8     |           | 4.03        |
| Grand mean =4.05   |           |          |           |          |           |             |
| <b>Health Well-Being</b>   |           |          |           |          |           |             |
| Access to health care facilities   | 1.7       | 4.3      | 30.8      | 50.0     | 12/8      | 3.68        |
| Access to insecticidal net to prevent malaria  | 0.9       | 4.3      | 11.1      | 68.4     | 15.4      | 3.93        |
| Use anti-malaria drug  | 1.7       | 3.4      | 9.4       | 71.8     | 13.7      | 3.92        |
| Affordability of fumigants to fumigate my environment to prevent mosquito in gestation | 2.6       | 1.7      | 11.1      | 65.8     | 18.8      | 3.97        |
| Access to balance food   | 3.4       | 7.7      | 71.8      | 17.1     |           | 4.03        |
| Grand Mean= 3.91   |           |          |           |          |           |             |

Source: Field survey, 2016

**Level of well-being status of the respondents**

The majority of the respondents (Table 6) had a high wellbeing status (70.1%) while 29.9% had low wellbeing status. This suggests that floricultural activities contribute to the wellbeing of young

floriculturist. This is also an indication that floricultural activities could serve as a means of reducing the problem of unemployment among youths.

**Table 6: Categorisation of respondents by well-being status**

| <b>Categories of wellbeing</b> | <b>Freq.</b> | <b>Percent</b> | <b>Minimum</b> | <b>Maximum</b> | <b>Mean</b> | <b>SD</b> |
|--------------------------------|--------------|----------------|----------------|----------------|-------------|-----------|
| Low (37-81.8)                  | 35           | 29.9           | 37             | 103            | 81.9        | 9.9       |
| High (81.9-103)                | 82           | 70.1           |                |                |             |           |

Source: Field survey, 2016

**Relationship between respondents' socioeconomic characteristics and their well-being Status**

The Chi-square analysis on Table 7 shows that significant association exists between marital status ( $\chi^2=16.398$ ;  $p = 0.000$ ), identity with association or group ( $\chi^2= 15.206$ ;  $p = 0.000$ ) and well-being status of youths involved in floricultural enterprise. A significant relationship between marital status and wellbeing implies that married individuals tend to enjoy spousal supports as they will be able to carry out their responsibility at home which as well

influenced their well-being thus, influencing their psychological, social and health wellbeing. Similarly, the relationship between membership of an association ( $\chi^2=15.206$ ;  $p = 0.000$ ) and wellbeing implies that affiliation with an association or farming group has an influence on the wellbeing status of youths in the study area. This is also possible as the association determines the price for majority aside other benefits that can be derived by being members of the association which can improve their well-being.

**Table 7: Relationship between socioeconomic characteristics of respondents and their well-being status**

| <b>Variables</b>                | <b><math>\chi^2</math></b> | <b>df</b> | <b>p-value</b> | <b>Decision</b> |
|---------------------------------|----------------------------|-----------|----------------|-----------------|
| Sex                             | 1.064                      | 1         | 0.242          | Not Significant |
| Marital status                  | 16.398                     | 1         | 0.000          | Significant     |
| Religion                        | 1.604                      | 1         | 0.146          | Not significant |
| Identity with group/association | 15.206                     | 1         | 0.000          | Significant     |

Source: Field survey, 2016

Table 8 shows that there was significant relationships between respondents age ( $r = 0.420$ ;  $p = 0.000$ ), years of experience in floricultural activities ( $r = 0.285$ ;  $p = 0.002$ ), respondent's attitude ( $r = 0.365$ ;  $p = 0.000$ ), and the well-being status of youths involved in floricultural enterprise. A positive

correlation between age and respondents' wellbeing status suggests that age has a positive influence on the wellbeing status of youths; as young people grow older, they tend to be more productive which consequently have a positive influence on their wellbeing. Similarly, positive correlation between

years of experience of respondents and wellbeing indicates that as years of experience in floricultural activities increases, the better their output and the more the wellbeing of respondents' improves. The attitude of the respondents towards floriculture also

positively correlates with wellbeing which is an indication that the more respondents' tend to be favourably disposed to floricultural activities with increased involvement, the more the income and the higher their wellbeing status.

**Table 8: Correlation between socioeconomic characteristics of respondents and their well-being status**

| Variables           | r-value | P- value | Decision        |
|---------------------|---------|----------|-----------------|
| Age                 | 0.420   | 0.000    | Significant     |
| Years of experience | 0.285   | 0.002    | Significant     |
| Household size      | 0.007   | 0.941    | Not significant |
| Attitude            | 0.365   | 0.000    | Significant     |

Source: Field survey, 2016

### CONCLUSION

The male gender dominated the floricultural enterprise in the study area. Most of the youths were young, married and small scale floriculturist. Floricultural associations play significant roles, particularly in price regulation. Respondents had favourable attitude towards the floricultural enterprise even though their average monthly income from floricultural enterprise was small. Respondents also have improved wellbeing status in all well being indicators (Material, Social, psychological, economic and health). On the overall, there was a high level of respondents' well-being through engagement in the floricultural enterprise. Female should be encouraged to take floriculture as a livelihood activity. Youth empowerment programmes on floricultural activities should be intensified by both government and Non-Governmental Organizations because of their favourable attitude towards the enterprise while also, encouraging youth organisations such as young farmers' clubs to follow suit by encouraging self-employment of youth through floricultural practice

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**Effects of National Directorate of Employment activities on youth poverty status in Southwestern Nigeria**

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**Abstract:** Youth unemployment is one of the most serious socio-economic problems currently confronting Nigeria. Its effect is felt on the high rate of poverty among the youth. The National Directorate of Employment (NDE) was an initiative, which targeted skills development and job creation among the youth. However, few studies exist on its impact on youth poverty. Therefore, effects of NDE on youth poverty status in Southwestern Nigeria were investigated. A two-stage sampling procedure was used to select respondents for the study. Out of the six Southwestern states, Osun, Oyo and Ogun were randomly selected. Simple random sampling was used to select 244 NDE participants of five years and above, with 155 non-NDE participants selected using snowball technique to give a total sample size of 399 respondents. Data were analysed using descriptive and inferential statistics. The findings revealed that majority of the respondents were male with mean age of  $31.0 \pm 6.1$  years. Half of the respondents (50.4%) were married, earning a mean income of N21,831.7 monthly. About 57.0% participated in agricultural training and 85.2% exhibited high knowledge of NDE activities. The greatest challenge faced by 66.0% of participants was insufficient fund ( $1.6 \pm 0.7$ ), with the most important benefit derived being technical skills ( $1.09 \pm 0.71$ ). More participants (27.1%) were better off than non-participants (21.3%) in poverty status. Furthermore, no significant difference ( $t=1.95$ ;  $p>0.05$ ) exists in poverty status of participants and non-participants. However, there was a significant difference ( $t=15.08$ ;  $p<0.00$ ) in the poverty status of participants in agricultural and non-agricultural training. The NDE activities had a low impact on the poverty status of participants. There should be an upward review of both monetary and material grants given to the participants to create a positive effect on the poverty status of participants,

**Keywords:** National Directorate of Employment, Youth unemployment, Youth poverty, Agricultural training.

**INTRODUCTION**

Poverty is a global phenomenon which affects continents, nations and peoples differently. Globally, more than 800 million people are living in extreme poverty, living on less than \$1.25 a day, many lacking access to adequate food and clean drinking water.

In Nigeria, the problem of poverty has for a long time been a cause of concern to the government (Nwaobi, 2003). Events and official statistics have continued to attest to the fact that the poverty level in Nigeria contradicts the country's immense wealth. Despite being the largest economy in Africa, the World Bank (2014) established that Nigeria with about 170 million population falls among countries with extreme poverty whose over 70% population live on \$1.25 (N450.00) or even less per day. Specifically, the report revealed that 7% of the 1.2 billion people living below the poverty line in the world are Nigerians.

However, the youth of today are the worst hit by poverty as many of them have suffered the consequences of severe poverty from birth. In this sense, they differ from their parents, who grew up at a time when the country was emerging from the colonial administration, with its promise of a brighter, independent future (World Youth Report, 2007). Unlike the past when there were many opportunities for free or state-subsidised education and health care, today's youth, from birth, have experienced the consequences of a serious global economic recession and of structural adjustment and

liberalisation policies that led to major retrenchment and job losses and the withdrawal of state subsidies for basic services. These changes resulted in increased poverty in the households in which young people grew up and diminished opportunities for their early development.

According to Olowa (2012), employment is a key determinant of poverty. This is in line with the assertion of World Bank Poverty Task Force (1999) which associates poverty with inadequate access of people to employment opportunities. When the rate of unemployment is high as pointed out by Omonijo, Fadugba, Nnedum, Biereenu-Nnabugwu and Uche (2013), it increases the rate of poverty. When people lack access to job opportunities, they tend to live in abject poverty. Such persons would not have resources to ensure their means of livelihood. Thus, the unemployment rate in the country is a direct indication of those who are being deprived of essential well-being either in absolute or relative terms of poverty.

In order to reduce poverty in Nigeria, several programmes and projects have been designed both in the past and in recent times. Most of these programmes target improving basic services, infrastructure and housing facilities for the rural and urban population extending access to credit and creating unemployment and not specially targeted towards the poor, though they affect them. Some achievements have been recorded by these poverty-related programmes in the area of primary health care, education enrollment, agricultural services,

financial sector services through the People’s Bank of Nigeria and Community Bank. Some of the programmes include; Family Economic Advancement Programme (FEAP), Better Life for Rural Women, Family Support Programme (FSP), National Directorate of Employment (NDE) among others.

National Directorate of Employment (NDE) is one of the notable agencies set up by Nigerian governments in response to the alarming unemployment situation and the resultant poverty. It was established in 1986 and statutorily mandated to design and implement programmes to combat mass unemployment and articulate policies aimed at developing work programmes with labour intensive potentials. It was formed to tackle employment problems in both the short and long term perspectives by formulating and administering job creation as well as employment-related training programmes.

The stability of NDE may be attributed to its continuous reformation and amendments of its programmes to meet its challenges. So far several youth have participated in non-agricultural and agricultural activities of the agency (Ezeanya, 2011). However, scanty studies exist of its impact on youth poverty. It, therefore, becomes imperative to study the effect of NDE on poverty status of youth in southwestern Nigeria, comparing participants’ and non-participants’ poverty status.

The general objective of the study was to determine the effect of NDE’s activities on youth poverty status in Southwestern Nigeria. The specific objectives were to:

1. determine the personal characteristics of respondents;

2. evaluate the level of knowledge of respondents on NDE’s activities in the study areas;
3. examine the benefits derived by the participants from participating in NDE;
4. ascertain the challenges encountered by the youth in participating in NDE activities;
5. ascertain the poverty status of participants and non-participants in the study areas.

The following are the research hypotheses set and tested in this study.

H<sub>01</sub>: There is no significant difference in the poverty status of youth participating in NDE activities and non-participants across selected states.

H<sub>02</sub>: There is no significant difference in the poverty status of youth involved in NDE’s agriculture training and non-agricultural training activities.

### METHODOLOGY

Multistage sampling procedure was used to select respondents for the study. Out of the six Southwestern states, Osun, Oyo and Ogun were randomly selected. Simple random sampling was used to select 88, 76 and 80 NDE participants of five years and above from Osun, Ogun and Oyo, respectively. For non-NDE participants, snowball technique was used to select 67 (Osun), 38 (Ogun) and 50 (Oyo) respondents to give a total sample size of 399 respondents. An interview schedule was used to collect data on respondents’ personal characteristics, type of NDE activities (agricultural and non-agricultural training), challenges encountered, benefits derived, level of knowledge of NDE activities and poverty status of participants and non-participants.

**Table 1: Distribution of sampled participants and non participants of NDE activities in Oyo, Ogun and Osun States**

| Project States in Selected States | No of Participants | No of selected participants (10%) | No of Non-Participants |
|-----------------------------------|--------------------|-----------------------------------|------------------------|
| Osun                              | 880                | 88                                | 67                     |
| Oyo                               | 760                | 76                                | 50                     |
| Ondo                              | 800                | 80                                | 38                     |
| Ekiti                             |                    |                                   |                        |
| Lagos                             |                    |                                   |                        |
| Ogun                              |                    |                                   |                        |
| Kwara                             |                    |                                   |                        |
| Total                             |                    | 244                               | 155                    |
| Total Respondents                 |                    | <b>399</b>                        |                        |

The dependent variable of the study is youth poverty status and was measured using total fuzzy set which is made up of fuzzy monetary and fuzzy supplementary (Monetary and multidimensional methods of measuring poverty). The scores of both types of a fuzzy set were pooled together and the

mean was generated which served as the benchmark for categorizing respondents into better off than others, average and poorest of the poor.

### RESULTS AND DISCUSSIONS

#### Age of respondents



Age distribution of respondents as presented in Table 2 shows that majority (58.9%) of the respondents were within the age range of 23-34 years of which about 60.0% were participants and 57.4% were non-participants with mean age of 30.7±6.1 years. This category represents vital source of manpower for development, they are the most active, yet the most vulnerable segment of the population. According to World Youth Report (2007) Weak infrastructure and poor economic development have traditionally impeded youth development in Nigeria; staying enrolled in school, finding decent and productive work, and maintaining a healthy lifestyle all present very real challenges to a large proportion of youth.

**Sex of respondents**

The distribution of respondents by sex in Table 2 further reveals that more than half (54.9%) of the

respondents were male while 45.1% were female. This is not unconnected to the facts that male are the breadwinners and in that consciousness will like to live up to expectation as the breadwinners of their families thereby engage in livelihood enhancing activities. This is consistent with the findings of Adofu, Orebiyi and Otitolaiye (2012), that men are the breadwinners and as such are more likely to engage in income-generating activities.

**Marital status of respondents**

The marital status of respondents as revealed in Table 2 shows that half of the respondents (50.4%) were married. This suggests that marriage is a cherished practice in the study areas. It further explains that most of the sampled respondents were with responsibilities which could trigger their search for opportunities such as offered by NDE to improve their status.

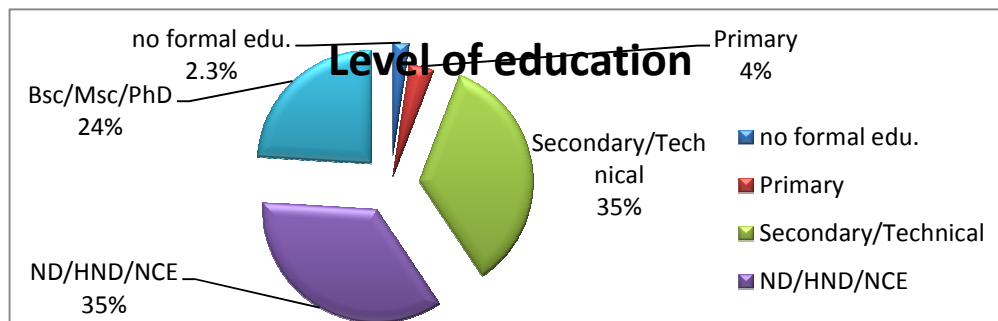
**Table 2: Distribution of respondents by personal characteristics**

| Variables             | Participants<br>F(%) | Non Participants<br>F(%) | Total<br>F(%) | Mean           |
|-----------------------|----------------------|--------------------------|---------------|----------------|
| <b>Age</b>            |                      |                          |               |                |
| 17-22 years           | 20 (8.2)             | 22 (14.2)                | 42 (10.5)     | 30.7±6.1 years |
| 23-28 years           | 69 (28.3)            | 43 (27.7)                | 112 (28.1)    |                |
| 29-34 years           | 77(31.6)             | 46(29.7)                 | 123(30.8)     |                |
| 35-40 years           | 78(32.0)             | 44(28.4)                 | 122(30.6)     |                |
| <b>Sex</b>            |                      |                          |               |                |
| Male                  | 120(49.2)            | 99(63.9)                 | 219(54.9)     |                |
| Female                | 124(50.8)            | 56(36.1)                 | 180(45.1)     |                |
| <b>Marital Status</b> |                      |                          |               |                |
| Single                | 111(45.5)            | 75(48.4)                 | 186(46.6)     |                |
| Married               | 121(49.6)            | 80(51.6)                 | 201(50.4)     |                |
| Divorced              | 10(4.1)              | 0(0.0)                   | 10(2.5)       |                |
| Widowed               | 2(8.0)               | 0(0.0)                   | 2(0.5)        |                |
| Total                 | 244(100.0)           | 155(100.0)               | 399(100.0)    |                |

**Educational attainment of respondents**

Almost all respondents (93.5%) had post primary education (i.e. SSCE ND/BSC/MSc/PhD) as reflected on Figure 1 while few respondents (2.3%) had no formal education. The implication is that majority of

the respondents had the basic formal education that will help them to functionally participate in educational activities including skill acquisition such as provided by NDE. Furthermore, 24.0% of the respondents had B.Sc, M.Sc, and Ph.D certificates.



Source: Field survey, 2015

**Figure 1: Pie chart distribution of respondents' level of education**

**Source of income before participating in NDE activities**

The result in Table 3 shows that 23.8% of the participants had no job before participating in NDE programme while some (8.6%) were engaged in

series of odd jobs like lotto services, sales of recharge cards and the likes. This affirms the report of Chigunta (2002) that the unemployed youths survive by engaging in various activities such as petty trading, casual work, borrowing, prostitution, touting and other illegal activities.

**Table 3: Distribution of respondents according to source of income before participating in NDE**

| Occupation                                 | Frequency | Percentage |
|--|-----------|------------|
| None                                       | 58        | 23.8       |
| Odd jobs (lotto, R.card, dry cleaning etc) | 21        | 8.6        |
| Farming(crop+livestock)                    | 40        | 16.4       |
| Trading/business/marketing                 | 50        | 20.5       |
| Vocational trade                           | 35        | 14.3       |
| Commercial motorcycling                    | 10        | 4.1        |
| Salary job                                 | 30        | 12.3       |
| Total                                      | 244       | 100.0      |

Source: Field survey, 2015

**Income of respondents**

The result on Table 4 shows the income distribution of respondents. Mean monthly income of participants was ₦28,049.18 while that of non-participants was ₦21,323.23. A little above half (51.6%) of the respondents earned between ₦4,000 and ₦29,967 in a month (participants 43.6%, non-participants (65.2%). The result points to the fact that

a larger percentage of participants had higher earnings than non-participants which is expected to have a positive impact on their poverty status. The training received from NDE may have contributed to the high earnings of the participants, also diversification into other livelihoods by participants could have opened up double sources of income.

**Table 4: Categorization of respondents by income**

| Income (₦)        | Participants | Non-participants | Total     |
|-------------------|--------------|------------------|-----------|
| 4,000 - 29,967    | 105(43.0)    | 101(65.2)        | 206(51.6) |
| 29,968 - 59,935   | 82(33.6)     | 29(18.7)         | 111(27.8) |
| 59,936 -89,903    | 37(15.2)     | 16(10.3)         | 53(13.3)  |
| 89,904 – 119,871  | 15(6.1)      | 5(3.2)           | 20(5.0)   |
| 119,872 - 149,839 | 4(1.6)       | 1(0.6)           | 5(1.3)    |
| 149,840 - 179,807 | 1(0.4)       | 2(1.3)           | 3(0.8)    |
| 209,775 - 220,000 | 0(0.0)       | 1(.6)            | 1(0.3)    |
| Mean              | 28,049.2     | 21,323.2         | 21,831.7  |
| Std.Dev           | 18,266.6     |                  |           |

Source: Field survey, 2015 (figures in parentheses are percentages)

**Respondents' occupation**

Means of livelihood is one of the major components to determine youth poverty as it serves as the means of survival/source of income. Table 5 shows that respondents were engaged in the following activities as their sources of income; petty trading (23.3%), vocational trades (22.1%), civil servants (16.3%), farming (22.6%), processing

(4.5%). However, 3.3% and 23.9 % of the participants and non-participants had no source of income respectively. The result is an indication that young people also strive to ensure they have at least a source of money flow to make ends meet, although it may not be sufficient to acquire material possession but may take care of certain basic needs.

**Table 5: Distribution of respondents according to occupation**

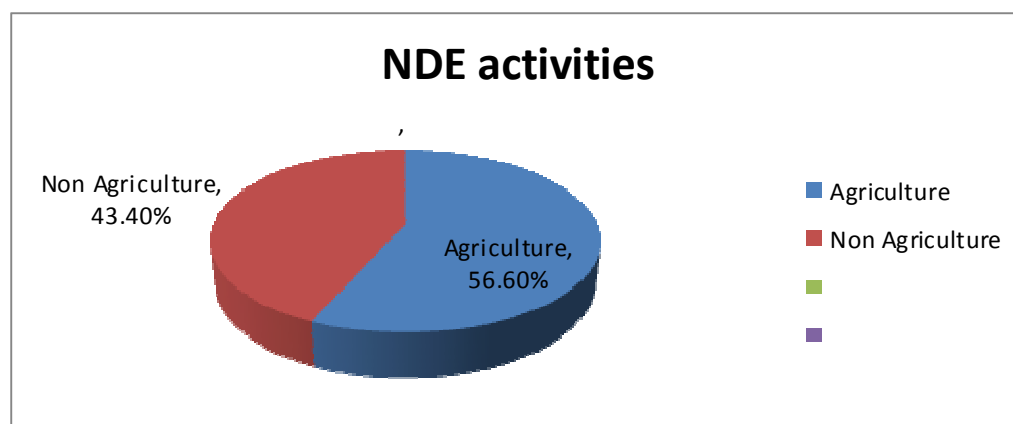
| Occupation   | Participants      | Non Participants  | Total             |
|--|-------------------|-------------------|-------------------|
| Petty trading  | 56 (23.0)         | 37 (23.9)         | 93(23.3)          |
| Vocational trades e.g. barbing tailoring, aluminium etc. | 73(29.9)          | 15(9.7)           | 88(22.1)          |
| Civil servants   | 24(9.8)           | 41(26.5)          | 65(16.3)          |
| Farming  | 78(32.0)          | 12(7.7)           | 90(22.6)          |
| Processing   | 5(2.0)            | 13(8.4)           | 18(4.5)           |
| No job   | 8(3.3)            | 37(23.9)          | 45(11.3)          |
| <b>Total</b>   | <b>244(100.0)</b> | <b>155(100.0)</b> | <b>399(100.0)</b> |

Source: Field survey, 2015 (figures in parentheses are percentages)

### NDE activities

The distribution of respondents according to Figure 11 reveals that 56.6% of the participants participated in agricultural training (poultry keeping, grasscutter, fish production, crop farming etc) activities of NDE while 43.4% participated in non agricultural training (hairdressing, tailoring, buying and selling, aluminium production etc). The call for

youth involvement in agriculture is generating positive response as reflected by the finding. The implication is that provided there is conducive environment for agriculture to thrive there is tendency for youth to be more involved in agriculture thus, leading to youth poverty reduction, improvement of the country's economy and ensuring food security.



Source: Field survey, 2015

Fig. 11: Pie chart distribution of NDE activities by participants

### Distribution of respondents by other poverty alleviation programmes

As reflected in Table 6, about 91.0% (91.4% participants and 90.3% non-participants) of respondents did not benefit from other poverty alleviation programmes. However, 4.0% (4.9% participants and 2.6% non-participants) of the respondents benefitted from NAPEP, 1.3% (1.6%

participants and 2.6% non-participants) benefitted from YES while a little percentage also benefitted from both GES and Fadama. The benefits received by some of the respondents from other poverty alleviation programmes are capable of positioning them as better off than others that benefitted only from NDE.

**Table 6: Distribution of respondents by other poverty alleviation programmes**

| Programme | Participants | Non-participants | Total     |
|-----------|--------------|------------------|-----------|
| None      | 223(91.4)    | 140(90.3)        | 363(91.0) |
| NAPEP     | 12(4.9)      | 4(2.6)           | 16(4.0)   |
| YES       | 4(1.6)       | 4(2.6)           | 5(1.3)    |
| GES       | 5(2.0)       | 5(3.2)           | 10(2.6)   |
| Fadama    | 0(0.0)       | 1(0.6)           | 1(0.3)    |

|              |                   |                   |                   |
|--------------|-------------------|-------------------|-------------------|
| <b>Total</b> | <b>244(100.0)</b> | <b>155(100.0)</b> | <b>399(100.0)</b> |
|--------------|-------------------|-------------------|-------------------|

Source: Field survey, 2015

### Knowledge of NDE by youth

Distribution of knowledge of respondents on NDE activities in Table 7 reveals that 85.2% of participants had high knowledge of NDE activities while 70.8% of non-participants had low knowledge of the programme. A plausible reason for this could

be attributed to the counselling services the participants were exposed to before participation in the programme. However the low knowledge on the path of non-participants may account for their non-participation.

**Table 7: Distribution of youth by knowledge of NDE programme**

| Knowledge   | Participants |         | Non Participants |         | Total N =399 |         |
|-------------|--------------|---------|------------------|---------|--------------|---------|
|             | Frequency    | Percent | Frequency        | Percent | Frequency    | Percent |
| High (9-11) | 208          | 85.2    | 46               | 29.7    | 253          | 63.4    |
| Low (1-8)   | 36           | 14.8    | 109              | 70.3    | 146          | 36.6    |
| Mean = 8 ±2 |              |         |                  |         |              |         |

Source: Field survey, 2015

### Challenges faced by participants

In government programmes such as NDE there are anticipated challenges. As reflected in Table 8, insufficient funds (1.60) ranked the greatest challenge faced in participation, closely followed by late disbursement of funds (1.50) which could delay the startup of skills learnt. Umoh (2012) asserted that factors which include inadequate funding and delayed release of funds from the federation account,

managerial deficiency, policy distortions and corruption impaired the effectiveness of the NDE programmes. Inadequate resettlement package (1.40) ranked 3<sup>rd</sup> while inadequate modern equipment (1.33) ranked 4<sup>th</sup> of the challenges ascertained by the participants. Other challenges acknowledged were; insufficient items (1.29), unfulfilled promise (1.27), and inadequate supervision (0.89).

**Table 8: Distribution of participants by challenges faced**

| Challenges                  | Not a Challenge<br>F (%) | Mild challenge<br>F (%) | Serious challenge<br>F (%) | Mean | Rank            |
|-----------------------------|--------------------------|-------------------------|----------------------------|------|-----------------|
| Late disbursement           | 44 (18.0)                | 45 (18.4)               | 155 (63.5)                 | 1.45 | 2 <sup>nd</sup> |
| Insufficient funds          | 25 (10.2)                | 58 (23.8)               | 161 (66.0)                 | 1.55 | 1 <sup>st</sup> |
| Inadequate modern equipment | 44 (18.0)                | 75 (30.7)               | 125 (51.2)                 | 1.33 | 4 <sup>th</sup> |
| Unfulfilled promise         | 60 (24.6)                | 58 (23.8)               | 126 (51.6)                 | 1.27 | 6 <sup>th</sup> |
| Insufficient items          | 45 (18.4)                | 83 (34.0)               | 116 (47.5)                 | 1.29 | 5 <sup>th</sup> |
| Poor supervision            | 91 (37.3)                | 88 (36.1)               | 65 (26.6)                  | 0.89 | 8 <sup>th</sup> |
| Inadequate package          | 43 (17.6)                | 64 (26.2)               | 137 (56.1)                 | 1.38 | 3 <sup>rd</sup> |
| Unfriendly trainers         | 85 (34.8)                | 87 (35.7)               | 72 (29.5)                  | 0.94 | 7 <sup>th</sup> |

Source: Field survey, 2015

### Benefits derived by participants

As shown in Table 9 technical skill (1.09) ranked highest as the benefit derived from participating in NDE, closely followed by social interaction (1.06) and business idea (1.06) which ranked 2<sup>nd</sup>. Food

security (1.02) ranked 4<sup>th</sup> while Credit acquisition (0.75) ranked 5<sup>th</sup>. Other benefits derived as indicated by the participants include; marketing skill (0.73) durable inputs (0.48) and basic inputs for start-up (0.46).

**Table 9: Distribution of participants by benefits derived**

| Benefits                                  | Not at all | Moderate   | Large extent | Mean | Rank            |
|---|------------|------------|--------------|------|-----------------|
| Food security                             | 52 (21.3)  | 136 (55.7) | 56 (23.0)    | 1.02 | 4 <sup>th</sup> |
| Credit acquisition opportunities          | 107 (44.0) | 83 (34.0)  | 50 (22.0)    | 0.75 | 5 <sup>th</sup> |
| Durable inputs (Clippers, Sewing machine) | 155 (63.5) | 54 (22.1)  | 35 (14.4)    | 0.48 | 8 <sup>th</sup> |

| Benefits                      | Not at all | Moderate   | Large extent | Mean | Rank            |
|-------------------------------|------------|------------|--------------|------|-----------------|
| Self-employment opportunities | 148 (60.7) | 54 (22.5)  | 45 (16.8)    | 0.54 | 7 <sup>th</sup> |
| Basic inputs for start up     | 152 (62.3) | 63 (25.8)  | 29 (11.9)    | 0.46 | 9 <sup>th</sup> |
| Marketing skills              | 116 (47.5) | 70 (28.7)  | 58 (23.8)    | 0.73 | 6 <sup>th</sup> |
| Social interaction            | 34 (14.0)  | 157 (64.3) | 53 (21.7)    | 1.06 | 2 <sup>nd</sup> |
| Technical skills              | 41 (16.8)  | 130 (53.3) | 73 (30.0)    | 1.09 | 1 <sup>st</sup> |
| Business ideas                | 44 (18.0)  | 133 (54.5) | 67 (27.5)    | 1.06 | 2 <sup>nd</sup> |

Source: Field survey, 2015

#### Poverty status of respondents

The result of poverty status of both participants and non-participants in Table 10 shows that 27.1% and 21.3% of participants and non-participants respectively were better off than others, this suggests that there were more 'better off' youth among participants than there are among non-participants. Also, 54.4% of respondents fell within average poverty status of which there were more non participants (58.7%) than participants (51.6%) in the

category. However, 20.8% of both participants (21.3%) and non-participants (20.0%) were categorized as poorest of the poor. This shows that the contribution of NDE activities to youth poverty status is low as there is no distinct difference in the percentage of youth that fall within the three categories among participants and non-participants. This could be attributed to the shortfall in annual budgetary allocations for the execution of employment programmes in recent years.

**Table 10: Categorization of respondents by poverty status**

| Respondents                   | Participants | Non participants | Total     |
|-------------------------------|--------------|------------------|-----------|
| Better off(0.18-0.53)         | 66(27.1)     | 33(21.3)         | 99(24.8)  |
| Average (0.54-0.72)           | 126(51.6)    | 91(58.7)         | 217(54.4) |
| Poorest of the poor (.73-.91) | 52(21.3)     | 31(20.0)         | 83(20.8)  |

\*Percentage in parenthesis

Source: Field survey, 2015

#### Hypotheses testing

H<sub>01</sub>: There is no significant difference in poverty status of participants and non-participants in NDE's activities.

According to the results in Table 11, no significant difference ( $t=1.95$ ;  $p>0.05$ ) exists in poverty status of participants and non-participants. This suggests that the contribution of NDE is not sufficient to make a considerable change in the

poverty status of participants. Inadequate funding situation of NDE may have prevented the Directorate from creating maximum impact on poverty status of youth. Alternatively, the current enlightenment on the need for youth empowerment and self-reliance may have encouraged some of the non-participants to engage in entrepreneurial activities capable of improving their poverty status thereby providing almost the same leverage as that of the participants in NDE activities.

**Table 11: Test of difference in poverty status in participants and non participants in NDE activities**

| Variable         | Mean   | Df  | T    | p-value |
|------------------|--------|-----|------|---------|
| Participants     | 0.5478 | 399 | 1.95 | 0.24    |
| Non-participants | 0.5512 |     |      |         |

H<sub>02</sub>: There is no significant difference in the poverty status of agricultural and non-agricultural training participants in NDE activities.

The result in Table 12 indicates that there was a significant difference ( $t=15.08$ ;  $p<0.00$ ) in the poverty status of participants in agricultural and non-agricultural training. This suggests that participants in agricultural training were less poor than non-

agricultural participants. This affirms the fact that agriculture is indeed the mainstay of the economy. As observed by Olokundun, Falola and Ibidunni (2014), the prominence of agriculture is reflected in its capacity to boost economic growth and development and its ability to feed the growing population, facilitate industrialization and generate employment opportunities particularly for the youths consequently improving their poverty status.

**Table 12 : Test of difference in poverty status of agricultural and non-agricultural training participants in NDE activities**

| Variable               | Mean  | Df  | T     | p-value | Decision |
|------------------------|-------|-----|-------|---------|----------|
| Agric participants     | 0.512 | 242 | 15.08 | 0.01    | Reject   |
| Non Agric participants | 0.595 |     |       |         |          |

### CONCLUSION AND RECOMMENDATION

The study assessed the effect of NDE on youth poverty status. It was concluded that the contribution of NDE activities slightly impacted on poverty status of youth. It is obvious that both categories of respondents had similar personal characteristics, they were young, educated, married with means of livelihood. The knowledge of participants of NDE programme and their attitude towards the programme was expectedly high. Also, the poverty status of a participant in agricultural training was better off than that of participants in non- agricultural training. Furthermore, participants engage in NDE activities due to personal interest and to have a means of livelihood. The benefit derived from participation was low.

It was recommended that the pattern of administering the programme, particularly the disbursement of training funds should be validated and reviewed on a continuous basis.

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**Gender disparity in academic performance of students in the Faculty of Agriculture and Forestry, University of Ibadan, Oyo State**  
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**Abstract:** Gender disparity in schooling is observed among younger population in which men perform better than women in certain settings while women outperform men in other settings. This study examined gender disparity in academic performance among students in Faculty of Agriculture and Forestry, University of Ibadan. One hundred and fifty respondents were randomly selected from 200, 300 and 400 levels and structured questionnaire was used for data collection. Data were analysed using descriptive statistics such as frequencies and percentages while T-test was employed for inferential statistics. Results showed that majority of the respondents were within the active age of 18-26 years (88.0%), single (86.7%) and were from monogamous family (71.3%). Conduciveness of learning environment (0.44) and parental/guardian attention (0.44) were considered by both male and female students respectively as the major factors that affect academic performance. About 45.0% of male students and 53.2% of female students had positive attitude to education (53.2%) and larger percentage of female students were in 2<sup>nd</sup> class upper division (48.1%). Furthermore, there was a significant difference in the academic performance of male (3.9863) and female (4.5870) students ( $t=6.049$ ,  $p=0.015$ ). The study concluded that female students perform academically better than their male counterparts. Male students should be given optimum attention in gender mainstreaming advocacy.

**Keywords:** Academic performance, gender differences, gender roles, gender mainstreaming, academic performance factors

**INTRODUCTION**

Gender in common usage refers to the sexual distribution between male and female. Social scientists however refer to the term as a social construction rather than a biological phenomenon (Leonard, Benjamin and Sagary, 2011). Gender differences have become on the hotlist of critical issues around the world. Although, Hausmann *et al* (2009) reported that there is no country in the world that has yet reached equality between women and men in different critical areas such as economic participation or education. Many years ago, people believed it was not “healthy” for women to receive education. Specifically, doctors warned that education redirected blood, initially destined for the ovaries to the brain. The result is that educated women would be less likely to reproduce and more likely to go insane (Sadler, 1999). This particular belief kept many women far from education in the past until around the middle of the twentieth century, when gender differences in intellectual abilities were considered natural or inherently dependent on biological sex differences (Sadler, Sadler and Klein, 1991).

While we see males dealing with complex and difficult tasks of life matters inside and outside the house, we see, on the other hand, girls handling the relatively easy and less demanding tasks or things at home. One of the most important differences observed is that while the male member is allowed to perform several activities concerning the family, female member is restricted from engaging in same chores. For example, parents allow the male member to participate in decision making, and to make little contributions to the house work but females are prevented from participating in decision making; nevertheless, they take the load of home chores. Furthermore, Al-bedour (2004) reported that the status of the mother and the father, the type of work they have, the age and level of education of

parents, and the income of the family, in addition to the number of family members are all reasons that affect the male or female to pursue university education.

Education is one of the social factors where gender disparity is reflected. In earlier days, and especially in traditional African systems, informal education tended to separate girls from boys as the knowledge, skills and values given were extremely sex stereotyped. This trend continued even when education became more formalised, structured and comprehensive. Education of the boy child was given greater importance than that of girls. Although there was a gradual extension of education to the girl child, girls were taught separately from boys, resulting in a predominance of single-sex schools (Al-bedour, 2004). The co-opting of girls into boys schools was adopted over time due to civil pressure and advocacy for the recognition of equal rights of the girl child in education. Although co-education became a normal system in education structures, it aroused intense interest among not only educators but also the public at large (Knight, 1999).

Gender differences in academic achievement have been among the contemporary issues in the current academic debate all over the world (Abdu-Raheem, 2012). In Nigeria, great strides have been made towards achieving gender mainstreaming in education over the past years. This is reflected in the introduction of gender mainstreaming offices in some institutions such that there is increased awareness on gender issues. Although, the common traditional stereotypical beliefs about women performance are that women seem to work less hard than men, and that female students achieve lower scores in school stages in general, and high school in particular, and that girls who fail at school usually get married at early ages. Research has also shown that men perform better than women in certain settings, while women outperform men in other settings (Voyer and

Voyer 2014; Farooq *et al* 2011; Udida *et al*, 2012; and Oluwagbohunmi, 2014). However, Hartley and Sutton (2013) reported that boys develop gender stereotypes where girls are perceived as academically superior with regard to motivation, performance and self-regulation. As a consequence more girls achieve the general qualification for university entrance.

Nevertheless, an understanding of the nature and determinants of gender differences in academic performance is important in itself and because of the fact that educational attainment has an impact on labour market outcomes. Gender differences in labour market outcomes also reflect differences between men and women in the earnings-related attributes they bring to the labour market, including differences in educational achievement. There is evidence, that not only degree but also degree classification impacts on earnings. The study therefore examined the gender dimension to academic performance among students of Faculty of Agricultural and Forestry University of Ibadan with the aim of examining the factors that determine academic performance of male and female students, their attitude towards education and their academic performance.

Hypotheses of the study are stated as follows;

H<sub>0</sub>1: There is no significant difference in academic performance of male and female students in the faculty of agriculture and forestry university of Ibadan.

## METHODOLOGY

The population of the study consisted of 200, 300 and 400 level students of the Faculty of Agriculture and Forestry, University of Ibadan. Multi-stage sampling was used to select respondents for the study. Simple random sampling was used to select five departments out of eight departments in the Faculty of Agriculture and Forestry, University of Ibadan. The lists of 200 to 400 level students in each department were obtained and simple random sampling was used to select ten 10% of male and female students from each level in each department to give a total of 150 respondents comprising 73 male and 77 female students. Data were collected with the use of questionnaires and were analyzed using descriptive and inferential statistics such as frequencies, percentages and T-test. Attitude of respondents towards education was measured using 5-point likert-type scale of strongly agree (SA), agreed (A), undecided (U), disagreed (D) and strongly disagree (SD). This was scored 5, 4, 3, 2, 1 respectively for positive statements and the reverse was scored for negative statements. Also, composite mean of the statements was determined and was used to categorize attitude into positive and negative attitude. Factors that determined academic performance was

measured by asking respondents to indicate with yes or no to the factors that contribute to their academic performance. A score of 1 and 0 were assigned respectively to the responses. The Cumulative Grade Point Average (CGPA) of male and female students was obtained to ascertain their academic performance on gender basis.

## RESULTS

### Personal characteristics of the respondents

Table 1 indicates that 40.7% of the respondents (42.5% male and 38.9% female) were within the age range of 21-23 years, 32.0% (31.5% male and 32.5% female) were between 24-26 years of age, while 1.3% of the respondents (1.4% males and 1.3% females) fell within the age range of 30-32. The mean age was 23 years. As revealed in Table 1, the mean age of 23 years implies that students were in their active year, where they have the capacity to grasp and retain what is being taught which may enhance their academic performance. This is in line with the findings of Dayiolu and Turut-Asik (2004) who stated that younger students in a given class are found to outperform the older counterpart. Age of an individual as it increases usually affects various developmental changes and other areas of human performance. Amuda *et al* (2016) observed that younger students obtain higher grades than older students because of their relative freedom from cares and worries.

As reflected in Table 1, about 61.0 % of female fathers had tertiary education compared to 46.6% of male fathers' respondents. Also, about 37.0% of male respondents' fathers and 26.0% female respondents' father had secondary school education, while (12.0%) (12.3% female and 11.7% male) respondents' father had no formal education. In addition, more than half (58.0%) of the respondents' mothers (54.8% males and 61.0% females) had tertiary education, 24.0% of the respondents' mothers (28.8% male and 19.5% females) had secondary school education, while 12.0% (11.7% female and 12.3% males) had no formal education. This implies more female respondents' fathers and mothers had tertiary education, which may have positive influence on their academic performance. This may be as a result of the parents' knowledge on significance of education. This agrees with the findings of Ozurumba, Briggs, Ebuara and Emanghe (2007) that educational level of the parents has a positive influence on academic performance of children. Better educated parents are likely to provide their children with favourable environment to motivate them to perform well; they visit the school to find out their wards' progress report and assignment records.



**Table 1: Distribution of respondents based on their personal characteristics**

|                                    | Male             | Female           | Mean   | Total(%)           |
|------------------------------------|------------------|------------------|--------|--------------------|
| <b>Age group</b>                   |                  |                  |        |                    |
| 18-20                              | 8(10.9)          | 15(19.5)         | 23 yrs | 23(15.3)           |
| 21-23                              | 31(42.5)         | 30(38.9)         |        | 61(40.7)           |
| 24-26                              | 23(31.5)         | 25(32.5)         |        | 48(32.0)           |
| 27-29                              | 10(13.7)         | 6(7.8)           |        | 16(10.7)           |
| 30-32                              | 1(1.4)           | 1(1.3)           |        | 2(1.3)             |
| <b>Fathers' level of education</b> |                  |                  |        |                    |
| No formal education                | 9(12.3)          | 9(11.7)          |        | 18(12.0)           |
| Primary education                  | 3(4.1)           | 1(1.3)           |        | 4(2.7)             |
| Secondary education                | 27(36.9)         | 20(26.0)         |        | 47(31.3)           |
| Tertiary education                 | 34(46.6)         | 47(61.0)         |        | 81(54.0)           |
| <b>Mothers' level of education</b> |                  |                  |        |                    |
| No formal education                | 9(12.3)          | 9(11.7)          |        | 18(12.0)           |
| Primary education                  | 3(4.1)           | 6(7.8)           |        | 9(6.0)             |
| Secondary education                | 21(28.8)         | 15(19.5)         |        | 36(24.0)           |
| Tertiary education                 | 40(54.8)         | 47(61.0)         |        | 87(58.0)           |
| <b>Total</b>                       | <b>73(100.0)</b> | <b>77(100.0)</b> |        | <b>150 (100.0)</b> |

Source: Field Survey, 2016

Figures in parentheses are percentages

**Marital status**

Figure 1 shows that Majority (89.0%) of the male students were single and 11.0% were married. Among the female students 84.4% were married and 15.6% single.. This suggests that the respondents were not

saddled with many responsibilities that may distract them from their studies or prevent them from performing excellently well. Although Amuda *et al* (2016) reported that marital status does not significantly predict academic performance, rather ones' commitment, belief confidence and self-efficacy.

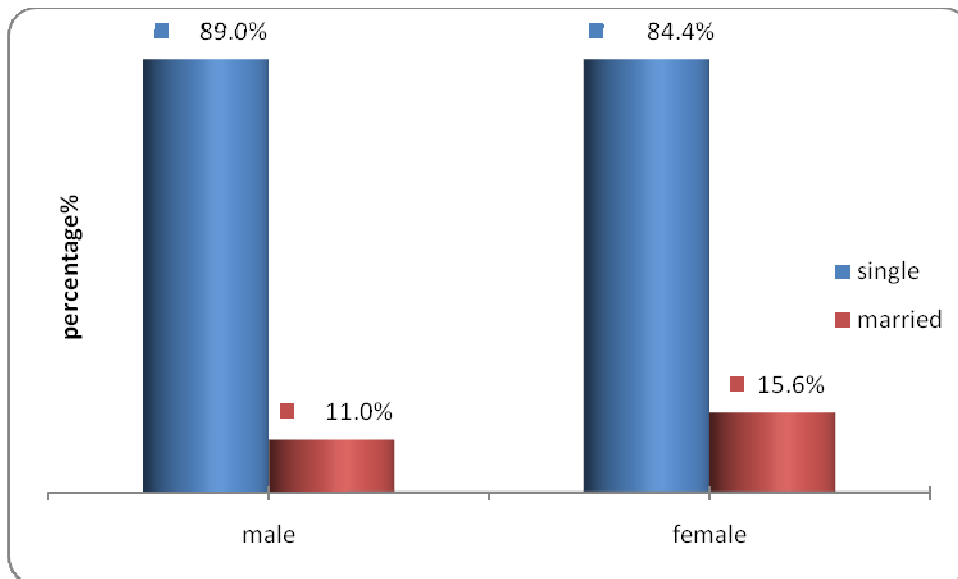


Figure 1: Marital status of Respondents

**Family types**

Figure 2 shows that more female students (72.7%) were from monogamous family compared to 69.9% of male students who were from monogamous family. Also 30.1% male and 27.3% female were from polygamous family. This implies that respondents especially the

female students were from monogamous home compared to the male students which may influence their academic performance since they enjoy attention and support of both parents at the same time. This is in tandem with the opinion of Fagan and Churchill (2012) that children with both parents enjoy parental support financially, socially

and receive physical help from their parents. UNICEF (2011) also posited that types of family structure, substantially influence outcomes such as high school drop-out rates as well as academic success, therefore when families are involved in their children's education, children earn higher grades. Furthermore, good academic

performance in monogamous family is a result of no external interferences as found by Nato (2016). Parents in monogamous family were found to offer moral, holistic and basic support as well as motivating their children to excel in their academics.

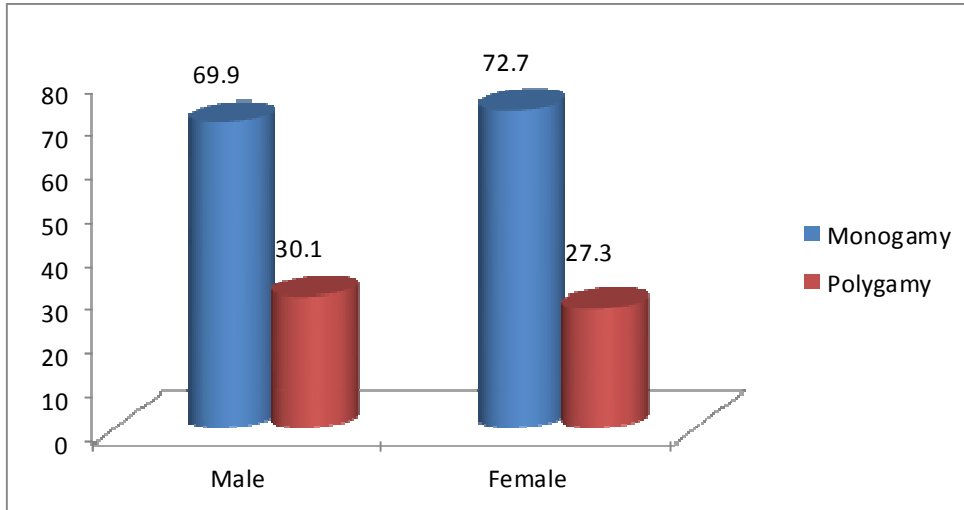


Figure 2: Family types of respondents

#### Respondents' attitude towards education

From the result on Table 2 female students (27.4) appreciate education than trading when compared with their male counterparts (23.3). Also female students (26.4) considered education to be the bedrock of any society more than the male students (24.7). As shown in the result, attending higher institution was not considered a waste of time by female respondents (26.8) as compared with male respondents (24.3). Furthermore, female students' (26.2) assumption that knowledge gained through learning in schools helps to contribute one's quota to the society was high compared to that of male students (24.7).

Furthermore, the result on Table 3 shows that a larger percentage of the female respondents (53.2 %) had

positive attitude towards education while 45.2% male had a positive attitude. According to Guledani (2011), girls and boys have equal opportunities for education, however, disposition towards education could determine the level of interest in schooling and further influence the outcome in terms of performance. The attitude of young boys in recent time has not been satisfying as they express little interest in education and more interest in activities that can produce quick money and this may result in poor academic performance. Furthermore, campaign for girl-child schooling could have resulted in the positive disposition exhibited by the female respondents.

**Table 2a: Distribution of respondents' attitude towards education**

| Attitude Statements  | Male (%)  |           |           |          |          | Mean | Female (%) |          |          |          |          | Mean |
|--|-----------|-----------|-----------|----------|----------|------|------------|----------|----------|----------|----------|------|
|  | SA        | A         | U         | D        | SD       |      | SA         | A        | U        | D        | SD       |      |
| 1. It would have been better for me to learn a trade than come to school   | 8(11.0)   | 5(6.8)    | 10(13.7)  | 19(26.0) | 31(42.5) | 23.3 | 4(5.2)     | 4(5.2)   | 4(5.2)   | 20(26.0) | 45(58.4) | 27.4 |
| 2. When I complete my B.SC I will go into business   | 14 (19.2) | 30 (41.0) | 20(27.4)  | 7(9.6)   | 2(2.7)   | 14.2 | 16(20.8)   | 31(40.3) | 18(23.4) | 6(7.8)   | 6(7.8)   | 15.5 |
| 3. It is a deceit that education is the best legacy  | 13(17.8)  | 12 (16.4) | 10 (13.7) | 19(26.0) | 19(26.0) | 19.8 | 9(11.7)    | 14(18.2) | 2(2.6)   | 18(23.4) | 33(42.9) | 23.3 |
| 4. University education is for those who are highly intelligent  | 24 (32.9) | 21(28.8)  | 9 (12.3)  | 14(19.2) | 5(6.8)   | 14.5 | 25(32.5)   | 34(44.2) | 7(9.0)   | 5(6.5)   | 5(6.5)   | 13.3 |
| 5. Female child is better off in kitchen activities than in classroom  | 4 (5.5)   | 5 (6.8)   | 12(16.4)  | 17(23.3) | 35(48.0) | 24.4 | 4(5.2)     | 5(6.5)   | 2(2.6)   | 29(37.7) | 37(48.1) | 26.8 |
| 6. Education prepares an individual for greater achievement in life.   | 2 (2.7)   | 2(2.7)    | 3(4.1)    | 34(46.6) | 32(43.8) | 10.6 | 4(5.2)     | 5(6.5)   | 2(2.6)   | 29(37.7) | 37(48.1) | 11.8 |
| 7. Agricultural science as a course is meant for male students due to the practical aspect which may be stressful for female students  | 22 (30.1) | 31(42.5)  | 7(9.6)    | 11(15.1) | 2(2.7)   | 13.3 | 27(35.1)   | 29(37.7) | 13(16.9) | 7(9.1)   | 1(1.3)   | 13.1 |
| 8. Knowledge gain through learning in school helps to contribute to ones quota to the society  | 30(41.1)  | 32(43.8)  | 3(4.1)    | 1(1.4)   | 7 (9.6)  | 24.7 | 26(33.8)   | 42(54.5) | 3(3.9)   | 1(1.3)   | 5(6.5)   | 26.2 |
| 9. Female child spends more time in doing domestic work than studying  | 2 (2.7)   | 20(27.4)  | 13(17.8)  | 25(34.2) | 13(17.8) | 16.0 | 6(7.8)     | 14(18.2) | 12(15.6) | 29(37.7) | 16(20.8) | 16.3 |
| 10. Education is the bedrock of any society  | 31(42.5)  | 26(35.6)  | 9(12.3)   | 3 (4.1)  | 4 (5.5)  | 24.7 | 36(46.8)   | 26(33.8) | 8(10.4)  | 4(5.2)   | 1(1.3)   | 26.4 |
| 11. Attending higher institution is a waste of time because, Primary school certificate is sufficient to make someone an important personality in the society as long as you are rich. | 3(4.1)    | 4(5.5)    | 9 (12.3)  | 31(42.5) | 26(35.6) | 24.3 | 1(1.3)     | 6(7.8)   | 8(10.4)  | 26(33.8) | 36(46.8) | 26.8 |
| 12. Our classrooms are conducive enough to motivate learning.  | 3(4.1)    | 21 (28.8) | 13(17.8)  | 24(32.9) | 12(16.4) | 12.0 | 7(9.1)     | 15(19.5) | 10(13.0) | 23(29.9) | 22(28.6) | 11.3 |

**Table 2b: Distribution of attitude of students to education**

| Attitude         | Male |       | Female |       |
|------------------|------|-------|--------|-------|
|                  | F    | %     | F      | %     |
| Negative (46-61) | 40   | 54.8  | 36     | 46.8  |
| Positive (62-84) | 33   | 45.2  | 41     | 53.2  |
| Total            | 73   | 100.0 | 77     | 100.0 |

Source: Field Survey, 2016

**Factors affecting academic performance**

Table 3 reveals that conduciveness of learning environment (0.44) ranked 1<sup>st</sup> of the factors that affect the academic performance of male respondents, childhood training and experience (0.42) ranked 2<sup>nd</sup> while the quality of education obtained and parental attention (0.41) ranked 3<sup>rd</sup>. However, parental attention (0.44) ranked most important factor that influence academic performance of female students, followed by conduciveness of environment (0.43) and childhood training and experience which ranked 2<sup>nd</sup> important factor. The two groups considered engaging in vocational activities (0.27) as the least factor that affect their performance in school so also preference of other siblings by parents. Conducive learning environment can play a

significant role in student's performance. Classroom arrangement, cleanliness, adequate teaching facilities, bright lights can enhance learning experience and improve students' achievement. Moreover, female gender generally tends to adapt to any given condition than the male gender. In addition, parental influence has been identified as an important factor affecting student achievement. The most prominent parental involvement components according to Cabus and Aries (2017) were communication between parents and children regarding school. As reported by Muller (1998) mothers show more involvement in academic issues of their children as compared to fathers. However, fathers show more participation in academics of their male child as compared to female.

**Table 3: Distribution of respondents according to factors that affect academic performance**

| FACTORS  | Male      | Mean | Rank            | Female   | Mean | Rank            | Total     |
|--|-----------|------|-----------------|----------|------|-----------------|-----------|
| Level of truancy   | 55(75.3)  | 0.37 | 4 <sup>th</sup> | 48(62.3) | 0.32 | 7 <sup>th</sup> | 103(68.7) |
| Conduciveness of learning environment  | 66(90.4)  | 0.44 | 1 <sup>st</sup> | 65(84.4) | 0.43 | 2 <sup>nd</sup> | 131(87.3) |
| Family composition(one or two parent family)                                       | 45(61.6)  | 0.30 | 6 <sup>th</sup> | 53(68.8) | 0.35 | 5 <sup>th</sup> | 98(65.3)  |
| Parental level of income   | 54(73.97) | 0.36 | 5 <sup>th</sup> | 53(68.8) | 0.35 | 5 <sup>th</sup> | 107(71.3) |
| Quality of secondary education obtained  | 61(83.6)  | 0.41 | 3 <sup>rd</sup> | 64(83.1) | 0.42 | 4 <sup>th</sup> | 125(83.4) |
| Childhood training and experience  | 64(87.7)  | 0.42 | 2 <sup>nd</sup> | 65(84.4) | 0.43 | 2 <sup>nd</sup> | 129(86.0) |
| Involvement in extra curricula activities (e.g. church mosque or sport activities) | 45(61.64) | 0.30 | 6 <sup>th</sup> | 41(53.2) | 0.27 | 9 <sup>th</sup> | 86(57.3)  |
| Parental/guardian attention  | 61(83.67) | 0.41 | 3 <sup>rd</sup> | 66(85.7) | 0.44 | 1 <sup>st</sup> | 127(84.7) |
| Engage in vocational activities  | 40(54.8)  | 0.27 | 9 <sup>th</sup> | 41(53.2) | 0.27 | 9 <sup>th</sup> | 81(54.0)  |
| Preference of other siblings by parent   | 42(57.5)  | 0.28 | 8 <sup>th</sup> | 44(57.1) | 0.29 | 8 <sup>th</sup> | 86(57.3)  |

Source: Field survey, 2016

**Respondents CGPA**

The Table 4 below reveals that there were more male (6.8%) in the 1<sup>st</sup> class category than female (6.5%); however, a larger percentage of female respondents (48.1%) were within the 2<sup>nd</sup> class upper category compared to the male respondents (28.8%) in the same category. Furthermore, 45.3% of the respondents (49.3% male and 41.6% female) were on

2<sup>nd</sup> class lower while 9.3 % of the respondent (15.1% male and 3.9% female) were on 3<sup>rd</sup> class. This implies that a little percentage of both male and female were on first class, although there were more male respondents than female respondents, however, there were more female students on 2<sup>nd</sup> class upper grade compared with male students. This suggests that female students were better positioned academically

than their male counterparts, less distraction and girl child advocacy may be responsible for this. This is in tandem with the findings of Amuda, Domiya and

Durkwa (2016) which revealed that girls tend to perform equally with boys and sometimes better.

**Table 4: Distribution of respondents according to CGPA**

| CGPA                                  | Male Frequency (%) | Female Frequency (%) | Total Frequency (%) |
|---------------------------------------|--------------------|----------------------|---------------------|
| Pass (1.0-1.5)                        | 0 (0.0)            | 0 (0.0)              | 0 (0.0)             |
| 3 <sup>rd</sup> class (1.6-2.5)       | 11 (15.1)          | 3 (3.9)              | 14 (9.3)            |
| 2 <sup>nd</sup> class lower (2.6-4.5) | 36 (49.3)          | 32 (41.6)            | 68 (45.3)           |
| 2 <sup>nd</sup> class upper (4.6-5.9) | 21 (28.8)          | 37 (48.1)            | 58 (38.7)           |
| 1 <sup>st</sup> class (6.0 and above) | 5 (6.8)            | 5 (6.5)              | 10 (6.7)            |

**Hypothesis of the study**

**There is no significant difference in the academic performance of male and female students.**

The result in Table 5 reveals a significant difference in the academic performance of male and female students ( $t=6.049$ ,  $p=0.015$ ) in the study area.

**Table 5 Significant difference in the academic performance of male and female students**

| Sex    | df | Mean   | Mean difference | t-value | p-value | Decision | Remark |
|--------|----|--------|-----------------|---------|---------|----------|--------|
| Male   | 73 | 3.9863 | -0.60071        | 6.049   | 0.015   | S        | Accept |
| Female | 77 | 4.5870 |                 |         |         |          |        |

The result in Table 5 affirms that female students perform better academically than male students with female students having higher mean score than their male counterparts. Thus the null hypothesis is accepted. This may be as a result of female ability to work harder, attend class more frequently and possession of better study skill than their male counterparts (Leonard and Jiang, 1999; Wainer and Steinberg (199). A similar result was reported by Farooq *et al.* (2011) and Voyer and Voyer (2014) in which female students performed significantly better than their male counterparts. However, the result disagreed with the findings of Awofala(2012), Udida *et al.* (2012) and Oluwagbohunmi (2014).

**CONCLUSION AND RECOMMENDATION**

Based on the findings of the study, it can be concluded that majority of the respondents were within their active and receptive age. More female students were from monogamous family having fathers and mothers with formal education. Male respondents considered conduciveness of the learning environment as the most important factor that affects academic performance while, parental/guidance attention was the major factor that influence the academic performance of female respondents in the study area. Also, female students had positive attitude to education compared to male students. A larger percentage of male students were on 2<sup>nd</sup> class lower grade while more female students were on 2<sup>nd</sup> class upper grade. Female students

perform significantly better than male students in the study area.

From the findings of the study the following recommendations were made;

1. Male students should be accorded adequate attention in gender mainstreaming activities.
2. There should be a forum of parent-lecturer interaction to check students' performance.
3. Conduciveness of learning environment should be considered a priority in learning institutions.

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## Linear Approximate Almost Ideal Demand System of Food Consumers Behaviour towards Price and Income in South-eastern Nigeria

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**Abstract:** A common approach in demand analysis using Linear Approximate/Almost Ideal Demand System (LA/AIDS) is to treat expenditure shares as constant parameters in the Stone's price index when taking derivatives for elasticities. This makes such estimation error-prone for the household price- and income-policy trust. To avoid such problems, this study estimated the conditional price- and income-elasticities in South-eastern Nigeria taking into account the price effects on the budget shares in the Stone geometric price index. Data collected from 710 household were subjected to the LA/AIDS model. The results showed that the food items were normal goods with necessities, luxuries and complements while some had independent relationship in the study area. The compensated own-price elasticities were positive and greater than their corresponding uncompensated own-price elasticities. The food commodities were price inelastic with the substitution-effect of a price-change of the food commodities outweighing the income-effect. Increasing the prices of food commodities in south-eastern Nigeria more than proportionately increase the substitution-effect in such a way that food commodities that were complements before a price-change become substitute after the price change. Policy interventions that can help to stabilize food price would be a more effective tool to overcome possible interchanging nature of food commodities from being substitutes to being complements in south-eastern part of Nigeria.

**Keywords:** LA/AIDS, elasticities, foods, complements, substitutes.

### INTRODUCTION

As there are wide disparities between cities of the developing world, so is reference to an "average" Nigerian consumer misleading. Empirical evidence on the behaviour of food consumers is useful for price- and income-based policies on food demand. A fairly extensive literature on the estimation of food consumer demand systems in Nigeria exist (Amao, *et al.*, 2006; Kudiet *et al.*, 2008; Tsegai and Kormawa, 2002; Ogunniyi, Ajiboye and Sanusi, 2012; Phillip, Shittu and Ashaolu, 2013; Ojogho and Alufohai, 2010; Adetunji and Rauf, 2010; Dalhatu and Ala, 2010; Ezedinma, Kormawa and Chianu, 2000; Yusuf, 2012). The effects of prices and consumer income on food consumption, as expressed in terms of the properties of Marshallian and Hicksian elasticities of demand, have also been studied extensively (Huang and Lin, 2000; Seale, Regmi and Bernstein, 2003; Gao, 2012, Capps and Love, 2002; Dhar, Chavas and Gould, 2003; Piggott, 2003; and LaFrance, 2008). With the dramatic structural change in the Nigerian food demand in recent years, the identification of consumer groups having different cultural backgrounds, socioeconomic status, lifestyles and, consequently, different consumer behaviours and needs, is preferred. Although general trends in food consumption patterns have been documented, such analysis underscores serious gaps in our knowledge and understanding of which foods are consumed by which consumer groups, where and why.

Most of the studies that used the Almost Ideal Demand System (AIDS) of Deaton and Muellbauer (1980) due, possibly, to its popularity in the last

decades (Anderson and Blundell, 1983; Blanciforti and Green, 1983; Blanciforti, Green and King, 1986; Chalfant, 1987; Eales and Unnevehr, 1988; Fujii, Khaled and Mak, 1985; Fulponi, Heien and Willett, 1989; Murray, 1984; Parsons, 1986; Ray, 1980) have adopted a variety of approaches that may lead to significant errors in computing uncompensated and compensated price elasticities, and income elasticity. Other studies have ignored the fact that the expenditure shares is a function of the Stone geometric price in the Linear Approximate Almost Ideal Demand System (LA/AIDS) (Chalfant, 1987; Fujii, Khaled and Mak, 1985; Udoh, Mbossoh, Udoh and Akpan, 2013; Erhabor and Ojogho, 2011), the studies have rather assumed that either preferences are homothetic, the group price is constant, or that they are independent of individual goods prices (Eales and Unnevehr, 1998). These also carry over directly into the computation of elasticities. The empirical evidence emerging from such studies on food consumer behaviour at the household level, with significant errors in the conditional price- and income-elasticities, are not only inconclusive and contradictory but have not described the actual behaviour of consumers of food commodities. This makes such studies undesirable as a calibration apparatus *a priori*. Consequently, the food demand of the various strata of Nigeria populations deserves more attention than they have been given so far, not only for their implications on food and agriculture planning, but also for determining remedial actions and preventive measures.

This study estimated the complete demand function of the LA/AIDS for food commodities, and examined the conditional uncompensated and compensated price elasticities and income-elasticities in the region. It updates the earlier demand studies beyond estimates of price and expenditure elasticities of different food commodities in Nigeria using derivatives that take into account the effects of price changes on the shares in the price index, a departure from other studies in Nigeria. The results of the study would objectively fortify the confidence of policy analysts on the choice between price- and income-based food policies rather than rely on the subjective, incorrect model assumptions on elasticities estimators for consumer behaviour prediction on food commodities demand in Nigeria given changes in economic parameters.

### METHODOLOGY

The study was carried out in Abia, Anambra and Imo states in the south-eastern zone of Nigeria. The states were chosen because food consumer behavior, to the best of the authors' knowledge, has been rarely studied in the area, except for the segmented food component demand analysis using single equation models. Administratively, the three States are divided into 65 Local Government Areas (LGAs) with 17 in Abia, 21 in Anambra and 27 in Imo State. According to the National Population Commission, (NPC) (2006), the three States represents 14.61% of the Nigeria population. The National Bureau of Statistics, NBS (2011) reported that the average monthly income in the states is between N5000 and N20000 with a poverty incidence of 52.1% in Abia, 45% in Anambra and 50.1% in Imo State, while household expenditure on food are 52.43% in Abia, 51.73% in Anambra and 55.58% in Imo State respectively. The target population for the study was food consuming households in the study area between April 2015 and May 2016. A three-stage sampling procedure was used to select households in the three States. Simple random sampling technique was used in the first stage to select one Local Government Areas (LGAs) from each State. The LGAs were Isuikwuato in Abia State, Ihiala in Anambra State, and Ikeduru in Imo State. The second stage involved another simple random sampling technique to select 2 communities in each LGA from a sampling frame of communities in the respective LGAs. The communities were Imenyi and Ohaise in Isuikwuato LGA of Abia State, Umueze and Ikenga in Ihiala LGA of Anambra State, and Akabo and Okwu in Ikeduru LGA of Imo State. To allow for a representative sample of households for each community, the sample-size estimator as used by Ojogho and Ojo (2017) was used to determine the

sample size for each community. The sample-size estimator is given as:

$$n_i = \frac{Z_{0.025}^2 \frac{e}{N_i} s_i^2}{e^2 + \frac{Z_{0.025}^2 s_i^2}{N_i}} \quad [1]$$

Where  $Z_{0.025} = 1.96$ ,  $s_i^2$  is the income variance of the  $i^{th}$  community,  $N_i$  is the target population of the  $i^{th}$  community and  $e = 0.03$ . A simple random sample of households in each community was then taken from the list of the target population in the region developed from a pilot survey. The sample size were respectively 112 in Imenyi and 96 in Ohaise in Isuikwuato LGA of Abia State, 204 in Umueze and 156 in Ikenga in Ihiala LGA of Anambra State, and 184 in Akabo and 168 in Okwu in Ikeduru LGA of Imo State making up a total of 208 in Abia state, 360 in Anambra state and 352 households in Imo state. Nine hundred and seventy copies of questionnaire were administered but 725 copies of questionnaire were retrieved from the respondents making a response rate of 75%. However, 710 copies of questionnaire were valid for analysis as only data from 7 or more in 10 respondents who consumed food commodities under study were used in the final analysis in order to avoid inclusion of household with zero consumption. The prices of food commodities were measured as the sum of the transactions costs incurred by a household and the retail prices in N/Kg per unit, while the quantity consumed of food commodities by a household was the quantities purchased at market price per Kg.

**Model specification:** To abstract from a completely specified demand system containing the different equation for each of plantain, pepper, beans, yam, rice, potato, tomato, *garri*, meat, fish and *fufu*, the Linear Approximate Almost Ideal Demand System (LA/AIDS) of Blanciforti and Green (1983) was used to model the conditional complete demand system as functions of prices and total expenditure. The model was used on the premise that it provides a first-order approximation to any demand system, it is easily estimated, satisfies the axioms of consumer choice exactly, aggregates perfectly over consumers under certain conditions without imposing any *a priori* restriction on elasticities so that food commodities can be either normal or inferior while a pair of food commodities can be either substitutes or complements to each other (Deaton and Muellbauer, 1980; Alston and Chalfant, 1993 and Eales and Unnevehr, 1994) and the estimated coefficients are easy to interpret (Fulponi, 1989). In contrast to the Almost Ideal Demand System, the LA/AIDS is



commonly linearized by applying Stone geometric price index (Shiptsova, 2004; Piumsombun, 2003; Brosig, 2000). The vector expenditure share equation is given as:

$$w = \alpha + A\bar{P} + \beta \ln\left(\frac{M}{P}\right) \quad [2]$$

Where  $w$  is the vector of budget shares,  $\bar{P}$  is the vector of logarithms of prices,  $P$  is the vector of prices,  $M$  is the total expenditure,  $\alpha$  and  $\beta$  are vector of parameters to be estimated and  $A$  is the matrix of parameters to be estimated. In the empirical estimation, the study directly imposed on the LA/AIDS parameters the usual theoretical restrictions derived from the utility maximisation, consistent with demand theory to ensure integrability of the demand system as used by Moro and Sekokai (2000) and Yuan *et. al* (2009). With  $i$  as unit vector, homogeneity, adding-up and symmetry restrictions were imposed as  $i'\alpha = 1$ ,  $i'A = 0$ ,  $i'\beta = 0$ ,  $A' = A$

The conditional expenditure elasticities were computed as:

$$\eta_{i,x} - 1 = \left(\frac{\beta_i}{\omega_i}\right) \left[1 - \sum_j \omega_j \ln P_j (\eta_{j,x} - 1)\right] \quad [3]$$

which in matrix form is given as  $N = (1 + BC)^{-1}B + \underline{i}$  where  $N$  is n-vector of expenditure elasticities,  $B$  is n-vector of  $\frac{\beta_i}{\omega_i}$ ,  $\underline{i}$  is a unit vector of length n, and  $C'$  is n-vector of  $c_j = \omega_j \ln P_j$

From the 11 commodities, the study estimated 121 simultaneous equations for (Marshallian) uncompensated demand price elasticities given, after some simplification, as:

$$\eta_{ij} = -\delta_{ij} + \frac{\gamma_{ij}}{\omega_i} - \frac{\beta_i}{\omega_i} \left[\omega_j + \sum_k \omega_k \ln P_k (\eta_{kj} + \delta_{kj})\right] \quad [4]$$

Equation [4] was expressed in matrix form as:  $E = [BC + I]^{-1}[A + I] - I$  where the typical

elements are  $a_{ij} = -\delta_{ij} + \frac{\gamma_{ij}}{\omega_i} - \beta_i \frac{\omega_j}{\omega_i}$  in the  $(n \times n)$  matrix  $A$ ;  $b_i = \frac{\beta_i}{\omega_i}$  in the  $(n \times 1)$  vector  $B$ ;  $c_j = \omega_j \ln P_j$  in the  $(1 \times n)$  vector  $C$ ; and  $\eta_{ij}$

in the  $(n \times n)$  matrix  $E$  and  $I$  is an  $(n \times n)$  identity matrix of the Kronecker delta with  $\delta_{ij} = \delta_{jk} = 1$  for  $i = j$  or  $j = k$  and zero otherwise. Several authors have used computing formulas for the LA/AIDS that may be seen as special cases of this result (Chalfant; Fujii, Khaled, and Mak, 1987). The compensated (Hicksian) price elasticities were computed using equation:

$$\eta_{ij}^* = \eta_{ij} + \omega_j \eta_{i,x} \quad [5]$$

Where  $\eta_{ij}^*$  is the Hicksian price elasticity of the  $i^{th}$  food commodity with respect to the  $j^{th}$  food commodity,  $\eta_{ij}$  is the Marshallian price elasticity of the  $i^{th}$  food commodity with respect to the  $j^{th}$  food commodity,  $\omega_j$  is the budget share of the  $j^{th}$  food commodity, and  $\eta_{i,x}$  is the expenditure elasticity of the  $i^{th}$  food commodity. Equation [5] was expressed in matrix forms as  $E^* = E + NW'$  where  $E^*$  is an  $(n \times n)$  matrix with typical elements  $\eta_{ij}^*$ , and  $W$  is an n-vector of share,  $\omega_i$ .

## RESULTS AND DISCUSSION

Table 1 shows the estimated parameters and associated asymptotic errors of the LA/AIDS model. The significance of the vast majority of the price and income effects indicates some degree of sensitivity of the budget shares to prices and income. The own-prices effects of the food items that were significant at 1% level of significance were 0.028, 0.066, 0.060, 0.074, 0.088, and 0.023 for plantain, bean, fish, meat, rice and tomato respectively. They provide the percentage increase in the budget shares for plantain, bean, fish, meat, rice and tomato respectively with an increase in their respective prices. They imply that unit percentage increase in the price of the respective food commodities would increase the budget share by N 0.03, N 0.07, N 0.060, N 0.07, N 0.09, and N 0.02 for plantain, bean, fish, meat, rice and tomato respectively. Unit percentage increase in cross-prices yields decrease in budget shares for about half of most the food items. This implies that some of the food items in the study area were complements as their cross-price effects were negative.

**Table 1: Parameter Estimates of the LA/AIDS Model and the Associated Standard Errors**

|               | <b>Plantain</b><br><b><i>i</i> = 1</b> | <b>Beans</b><br><b><i>i</i> = 2</b> | <b>Fish</b><br><b><i>i</i> = 3</b> | <b><i>Fufu</i></b><br><b><i>i</i> = 4</b> | <b>Meat</b><br><b><i>i</i> = 5</b> | <b>Pepper</b><br><b><i>i</i> = 6</b> | <b>Potato</b><br><b><i>i</i> = 7</b> | <b>Rice</b><br><b><i>i</i> = 8</b> | <b>Tomato</b><br><b><i>i</i> = 9</b> | <b>Yam</b><br><b><i>i</i> = 10</b> | <b><i>Garri</i></b><br><b><i>i</i> = 11</b> |
|---------------|--|-------------------------------------|------------------------------------|---|------------------------------------|--------------------------------------|--------------------------------------|------------------------------------|--------------------------------------|------------------------------------|---|
| $\alpha_i$    | 0.076***<br>(0.024)                    | 0.006<br>(0.030)                    | -0.003<br>(0.035)                  | 0.067**<br>(0.032)                        | -0.058<br>(0.044)                  | 0.035**<br>(0.013)                   | 0.042**<br>(0.018)                   | 0.549***<br>(0.032)                | 0.059**<br>(0.025)                   | 0.031<br>(0.024)                   | 0.197***<br>(0.028)                         |
| $\gamma_{1i}$ | 0.028***<br>(0.006)                    | -0.005<br>(0.006)                   | -0.010<br>(0.006)                  | 0.002<br>(0.005)                          | -0.010*<br>(0.006)                 | -0.0007<br>(0.003)                   | 0.002<br>(0.003)                     | -0.009*<br>(0.005)                 | -0.003<br>(0.005)                    | -0.003<br>(0.004)                  | 0.006<br>(0.008)                            |
| $\gamma_{2i}$ | -0.005<br>(0.006)                      | 0.066***<br>(0.012)                 | 0.005<br>(0.009)                   | -0.002<br>(0.006)                         | -0.006<br>(0.008)                  | -0.003<br>(0.004)                    | -0.010*<br>(0.005)                   | -0.010<br>(0.007)                  | -0.015*<br>(0.008)                   | -0.002<br>(0.005)                  | -0.020**<br>(0.007)                         |
| $\gamma_{3i}$ | -0.010<br>(0.006)                      | 0.005<br>(0.009)                    | 0.060***<br>(0.013)                | -0.011*<br>(0.007)                        | -0.008<br>(0.008)                  | -0.008*<br>(0.004)                   | -0.003<br>(0.005)                    | -0.025***<br>(0.008)               | 0.007<br>(0.007)                     | -0.006<br>(0.006)                  | -0.001<br>(0.007)                           |
| $\gamma_{4i}$ | 0.002<br>(0.005)                       | -0.002<br>(0.006)                   | -0.011*<br>(0.007)                 | -0.012<br>(0.008)                         | 0.002<br>(0.007)                   | 0.006**<br>(0.003)                   | 0.002<br>(0.003)                     | -0.010*<br>(0.006)                 | 0.008*<br>(0.005)                    | 0.004<br>(0.004)                   | 0.011**<br>(0.005)                          |
| $\gamma_{5i}$ | -0.010*<br>(0.006)                     | -0.006<br>(0.008)                   | -0.008<br>(0.008)                  | 0.002<br>(0.007)                          | 0.074***<br>(0.013)                | -0.002<br>(0.003)                    | -0.006<br>(0.004)                    | -0.026***<br>(0.008)               | -0.013**<br>(0.006)                  | 0.001<br>(0.006)                   | -0.007<br>(0.007)                           |
| $\gamma_{6i}$ | -0.0008<br>(0.003)                     | -0.003<br>(0.004)                   | -0.008*<br>(0.004)                 | 0.006**<br>(0.003)                        | -0.002<br>(0.003)                  | 0.004<br>(0.003)                     | 0.0007<br>(0.003)                    | -0.0003<br>(0.003)                 | 0.002<br>(0.004)                     | 0.0006<br>(0.002)                  | 0.0003<br>(0.003)                           |
| $\gamma_{7i}$ | 0.002<br>(0.003)                       | -0.010*<br>(0.005)                  | -0.003<br>(0.005)                  | 0.002<br>(0.003)                          | -0.006<br>(0.004)                  | 0.0007<br>(0.003)                    | 0.005<br>(0.005)                     | 0.002<br>(0.004)                   | -0.004<br>(0.005)                    | 0.004<br>(0.003)                   | 0.008**<br>(0.004)                          |
| $\gamma_{8i}$ | -0.009*<br>(0.005)                     | -0.010<br>(0.007)                   | -0.025***<br>(0.008)               | -0.010*<br>(0.006)                        | -0.026***<br>(0.008)               | -0.0003<br>(0.003)                   | 0.002<br>(0.004)                     | 0.088***<br>(0.009)                | -0.0007<br>(0.006)                   | -0.010*<br>(0.005)                 | 0.002<br>(0.006)                            |
| $\gamma_{9i}$ | -0.003<br>(0.005)                      | -0.015*<br>(0.008)                  | 0.007<br>(0.007)                   | 0.008*<br>(0.005)                         | -0.013**<br>(0.006)                | 0.002<br>(0.004)                     | -0.004<br>(0.005)                    | -0.0007<br>(0.006)                 | 0.023**<br>(0.009)                   | 0.002<br>(0.004)                   | -0.006<br>(0.007)                           |
| $\gamma_{10}$ | -0.003<br>(0.004)                      | -0.0002<br>(0.005)                  | -0.006<br>(0.007)                  | 0.004<br>(0.004)                          | 0.001<br>(0.006)                   | 0.0006<br>(0.002)                    | 0.004<br>(0.003)                     | -0.010**<br>(0.005)                | 0.002<br>(0.004)                     | 0.006<br>(0.005)                   | 7.21E-05<br>(0.005)                         |
| $\gamma_{11}$ | 0.008*<br>(0.005)                      | -0.020**<br>(0.007)                 | -0.001<br>(0.007)                  | 0.011*<br>(0.005)                         | -0.007<br>(0.007)                  | 0.0003<br>(0.003)                    | 0.008**<br>(0.004)                   | 0.002<br>(0.006)                   | -0.006<br>(0.006)                    | 7.21E-05<br>(0.005)                | 0.006<br>(0.008)                            |
| $\beta_i$     | 0.014**<br>(0.005)                     | 0.015**<br>(0.007)                  | 0.020**<br>(0.008)                 | 0.006<br>(0.008)                          | 0.026**<br>(0.010)                 | 0.002<br>(0.003)                     | 0.004<br>(0.004)                     | -0.094***<br>(0.008)               | 0.008<br>(0.005)                     | 0.020***<br>(0.006)                | -0.022***<br>(0.006)                        |
| $\omega_i$    | 0.069                                  | 0.101                               | 0.113                              | 0.064                                     | 0.148                              | 0.034                                | 0.036                                | 0.179                              | 0.072                                | 0.093                              | 0.091                                       |

**Source:** Authors' Computation from Survey, 2016, values in parentheses are standard errors, \*significant at 10%, \*\*significant at 5%, \*\*\*significant at 1% levels of significance

The expenditure coefficients for plantain, bean, fish, meat and yam had non-negative values that were significant at least at 5% while rice and *garri* had negative values that were significant at least at 5%. This implies that plantain, bean, fish, meat and yam are normal goods in the region with budget shares that are positively responsive to conditional food expenditure with real income held constant while rice and *garri* have budget shares that are negatively responsive to conditional food expenditure with real income held constant. With a percentage increase in total food expenditure, the budget share of plantain, bean, fish, meat and yam would increase by ₦0.01, ₦0.02, ₦0.02, ₦0.03 and ₦0.03 respectively while rice and *garri* would decrease in budget shares by ₦0.09 and ₦0.02 respectively. Also, since the expenditure coefficients for rice and *garri* in this study are less than zero, rice and *garri* are necessities.

The results of the uncompensated price elasticities and conditional expenditure elasticities are presented in Table 2. All the uncompensated own-price elasticities are positive and less than unity, except for *fufu* that has uncompensated own-price elasticity greater than one. In terms of own-price elasticity, the demand for plantain, potato and rice were less sensitive to their prices but less than unity implying that they are more necessary in the consumer diet in the region than the other food items. This also applies to bean, fish, meat, pepper, tomato, and *garri*. In terms of own-price elasticity, *fufu* was more sensitive to its own price. As expected, the cross-elasticities are generally lower in absolute terms value than own-price elasticities, implying that consumers were more responsive to changes in own-prices than the price of other food commodities. With cross-price elasticities among some food items close to zero, some of the food items seem to be unrelated as seen with respect to yam and potato. The uncompensated cross-price elasticities were mostly positive, implying high level of sustainability amongst food items, though the level of cross-price sensitivities varies with respect to either food items that are substitute to each other. Amongst the carbohydrate food items, plantain and *fufu*, and plantain and potato, plantain and *garri*, rice and potato, *fufu* and yam, *fufu* and *garri*, potato and *garri* are classified as complements in the region from the results of their cross-price elasticities. Food consumers in the region take *fufu* and yam, *fufu* and

*garri*, potato and *garri* as combination-food items in a meal. The results showed that 1% increase in the prices of yam and *garri* would decrease the quantity demanded of *fufu* by 0.04% and 0.07% respectively while a similar percentage increase in the price of *garri* would decrease the quantity demanded of potato by 0.22%. Amongst the proteinous food items, meat and fish, and beans and meat are substitutes while fish and bean are complements. The implication is that while food consumers take meat or fish, and beans or meat depending on which is cheaper, the consume fish and beans together in a meal. Consumers of fish would increase the quantity demanded of fish by 0.13% for a 1% increase in the price of meat while consumers of meat would increase the quantity demanded of beans by 0.11% for 1% increase in the price of meat. In the category of vegetables, pepper and tomato are complements. Pepper and tomatoes are consumed together in the same meal but 1% increase in the price of tomato would lead to a decrease in the quantity of pepper demanded by 0.05%.

Also, the results of the expenditure elasticities of the food commodities in south-eastern Nigeria are presented in Table 2. Expenditure elasticities,  $\eta_{i,x}$ , are all positive, implying all eleven food categories are normal goods. The expenditure elasticities for rice and *garri* are respectively 0.48 and 0.76, implying that rice and *garri* are necessities while the other food items are luxuries. Thus when household expenditure on food increases, the expenditure shares of plantain, beans, meats, fish, *fufu*, pepper, potato, tomato, and yam would increase more than proportionately the increase in the expenditure on these food commodities while the shares of rice and *garri* would increase proportionately less than the expenditure on rice and *garri*. This also implies that there is weak preference for rice and *garri* demand by households, resulting in less consumption of rice and *garri* by households in the region. However, the importance of the demand for rice and *garri* in the diet of south-east Nigerian food consumers could increase as income-earning capacity of the households improves with *garri* increasing more than rice because the expenditure elasticity of *garri* had a higher elasticity among the food items considered as necessity.

**Table 2: Marshallian (Uncompesated) Price and Expenditure Elasticities**

|              | Plantain | Beans | Fish  | Fufu  | Meat   | Pepper | Potato | Rice  | Tomato | Yam   | Garri |
|--------------|----------|-------|-------|-------|--------|--------|--------|-------|--------|-------|-------|
| Plantain     | 0.63     | 0.11  | 0.17  | -0.17 | 0.21   | 0.02   | -0.02  | 0.17  | 0.09   | 0.08  | -0.08 |
| Beans        | 0.08     | 0.38  | -0.03 | 0.02  | 0.11   | 0.04   | 0.10   | 0.13  | 0.16   | 0.05  | 0.02  |
| Fish         | 0.12     | -0.01 | 0.49  | 0.10  | 0.13   | 0.08   | 0.03   | 0.26  | -0.04  | 0.09  | 0.01  |
| Fufu         | -0.01    | 0.05  | 0.19  | 1.19  | 0.00   | -0.09  | -0.03  | 0.18  | -0.12  | -0.04 | -0.07 |
| Meat         | 0.10     | 0.08  | 0.08  | -0.01 | 0.55   | 0.02   | 0.05   | 0.21  | 0.10   | 0.03  | 0.05  |
| Pepper       | 0.30     | 0.10  | 0.24  | -0.18 | 0.08   | 0.89   | -0.02  | 0.02  | -0.05  | -0.01 | 0.00  |
| Potato       | -0.03    | 0.30  | 0.10  | -0.05 | 0.20   | -0.01  | 0.87   | -0.03 | 0.12   | 0.00  | -0.22 |
| Rice         | -0.01    | 0.01  | 0.13  | 0.08  | 0.07   | -0.01  | -0.01  | 0.40  | -0.01  | 0.01  | -0.03 |
| Tomato       | 0.06     | 0.23  | -0.09 | -0.11 | 0.21   | -0.02  | 0.06   | 0.03  | 0.69   | -0.01 | 0.09  |
| Yam          | 0.06     | 0.03  | 0.08  | -0.05 | 0.03   | 0.00   | -0.04  | 0.13  | -0.01  | 0.97  | 0.01  |
| Garri        | -0.11    | 0.20  | 0.01  | -0.11 | 0.05   | -0.01  | -0.09  | -0.02 | 0.07   | -0.02 | 0.93  |
| $\eta_{E,x}$ | 1.200    | 1.150 | 1.170 | 1.090 | 1.1700 | 1.060  | 1.110  | 0.480 | 1.110  | 1.210 | 0.760 |

**Source:** Authors' Computation from Survey, 2016,  $\eta_{E,x}$  are conditional expenditure elasticities.

The results of the Hicksian own-price and cross-price elasticities are presented in Table 3. The results show that the compensated own-price elasticities are all positive and less than unity. The compensated own-price elasticities are higher than their corresponding uncompensated own-price elasticities. This is the case of beans (0.492), meat (0.728), garri (0.997), fish (0.178), and pepper (0.921). This does not only suggest that the substitution-effect of the food commodities outweighs the income-effect, but that the food commodities are inelastic implying a less than proportionate percentage increase in the quantity demanded of these food commodities for 1% increase in their respective prices. This also applies to plantain (0.715), rice (0.485) and tomato (0.772).

Using the results of the compensated cross-price elasticities, fufu plantain, plantain and garri, fufu and garri, potato and garri are classified as complement food commodities amongst the carbohydrate food items in the region. Food consumers in the region take fufu plantain, fufu and garri, potato and garri, and plantain and garri as combination-food items in a meal. The results showed that 1% increase in the price of garri would increase the quantity demanded of fufu and plantain by 0.025% and 0.028% respectively but decreased quantity demanded of

potato by 0.118% while a similar percentage increase in the price of fufu would decrease the quantity demanded of plantain by 0.09%. In the proteinous food items, meat and fish, beans and fish, and beans and meat are substitutes. The implication is that food consumers take meat or fish, bean or fish, and beans or meat depending on which is cheaper. Consumers of fish would increase the quantity demanded of fish by 0.30% for 1% increase in the price of meat when compared with 0.13% in the uncompensated cross-price elasticity. For a similar 1% increase in the price of meat, food consumers of meat in the region would increase the quantity demanded of beans by 0.28% compared with 0.11% in the uncompensated cross-price elasticity. In the category of vegetables, pepper and tomato are substitutes. The change from complement to substitutes for some of the food commodities may be attributed to the larger substitution-effect resulting from the price change. Thus, increasing the prices of food commodities in the study area more than proportionately increase the substitution-effect for some of the food commodities in south-eastern Nigeria such that food commodities that were complement-food commodities before the change in prices of the food commodities become substitute after the change in prices.

**Table 3: Hicksian (Compesated) Price Elasticities**

|          | Plantain | Beans | Fish  | Fufu   | Meat  | Pepper | Potato | Rice  | Tomato | Yam   | Garri  |
|----------|----------|-------|-------|--------|-------|--------|--------|-------|--------|-------|--------|
| Plantain | 0.715    | 0.234 | 0.310 | -0.091 | 0.386 | 0.062  | 0.021  | 0.388 | 0.179  | 0.192 | 0.028  |
| Beans    | 0.156    | 0.492 | 0.101 | 0.097  | 0.275 | 0.077  | 0.145  | 0.336 | 0.245  | 0.154 | 0.128  |
| Fish     | 0.203    | 0.110 | 0.628 | 0.178  | 0.300 | 0.121  | 0.075  | 0.468 | 0.040  | 0.195 | 0.120  |
| Fufu     | 0.061    | 0.161 | 0.309 | 1.260  | 0.160 | -0.052 | 0.011  | 0.371 | -0.037 | 0.057 | 0.025  |
| Meat     | 0.182    | 0.194 | 0.212 | 0.067  | 0.728 | 0.063  | 0.089  | 0.422 | 0.189  | 0.135 | 0.158  |
| Pepper   | 0.373    | 0.207 | 0.363 | -0.107 | 0.234 | 0.921  | 0.020  | 0.210 | 0.023  | 0.092 | 0.095  |
| Potato   | 0.042    | 0.412 | 0.225 | 0.019  | 0.365 | 0.024  | 0.905  | 0.166 | 0.202  | 0.103 | -0.118 |
| Rice     | 0.024    | 0.057 | 0.182 | 0.110  | 0.137 | 0.009  | 0.007  | 0.485 | 0.029  | 0.057 | 0.019  |
| Tomato   | 0.136    | 0.338 | 0.040 | -0.040 | 0.373 | 0.015  | 0.098  | 0.224 | 0.772  | 0.092 | 0.187  |

|       | Plantain | Beans | Fish  | Fufu   | Meat  | Pepper | Potato | Rice  | Tomato | Yam   | Garri |
|-------|----------|-------|-------|--------|-------|--------|--------|-------|--------|-------|-------|
| Yam   | 0.146    | 0.153 | 0.221 | 0.031  | 0.214 | 0.042  | 0.003  | 0.342 | 0.075  | 1.087 | 0.115 |
| Garri | -0.059   | 0.279 | 0.096 | -0.059 | 0.160 | 0.020  | -0.059 | 0.119 | 0.120  | 0.054 | 0.997 |

Source: Authors' Computation from Survey, 2016

## CONCLUSIONS

The study estimated the complete demand function of the LA/AIDS for food commodities, and examined the conditional uncompensated and compensated price elasticities and income-elasticities in the region using derivatives that take into account the effects of price changes on the shares in the Stone geometric price index. Results from the micro-level data on food consumers in South-eastern Nigeria between the year 2015 and 2016 revealed certain systematic classification of food commodities in the region. Some of the food items were normal goods, some necessities while some were luxuries with some level of complementarity and independent relationship. The percentage change in the quantity demanded of the food commodities due to a percentage change in the prices of the respective food commodities in the region was due to the relative high substitution-effects component of the price change. This indicates that price-policy interventions for the consumers of these products can have a more significant impact on their consumption, at least in the short run than income-policy trust. Increase in price of fish and meat items can have bad toll on the demand level of fish and meat consumers, in South-eastern Nigeria.

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**Mobile phone usage for agricultural information on rice production among rural youths in Kwara state, Nigeria**

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**Abstract:** This study assessed the use of mobile phone for agricultural information on rice production among rural youth in Kwara State, Nigeria. Multistage sampling procedure was used in selecting a total sample of 301 young farmers for the study. Data were collected through the use of an interview schedule. Frequency counts, percentages, Mean and Spearman Rho Correlation were used to analyze the data. Agricultural information on rice production accessed through mobile phones and utilized by the respondents include information on land clearing for rice production (Mean= 2.67), soil management practices (Mean=2.46), safety and precautionary measures on the use of agro-chemicals (Mean= 2.41), improved rice varieties (Mean=2.40) and information on weather and climate forecast (Mean= 2.38). Household size ( $r = - 0.144$ ,  $P < 0.05$ ), cultivatable farm size ( $r = -0.266$ ,  $P < 0.05$ ) significantly influenced the extent of mobile phone usage for accessing agricultural information on rice production. The study recommended that information dissemination and delivery through mobile phone should be targeted toward encouraging rural youth to acquire relevant information that will enhance rice production in the study area..

**Keywords:** Agricultural information, Mobile phone, Youth, Rice production

**INTRODUCTION**

There have been spectacular developments in the adoption of Information and Communication Technologies (ICTs) around the world especially in Nigeria. ICTs have penetrated virtually every sector of the economy in Nigeria, agriculture inclusive. There are different forms of ICTs these include the modern and traditional/old forms. The traditional forms of ICTs have been used in advisory service provision to farmers in many States in Nigeria (Egbule *et al.*, (2013). Radio and television are forms of old ICTs that have been used to feature agricultural related information to farmers in many developing countries (Aker, (2011). The growth of mobile phones coverage, had led to the moving away from traditional ICTs to the use of modern ICT especially mobile phones. The number of connected mobile telephones in Nigeria rose from 266,401 in 2001, to 101,271,578 as at 2012 with the total population of about 140 million people. With this growth in coverage, there has been an increase in mobile phone adoption and usage by rural farmers despite their resource poor conditions. Therefore, the potential role of mobile phone for agricultural production cannot be underestimated. Mobile phones can enhance and contribute to the efficient sharing of agricultural information in the area of weather forecast, farming decisions such as, when to plant, what to plant, which agro-chemical to use and when to harvest among others.

Aker and Mbiti (2010) and Aminuzzaman *et al.* (2003) enumerated that mobile phone usage by young farmers is predicated on the perception that it is better than most other communication means, as it is convenient to handle, provides economic advantages

and enhance the social status of the users. The use of mobile phone sits within the core value of communities communicating within and between groups for social or economic interactions. The use of mobile phone as a communication tool has removed the cumbersomeness associated with other communication methods used in agricultural extension (Qiang, Kuek, Dymond and Esselaar, 2011; Martin and Abbott, 2011). This perceived relative advantage of mobile phone arguably increases rate and possibly the growth in mobile phone ownership amongst community members and young farmers in particular.

Mobile phone services also facilitate easy transactions by connecting farmers with various buyers and traders, deciding where and what price to sell their produce, and reduces costs associated with locating market outlets (Abraham, 2007). This, in turn, has increased efficiency, increased yields, reduced wastage and have overall positive effects on farmers earning and livelihood. In addition to transaction costs, accident, theft, perishability of produce and frustration among farmers can be reduced through mobile phone usage. In the same vein, mobile phone enables farmers to interact with other stakeholders, (extension agents, researchers, and inputs dealers) thus reducing social isolation. Farmers with relevant information are better and able to assume responsibilities for themselves and their farm operations than those without such information. According to the International Institute of Communication Development (IICD) (2009) individuals who have access to information often find their social status improved.

The availability of mobile phones for information dissemination is very vital and has a direct bearing on the dissemination of agricultural information to young able bodied that are involved in agriculture. The recent Agricultural Transformation Agenda (ATA) of the Federal Ministry of Agriculture and Rural Development (FMARD) aimed at having the data base of all farmers in order to facilitate the process of reaching them with innovative agricultural information as well as agro-input. This is being achieved through communication using the mobile phones; it is pertinent that information dissemination is targeted to meet the information need of young farmers, the set of people that possess regenerative energies, intelligence and capabilities for sustainable development.

Adequate information is therefore essential to empower young people (youths) to make a difference. Invariably, the dissemination of agricultural information is crucial to agricultural productivity of the farming population because it is only through this means that young farmers (youth) can learn about those things they are not aware of, and when such knowledge is acquired through mobile phone usage and utilized effectively, the result will always improve the quality of life and fulfillment for rural population in particular and the nation at large. As noted by Omokhaye (2000) that the main problem is not the lack of technologies and research findings needed for economic growth and social change but delayed and inappropriate channels of communication used to pass down such information to the end users for adequate utilization.

Rice is an important food and cash crop that is relatively easy to produce and grown in every ecological zone in Nigeria. It serves multipurpose roles and immensely contributes to internal and external African sub-regional trade as well as food security of the nation. The contribution of rice to economic growth and food security in Nigeria has been on the increase over the years (Akpokodje, Hamcon and Erenstein, 2001). Today, rice is the most staple food consumed in every household and the rate of its production cannot meet-up the demand in the country. Hence, the importation of rice becomes the order of the day.

Involvement of youth in agriculture, especially in rice production, is vital to facilitate the increase in production of food and nutritional value thereby providing a solution to the food insecurity in Nigeria. In many developing countries, up to 70 percent of young people live in rural areas and account for 65% of labour force in agriculture and agricultural related activities (Divyakirti, 2002; ILO, 2012). For effective and progressive rice production, an active work force is required. To attain this, the active group of the

population (Youth) needs to be favourably encouraged to be involved in agricultural production but they need to be adequately empowered through knowledge and information for optimum production capacity in agriculture. According to International Telecommunication Union (ITU) (2009), mobile phones do not directly improve agricultural production but rather play an important role in the production process by keeping farmers abreast of up to date information through extension services which assist them to make rational decisions. Without adequate knowledge and skills, on the use of mobile phones innovatively, by the active segment of the rural population (youths) for acquiring agricultural information, agricultural productivity especially rice production will remain low leading to high importation of rice, lack of self-reliance and food insecurity. It has been noted that the availability of mobile phone for information dissemination has a direct bearing on the dissemination of agricultural information (Egbule, *et al*, 2013)

It is therefore necessary to ascertain the mobile phones usage for agricultural information on rice production among rural youths in Kwara State, Nigeria. The study specifically described the socio-economic characteristics of the respondents; identified the agricultural information accessed through mobile phone; determined the level of utilization of agricultural information on rice production disseminated through mobile phone; and identified the constraints to mobile phone usage for agricultural information on rice production in the study area.

There is no significant relationship between selected socio-economic characteristics of rural youth and extent of Mobile phone usage for accessing agricultural information on rice production

## **METHODOLOGY**

The study was carried out in Kwara State of Nigeria. The state has an area of about 60,388km<sup>2</sup>. It extends from latitude 74.15<sup>0</sup>N in its Southern tip and lies between longitude 2.45<sup>0</sup>E in the South- Western region and longitude 6.40<sup>0</sup>E in the South- Eastern region. It shares common boundaries with Oyo, Ekiti and Ondo states to the South, and with Niger, Kebbi, Kogi states and the Federal Capital Territory to the North. The state presently has sixteen (16) Local Government Areas. According to the 2006 National Population Census (NPC) Kwara State has a population of about 3.5 Million people. The population is made up of many ethnic groups including Yoruba, Baruba, Nupe and Bokobaru speaking people all with different cultural backgrounds. Majority of the inhabitants are predominantly farmers Among the crops cultivated



include: rice, yams, maize, cassavas, guinea corn, potatoes, melon, among others. Some of the inhabitants are also engage in other gainful activities like civil service, food processing, trading, and marketing of farm produce (Wuraola, 2009). The target population for this study was rural youth both male and female that are growing rice in Kwara State.

Multistage sampling procedure was employed in the selection of the respondents. Kwara state consists of four agricultural zones with 16 blocks. The first stage involved purposive selection of two agricultural zones based on the fact that they are major producers of rice. These are Zone A (Baruten and Kaiama) and Zone B (Edu and Patigi). Second stage involved selection of the entire Local Government Areas of the two agricultural zones. The local government areas selected were Baruten, Kaiama, Edu and Patigi Local Government Areas. Third stage involved a random selection of 20% of the total villages from each of the selected local government areas. This makes 25 villages selected. The fourth stage was the selection of youth that are registered rice farmers in each village. From the list of registered youth rice farmers, 15% of the total was randomly selected. In all, a total of 301 young rice farmers formed the sample size for the study. Interview schedule was used to elicit the necessary information from the respondents. Data collected were analyzed using frequency counts, percentages, Mean, and Spearman Rho Correlation was used to test the hypothesis. The dependent variable of the study was the extent of mobile phone usage for accessing agricultural information. This was measured on a 4 point rating scale of never, rarely; sometimes and always with a score of 1, 2, 3 and 4 respectively. The mean and standard deviation was used to categorize the respondents into three namely: low, moderate and high users.

## RESULTS AND DISCUSSION

### Socioeconomic characteristics

The result shown in Table 1 reveals that majority (86.7%) of the respondents were within the age bracket 18 and 30 years with the mean age of 24.4 years. This finding implies that the respondents were relatively young. This agrees with the findings of (Olaniyi and Adewale, 2013) which revealed that the respondents of this age category are energetic, innovative and technological inclined than old people. With regards to sex of the respondents, most (69.1% ) of the respondents were male and the remaining 30.9% of the respondents were female. This implies that both male and female farmers were involved in rice production in the study area. It is generally believed that male gender are more involved in direct agricultural production, while

female folks are generally more involved in agro-processing and marketing especially in rice production. This result agrees with the findings of Jibowo (2000) and Torimiro and Oluborode (2006) that farming occupation in rural area is dominated by male as a means of livelihood which could be as a result of the energy required for most of the operations. The result on marital status shows that majority (70.4%) of the respondents were single, while 26.6% of the respondents were married and 0.3% of the respondents were divorced. Being single as a status suggests a low degree of responsibility and flexibility in mind and this may make sound agricultural practice decisions to elude them because they may be distracted from farming because of opportunities that exists in other sectors of the economy. This finding is in line with that of Olaniyi (2010) who reported that being married as a status suggests high degree of responsibility and a great capacity for sound rational decisions

A sizeable proportion (78.4%) of the respondents had household size range between 6 and above with a mean household size of 10. Large household size is a characteristic of rural setting especially where large family size is the determinants of wealth and easier availability of labour for farming (Nenna, 2012). Educationally, greater proportion (77.1%) of the respondents had one form of formal education or the other. The mean year of formal education of the respondents was 11.5 years. The implication of this finding is that there is high level of literacy among rural youth in the study area. Also, Table 1 reveals that majority (73.4%) of the respondents had farming experience of between 6 and 15 years. This implies that most of the respondents had a quite number of years of farming experience that could assist them to take reasonable farming with respect to rice production in the study area. The result on cultivatable farm size shows that most (65.1%) of the respondents had between 1 and 10 hectares of land for rice production. The mean cultivatable farm size was 4.24 hectares. This is considered to be relatively moderate farm size and indicating that the respondents are moving towards commercial level of rice production in the study area. This may probably be due to access to land for rice production as well as the Federal Government initiative on local rice production in Nigeria.

Table 1 further show that 68.8% of the respondents did not belong to any social organization and while 31.2% of the respondents belonged to one social organization or the other. This finding reveals that most of the respondents did not have social affiliation in their communities and this could hinder the respondents from having access to useful

information and innovations related to agriculture and rice production in particular.

Also from Table 1, it could be seen that majority (99.3%) of the respondents had access to extension agents while 0.7% of the respondents had no access to extension agents. Concerning the ownership of mobile phones, it was revealed that majority (85.0%) of the respondents claimed that they owned mobile phones and others (15.0%) were not the owners of mobile phone. The implication of this finding is that

majority of the respondents will be able to use mobile phones to acquire and to access useful agricultural information that would be needed to boost their production. Finally, Table 1 shows that close to one-third (30.7%) of the respondents used mobile phones always 33.3% rarely used mobile phones to access agricultural information and 13.0% used mobile phones sometimes for accessing agricultural information on rice production in the study area.

**Table 1: Distribution of the Respondents according to Socioeconomic Characteristics**

| <b>Variable</b>                            | <b>Frequency</b> | <b>Percentage</b> | <b>Mean</b> |
|--|------------------|-------------------|-------------|
| <b>Age</b>                                 |                  |                   |             |
| 18-23                                      | 79               | 25.2              |             |
| 24-30                                      | 185              | 61.5              |             |
| 30-35                                      | 37               | 12.3              | 24.4        |
| <b>Sex</b>                                 |                  |                   |             |
| Male                                       | 208              | 69.1              |             |
| Female                                     | 93               | 30.9              |             |
| <b>Marital status</b>                      |                  |                   |             |
| Single                                     | 212              | 70.4              |             |
| Married                                    | 80               | 26.6              |             |
| Widow                                      | 8                | 2.7               |             |
| Divorced                                   | 1                | 0.3               |             |
| <b>Household size</b>                      |                  |                   |             |
| 1-5  | 65               | 21.6              |             |
| 6-10                                       | 122              | 40.5              |             |
| 11 and above                               | 114              | 37.9              | 10.4        |
| <b>Years spent in school</b>               |                  |                   |             |
| 0 (no formal education)                    | 69               | 22.9              |             |
| 1-6 (primary education)                    | 53               | 17.6              |             |
| 7-12 (secondary education)                 | 110              | 36.6              |             |
| 13 and above (tertiary education)          | 69               | 22.9              |             |
| <b>Years of rice production experience</b> |                  |                   |             |
| 1-5  | 42               | 14.0              |             |
| 6-10                                       | 126              | 41.9              |             |
| 11-15                                      | 95               | 31.5              |             |
| 16 and above                               | 38               | 12.6              |             |
| <b>Cultivable farm size (Hectares)</b>     |                  |                   |             |
| < 1-2.0                                    | 122              | 40.5              |             |
| 2.1 -4.0                                   | 74               | 24.6              |             |
| 4.1- 6.0                                   | 67               | 22.3              |             |
| 6.1 and above                              | 38               | 12.6              | 4.24        |
| <b>Income per annum (Naira)</b>            |                  |                   |             |
| 1,000-20,000                               | 78               | 25.9              |             |
| 21,000-40,000                              | 52               | 17.2              |             |
| 41,000-60,000                              | 49               | 16.3              |             |
| 61,000-80,000                              | 34               | 11.3              |             |
| 81,000-100,000                             | 39               | 13.0              |             |
| Above 100,000                              | 49               | 16.3              | 127,627     |
| <b>Membership of social organization</b>   |                  |                   |             |
| Member                                     | 94               | 31.2              |             |
| Non member                                 | 207              | 68.8              |             |
| <b>Contact with extension agents</b>       |                  |                   |             |
| Yes  | 299              | 99.3              |             |

| Variable   | Frequency | Percentage | Mean |
|--|-----------|------------|------|
| No   | 02        | 0.7        |      |
| <b>Ownership of Mobile phone</b>                                     |           |            |      |
| Yes  | 256       | 85.0       |      |
| No   | 45        | 15.0       |      |
| <b>Frequency of use of mobile phone for agricultural information</b> |           |            |      |
| Always   | 92        | 30.7       |      |
| Sometimes  | 39        | 13.0       |      |
| Rarely   | 100       | 33.3       |      |
| Never  | 70        | 24.0       |      |

Source: Field survey, 2016

#### Agricultural information on rice production sourced with mobile phones by the respondents

The various types of agricultural information sourced by young farmers through mobile phones reveals that information on land clearing methods were accessed through mobile phone and utilized by the respondents (WMS = 2.67) followed by soil management practices (WMS = 2.46) and safety and precaution measures on the use of agro-chemicals (WMS = 2.41). These were ranked 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> respectively. Other agricultural information on rice production accessed and utilized are: improved seedling (WMS = 2.40), storage of grains and information on climate forecast (WMS = 2.38), improved varieties of rice (WMS = 2.34), information on pest control on the farm and during

storage (WMS = 2.33). In addition, information on planting method of rice (WMS of 2.32), type of fertilizer to be applied (WMS = 2.31) among the least disseminated and utilized agricultural information include: information on sources of credit facilities (WMS = 2.23) and information on training, workshops and seminars on rice production (WMS= 2.21). This finding is in agreement with the study of Olajide (2015) who reported land clearing as one of the types of agricultural information accessed and utilized by farmers in Ogun State Nigeria.

This study shows that various agricultural information on rice production were accessed and utilized by the respondents especially those that can improve the production level of the respondents.

**Table 2: Distribution of the respondents by agricultural information accessed and utilized**

| Types of Agricultural Information                          | Extent of Use of Mobile phone for accessing agricultural information |            |           |          |  | Mean | Rank             |
|--|--|------------|-----------|----------|--|------|------------------|
|  | Always   | Sometimes  | Rarely    | Never    |  |      |                  |
| Land clearing method                                       | 219 (72.7)   | 68 (22.6)  | 11 (3.7)  | 3 (1.0)  |  | 2.67 | 1 <sup>st</sup>  |
| Soil management practices required In rice production      | 174 (57.8)   | 99 (32.9)  | 21 (7.0)  | 7 (2.3)  |  | 2.46 | 2 <sup>nd</sup>  |
| Safety and precaution measures on the use of agrochemicals | 155 (50.8)   | 108 (35.9) | 29 (2.7)  | 1 (0.3)  |  | 2.41 | 3 <sup>rd</sup>  |
| Improved seedling  | 154 (57.2)   | 110 (36.5) | 23 (7.6)  | 14 (4.7) |  | 2.40 | 4 <sup>th</sup>  |
| Information on climate forecast                            | 158 (52.5)   | 108 (35.9) | 23 (7.6)  | 12 (4.0) |  | 2.38 | 5 <sup>th</sup>  |
| Disease control of rice in farm and stores                 | 149 (49.5)   | 118 (39.2) | 22 (7.3)  | 12 (4.0) |  | 2.34 | 6 <sup>th</sup>  |
| Information on pest control in farms and stores            | 152 (50.5)   | 108 (35.9) | 30 (10.0) | 11 (3.7) |  | 2.33 | 7 <sup>th</sup>  |
| Planting method in rice production                         | 140 (46.5)   | 124 (41.2) | 29 (9.6)  | 8 (2.7)  |  | 2.32 | 8 <sup>th</sup>  |
| selection of chemicals for weed control                    | 153 (50.8)   | 122 (40.5) | 23 (7.6)  | 3 (1.0)  |  | 2.31 | 9 <sup>th</sup>  |
| Type of fertilizer to be applied                           | 138 (45.8)   | 129 (42.9) | 24 (8.0)  | 10 (3.3) |  | 2.31 | 9 <sup>th</sup>  |
| Use of sprayers in farm operations                         | 158 (52.5)   | 115 (38.2) | 19 (6.3)  | 9 (3.0)  |  | 2.30 | 10 <sup>th</sup> |
| Method of fertilizer application                           | 143 (47.5)   | 113 (37.5) | 38 (12.6) | 7 (2.3)  |  | 2.30 | 10 <sup>th</sup> |
| Improved planting distance for rice                        | 143 (47.5)   | 109 (36.9) | 38 (12.6) | 11 (3.7) |  | 2.28 | 11 <sup>th</sup> |
| Modern processing of rice produce                          | 136 (42.5)   | 121 (40.2) | 32 (10.6) | 12 (4.0) |  | 2.27 | 12 <sup>th</sup> |
| Mechanized method of threshing grain                       | 131 (43.5)   | 125 (41.5) | 38 (12.6) | 7 (2.3)  |  | 2.26 | 13 <sup>th</sup> |
| Labour availability for rice production                    | 138 (45.8)   | 117 (38.9) | 31 (10.3) | 15 (5.0) |  | 2.26 | 13 <sup>th</sup> |
| Sources of farm inputs                                     | 127 (42.2)   | 134 (44.5) | 28 (9.3)  | 12 (4.0) |  | 2.25 | 14 <sup>th</sup> |
| Sources of credit facility                                 | 124 (41.2)   | 136 (45.2) | 28 (9.3)  | 13 (4.3) |  | 2.23 | 15 <sup>th</sup> |

**Extent of Use of Mobile phone for accessing agricultural information**

| <b>Types of Agricultural Information</b>           | <b>Always</b> | <b>Sometimes</b> | <b>Rarely</b> | <b>Never</b> | <b>Mean</b> | <b>Rank</b>      |
|--|---------------|------------------|---------------|--------------|-------------|------------------|
| Current price of rice produce in the market        | 130 (43.2)    | 121 (40.2)       | 38 (12.6)     | 12 (4.0)     | 2.23        | 16 <sup>th</sup> |
| Training, workshop and seminars on rice production | 131 (43.5)    | 118 (39.2)       | 36 (12.0)     | 16 (5.3)     | 2.21        | 17 <sup>th</sup> |

**Field survey, 2016**

**Categorization of the respondents by the level of utilization of agricultural information sourced with mobile phone**

The results of the analysis in Table 3 reveal that a high percentage (85.4%) of the respondents were in the low utilization category while 14.3% of the respondents were in the high category and the remaining 1.3% fell into moderate utilization

category as shown in Table 4. From this results, it can be deduced that majority of the respondents had a low level of utilization agricultural information sourcing through mobile phone. This may probably be due to some of the constraints to the usage of mobile phones for agricultural information on rice production.

**Table 3: Distribution of the respondents by according to categorization into levels of utilization of agricultural information Accessed through mobile phone**

| <b>Level of Utilization</b> | <b>Frequency</b> | <b>Percentage</b> |
|-----------------------------|------------------|-------------------|
| High                        | 43               | 14.3              |
| Moderate                    | 04               | 1.3               |
| Low                         | 254              | 85.4              |
| Total                       | 301              | 100               |

**Mean (X) = 51.14      Standard Deviation = 7.92**  
**Field survey, 2016**

**Constraints to mobile phone usage for agricultural information on rice production**

Of all the constraints to mobile phone usage for agricultural information by the rural youth for rice production, inadequate power supply was noted as the most severe constraints to mobile phone usage for agricultural information (WMS=2.16), followed by poor mobile network coverage (WMS = 2.14), and lack of local content and language barrier (WMS = 2.02) respectively (Table 4). Other constraints to mobile phone usage for agricultural information include: high cost of acquiring mobile phone ranked

(WMS =2.01), high tariff for subscription ( WMS = 2.00), lack of awareness or knowledge about the importance of mobile phone for accessing information related to rice production ranked (WMS = 1.99) and difficulty in mobile phone maintenance and inadequate skill to operate mobile phone (WMS = 1.91) respectively..This finding reveals the various constraints to mobile phone usage for agricultural information and could affect the extent to which the young farmers would utilize the available agricultural information on rice production.

**Table 4: Distribution of respondents according to constraints to mobile phone usage for agricultural information on rice production**

| <b>Constraints</b>  | <b>Very severe</b> | <b>Severe</b> | <b>Mid severe</b> | <b>Not severe</b> | <b>WMS</b> |
|---|--------------------|---------------|-------------------|-------------------|------------|
| Poor power supply   | 138 (45.8)         | 94 (31.2)     | 49 (16.3)         | 20 (6.6)          | 2.16       |
| Poor network coverage   | 169 (56.1)         | 58 (19.3)     | 20 (6.6)          | 54 (17.9)         | 2.14       |
| Lack of local content and language barrier  | 112 (37.2)         | 106 (35.2)    | 60 (19.9)         | 23 (7.6)          | 2.02       |
| High cost of acquiring mobile phones  | 122 (40.5)         | 101 (33.6)    | 37 (12.3)         | 41 (13.6)         | 2.01       |
| High tariff for subscription  | 110 (36.5)         | 108 (35.9)    | 56 (18.6)         | 27 (9.0)          | 2.00       |
| Lack of awareness/knowledge about the importance of mobile phone for accessing information related to rice production | 121 (40.2)         | 94 (31.2)     | 47 (15.6)         | 39 (13.0)         | 1.99       |
| Difficulty of mobile phone maintenance  | 101 (36.9)         | 106 (35.2)    | 60 (19.9)         | 34 (11.3)         | 1.91       |
| Inadequate skill to operate mobile phone  | 111 (36.9)         | 96 (31.9)     | 49 (16.3)         | 45 (15.0)         | 1.91       |

**WMS = Weighted Mean Score. Parentheses indicates percentages, Field survey, 2016**

**Test of Hypothesis**

The result of the analysis shows in Table 5 shows that negative and significant relationship existed between the household size ( $r = -0.144$ ,  $p \leq 0.05$ ), cultivable farm size ( $r = -0.266$ ,  $p \leq 0.05$ ) and extent of mobile phone usage for accessing agricultural information. Conversely, there was a positive and significant relationship in years of education ( $r = 0.138$ ,  $p \leq 0.05$ ) and extent of mobile phone usage for accessing agricultural information. This finding implies that the larger the household size and farm size, the less the respondents utilise agricultural information. This is quite unexpected but this result shows that having large household size and

farm size the less the extent of mobile phone usage for accessing agricultural information. This finding is in line with that of Siwel (2017) who reported that farm size as one of the determinants of mobile phone usage for communicating agricultural information among agricultural development stakeholders. On the other hand, the more the years of education of the respondents, the more the respondents' extent of mobile phone usage for accessing agricultural information on rice production. This finding tallies with that of Onwuemele (2011) who found that education determines the level and use of ICTs mobile phone inclusive.

**Table 5: Relationship between selected socio-economic characteristics and level of utilization of agricultural information Accessed through mobile phone**

| Variable                    | r - value | p - value | Remark |
|-----------------------------|-----------|-----------|--------|
| Age                         | -0.046    | 0.429     | NS     |
| Household size              | -0.144    | 0.012**   | S      |
| Years of farming experience | 0.000     | 0.999     | NS     |
| Farm size                   | -0.266    | 0.000*    | S      |
| Income                      | -0.097    | 0.095     | NS     |
| Years of education          | 0.138     | 0.018**   | S      |

\*Correlation is significant at the 0-01 level \*\*Correlation is significant at the 0-05 level

S = Significant NS = Not significant

Source: Field survey, 2016

**CONCLUSION AND RECOMMENDATIONS**

The study concluded that agricultural information on rice production were sourced through mobile phone and were utilized by the young farmers. The extent of mobile phone usage for accessing agricultural information was low among the respondents and the identified constraints to mobile phone usage for sourcing agricultural information include: inadequate electricity power supply, poor mobile phone network and lack of local content and language of information delivery. Significant relationships exist between household size, farm size, education and level of utilization of agricultural information disseminated through mobile phone. Based on the findings of the study, it was recommended that the Government and Non Governmental organizations in collaboration with mobile phone service providers should ensure capacity building of young farmers through sensitization and education on apt to mobile phone usage for accessing agricultural information on rice production Also an alternative source of power supply should be made available in the rural areas in order to ameliorate the problem of poor electricity supply for charging mobile phones in the study area.

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**Socioeconomics of expenditure structure among rural-households in Southeastern Nigeria: Fractional Multinomial Response Approach**

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**Abstract:** Most studies ignore the bounded nature of expenditure shares, and the place of socio-economic characteristics to commodities demand of households. Others use estimated parameters of empirical studies that disregard these conditions. These not only make the studies incomplete but are likely not to provide much insight into socio-economic policy trust for families. This study, therefore, undertook socio-economics of expenditure structure using the Fractional Multinomial Logit Model (FMLM) on data from a cross-section of 590 rural households in south-eastern Nigeria. The results show that households spend 75% of their conditional income on the necessities of life with about one-fifth on education and two-fifth on food. Households expend lower expenditure share on education and housing but higher expenditure share on health and lower share on basic food item, given an increase in their conditional income as their education level improve from non-formal to tertiary education. Increase in the age of a household head would result in a decrease in the expenditure on food by N0.11. Household expenditure structure is a reflection of the socio-economic variables of commodities consuming households in Nigeria.

**Keywords:** food, consumers, income, expenditure, FMLM

**INTRODUCTION**

Analyses of expenditure data in Nigeria have only rarely focused on the deeper empirical realities associated with the estimation of expenditure shares (Ezedinma, Kormawa and Chianu, 2000; Amao, *et al.*, 2006; Ojogho and Alufohai, 2010; Ogunniyi, Ajiboye and Sanusi, 2012; Phillip, Shittu and Ashaolu, 2013; Adetunji and Rauf, 2010; Dalhatu and Ala, 2010; Yusuf, 2012). Budget allocation to various consumption commodity groups has been attributed to prices and income only. This can be likened to other studies in some other parts of the world (Tsegai and Kormawa, 2002; Campbell, *et al.* 2004; Hu *et al.* 2005; Rigby and Barton, 2005; Gao and Schroeder 2009) besides Tiffin and Dawson (2002) with emphases on the price and income elasticities. The National Bureau of Statistics, NBS (2011) reported that households in the south-eastern part of Nigeria are noted for their dependence on agriculture. The article also noted that they have diverse socio-economic status with high incidence of poverty (76.8%), high difficulty in satisfying household needs for food (25.7%), school fees (23.8%), utility bills (17.7%) and health care (25.5%), and high level of orphan-hood (0.8) when compared with 18.7%, 21.1%, 4.7%, 8.7%, 25.0% and 0.6 respectively in south-southern Nigeria. These cannot be attributed to prices and income alone in Nigeria.

In addition, the econometric models like the Almost Ideal Demand System, and the Linear Expenditure System used in such studies have not taken into account the bounded nature of expenditure shares for a given number of exhaustive and mutually

exclusive commodity groups, positive continuous data with a corresponding simplex sample space that is quite different from the real Euclidean space associated with unconstrained data. The use of such models for effects of prices, income and other socio-economic variable is unsuitable for bounded budget share.

The empirical results are likely to be incorrect for a wider range of the data while the estimated parameters from such studies for household considerations will not provide much insight into household expenditure away from the mean. Some other studies (Perali, 2002, 2003; Ravallion, 2002; Menezes, Azzoni, and Silveira, 2008; Jabarin, 2005; Shiptsova, Goodwin, and Holcomb, 2004; Abdulai and Aubert, 2004; Champagne *et al.*, 2007; Darmon and Drewnowski, 2008; Drewnowski and Darmon, 2005; Drewnowski and Specter, 2004; Kirkpatrick and Tarasuk, 2008; Deshmukh-Taskar, Nicklas, Yang, and Berenson, 2007) have typically been based on highly aggregated data and/or used the restrictive demand system models like the single linear equation models, which do not allow for adequate curvature in the Engel curves. This, thus, compresses household heterogeneity to the knowledge of the first few moments of household budget-share distribution for the commodity (Barigozzi, Alessi, Capasso, and Fagiolo, 2012).

The study, therefore, approached the expenditure structure of rural households in south-eastern Nigeria *vis-à-vis* their socio-economic characteristics using the Fractional Multinomial Logit Model. Methodologically, this approach is arguably more appropriate than other often used models in this

context. What is more, by modeling shares in a joint framework, the study incorporated the interdependences between the commodities compared to a situation where studies investigate each budget share separately in single equation models.

**METHODOLOGY**

The study was carried out in Abia, Anambra and Imo states in the south-eastern zone of Nigeria. The target population for the study was the set of commodities consuming households in the study area from April 2015 to May 2016. Administratively, the three States are divided into 65 Local Government Areas (LGAs) with 17 in Abia, 21 in Anambra and 27 in Imo State. According to the National Population Commission, (NPC) (2006), the three States represents 14.61% of the Nigeria population. The National Bureau of Statistics, NBS, (2011) states that the average monthly income in the states is between N5000 and N20000 with a poverty incidence of 52.1% in Abia, 45% in Anambra and 50.1% in Imo State. The article states that household expenditures on food are, on average, 52.43% in Abia, 51.73% in Anambra and 55.58% in Imo State respectively.

A three-stage stratified sampling procedure was used to select households in the three States. The first stage used a simple random sampling technique to select a Local Government Areas (LGAs) from each State. That makes 3 LGAs. The LGAs were Isuikwuato in Abia State, Ihiala in Anambra State, and Ikeduru in Imo State. The second stage involved another simple random sampling to select 2 communities in each LGA. The communities selected were Imenyi and Ohaise in Isuikwuato LGA of Abia State, Umueze and Ikenga in ihiala LGA of Anambra State, and Akabo and Okwu in Ikeduru LGA of Imo State. To allow for a representative sample of households for each community, the sample-size estimator as used by Ojogho and Ojo (2017) was used to determine the sample size for each community. The sample-size estimator is given as:

$$n_i = \frac{z_{\alpha/2}^2 S_i^2}{e^2 + \frac{z_{\alpha/2}^2 S_i^2}{N_i}} \tag{1}$$

where  $z_{\alpha/2} = z_{0.05/2} = 1.96$  from the standard normal distribution table for 95% confidence interval,  $S_i^2$  is the expenditure variance of the  $i^{th}$  community,  $N_i$  is the target population of the  $i^{th}$  community and  $e = 0.03$  as the margin of error. A simple random sample of households in each community was then

taken from the list of the target population in the region developed from a pilot survey. The sample size comprises 112 in Imenyi and 96 in Ohaise in Isuikwuato LGA of Abia State, 204 in Umueze and 156 in Ikenga in ihiala LGA of Anambra State, and 184 in Akabo and 168 in Okwu in Ikeduru LGA of Imo State making up a total of 208 in Abia state, 360 in Anambra state and 352 households in Imo state. 970 copies of the questionnaire were administered but only 725 copies of questionnaire were retrieved from the respondents making a response rate of 75%. However, 590 copies of questionnaire were valid for analysis as only data from 7 or more in 10 respondents who consumed commonly consumed food commodities were used in the final analysis. Data were collected on expenditure on food, education, housing, health, clothing, and other commodities besides food, education, housing, health, clothes and other items aggregated as *others* (transportation and recreation).

Data collected were analysed using the Fractional Multinomial Logit (FMNL) model for the pattern of budget share on household expenditure pattern on household commodities and its relationship with socio-economic characteristics of households. The model is specified, in its generic form, as used by Mullahy (2011) and Murteira and Ramalho (2013):

$$E(w_{ij}|p_i) = \Lambda(x_i\beta_j) = \frac{\exp(x_i\beta_j)}{\sum_{k=1}^J \exp(p_k\beta_k)}, j = 1, 2, 3, \dots, J$$

where

$$\begin{cases} E(w_{ij}|x_i) \in (0,1) \quad j = 1, 2, \dots, 6, \quad \sum_{j=1}^6 E(w_{ij}|x_i) = 1, \text{ for household commodities} \\ E(w_{ij}|x_i) \in (0,1) \quad j = 1, 2, \dots, 11, \quad \sum_{j=1}^{11} E(w_{ij}|x_i) = 1, \text{ for household food commodities} \end{cases} \tag{2}$$

Where  $w_{ij}$  is the expenditure share on the  $j^{th}$  commodity by the  $i^{th}$  household,  $x_i$  is a socio-economic characteristic  $i^{th}$  household,  $\beta_j$  represent the mean of the change in budget  $j^{th}$  expenditure shares as a result of a marginal change in a socio-economic characteristic,  $x_i$  for all observations. The reason for the choice of FMNL is that it drastically simplifies the computational burden compared to, for instance, a multinomial probit specification because no correlations across alternatives are assumed (Cameron and Trivedi, 2005). However, the weighted sum of all other  $\beta_j$  is needed to calculate the partial effects, the  $\beta_j$  give less information regarding the partial effect of a socio-economic characteristic on the conditional mean compared to the univariate case where it is possible, at least, to infer the direction and significance of an effect. This can be seen by writing



out the partial effect of the  $k^{th}$  a socio-economic characteristic on the  $j^{th}$  share:

$$PE_{ijk} = \frac{\partial E[s_{ij}|z_i]}{\partial z_{ik}} = E[s_{ij}|z_i] \cdot \left[ \beta_{jk} - \frac{\exp(z_i \beta_j)}{\sum_{k=1}^{J-1} \exp(z_i \beta_k)} \right] \quad [3]$$

The study, therefore, mainly reported the estimated average marginal effects from the results as these can be readily interpreted in the usual way.

## RESULTS AND DISCUSSION

The results of the marginal effects for the Fractional Multinomial Logit model for household commodities are shown in Table 1. The reported standard errors are based on fully robust standard errors clustered at the household level. The effects for most covariates are largely as expected either from theoretical consideration, prior empirical work, or what one might anticipate intuitively.

**Table1: Estimated Marginal Effects and the associated standard errors from the Fractional Multinomial Logit model for common Commodities Expenditure Structure**

| Variable          | wF                     | wE                    | wH                     | wHe                   | wC                   | wOthers               | Mean   | St.dev |
|-------------------|------------------------|-----------------------|------------------------|-----------------------|----------------------|-----------------------|--------|--------|
| Age               | -0.0011***<br>(0.0008) | 0.0009<br>(0.0008)    | -0.0006<br>(0.0004)    | 0.0002<br>(0.0003)    | 0.0004<br>(0.0003)   | 0.0002<br>(0.0005)    | 43.78  | 8.641  |
| Age<br>(Discrete) | -0.0553<br>(0.5950)    | 0.0448<br>(0.9307)    | -0.0284<br>(0.6243)    | 0.0084<br>(0.2382)    | 0.0208<br>(0.4116)   | 0.0097<br>(0.4234)    |        |        |
| Hhs               | 0.0180<br>(0.0132)     | 0.0489***<br>(0.0147) | -0.0283***<br>(0.0083) | -0.0038<br>(0.0056)   | -0.0103*<br>(0.0062) | -0.0245**<br>(0.0091) | 0.3284 | 0.4708 |
| Male              | 0.0013<br>(0.0163)     | 0.0006<br>(0.0182)    | 0.0001<br>(0.0079)     | -0.0083<br>(0.0068)   | 0.0002<br>(0.0072)   | 0.0063<br>(0.0111)    | 0.75   | 0.4341 |
| Pedu              | 0.0339<br>(0.0355)     | 0.0026<br>(0.0288)    | 0.0035<br>(0.0172)     | -0.0132<br>(0.0108)   | -0.0078<br>(0.0149)  | -0.0191<br>(0.0216)   | 0.0343 | 0.1825 |
| Sedu              | -0.0396<br>(0.0348)    | 0.1073***<br>(0.0373) | -0.0452***<br>(0.0151) | -0.0125<br>(0.0099)   | -0.0132<br>(0.0144)  | 0.0032<br>(0.0213)    | 0.1471 | 0.355  |
| Tedu              | -0.0683**<br>(0.0311)  | 0.0940**<br>(0.0440)  | -0.0284**<br>(0.0126)  | -0.0188**<br>(0.0088) | 0.0068<br>(0.0142)   | 0.0146<br>(0.0219)    | 0.799  | 0.4017 |
| Divorce           | 0.0135<br>(0.0402)     | -0.0520<br>(0.0441)   | -0.0130<br>(0.0172)    | 0.0233*<br>(0.0144)   | 0.0060<br>(0.0127)   | 0.0222<br>(0.0251)    | 0.0539 | 0.2264 |
| Married           | 0.0440<br>(0.0353)     | -0.0310<br>(0.0339)   | -0.0201<br>(0.0139)    | 0.0185<br>(0.0121)    | -0.0093<br>(0.0104)  | -0.0022<br>(0.0204)   | 0.799  | 0.4017 |
| Widow             | 0.0721*<br>(0.0404)    | -0.0406<br>(0.0400)   | -0.0326*<br>(0.0172)   | 0.0292*<br>(0.0172)   | -0.0050<br>(0.0130)  | -0.0230<br>(0.0232)   | 0.0686 | 0.2534 |
| $E(w_i x)$        | 0.3478                 | 0.2061                | 0.1161                 | 0.0688                | 0.1078               | 0.1532                |        |        |

Log pseudo-likelihood = -336.25015

**Source** Computed from Field Data, 2018, values in parentheses are standard errors, \*\*\*significant at 1%, \*\*significant at 5%, \*significant at 10%, Hhs is household size, Pedu is primary education of household head, Sedu is secondary education of household head, Tedu is tertiary education of household head.

The effect of age on household behavior is significant for expenditure on food and health at 1% and 10% respectively. The age of a household head plays an inverse role in the share of conditional income expended on food, but a direct role in the share of conditional income on health. Age in levels negatively affects the expenditure share on food while it has a positive effect on the expenditure on health. This pattern probably reflects the place of food and health category which becomes less and more important respectively in the life of the household head as the age increases. The results show that the marginal effects of age on food and health for a household head were -0.0011 and 0.0002 respectively. These imply that an additional increase in the age of a household head would result in a

decrease in the expenditure on food but an increase in expenditure on health by N0.11 and N0.02 of every N100 conditional income of the household.

Whether a household head is a male or female does not seem to play a role in the expenditure pattern. The marginal effects of being a male household head for each share are small and distinctively not significant. This is an interesting finding as one might expect different expenditure patterns between a male- and a female-household head due to differences in the areas of conditional income expenditure of households.

Household size exhibits the anticipated effect on the expenditure share of household commodities. It has effects on expenditure share for education, housing, clothes and *others* (transportation and

recreation). The marginal effects of household size on these household commodities were significant at 1%, 5% and 10%. While household size had positive effect on the expenditure share on education, there was a negative effect of household size on the expenditure share on housing, clothes and *others*. The negative effects of household size on the expenditure share on these commodities may be attributed to the economics of scale as members of the household tend to consume these commodities as common goods. The marginal effects were 0.0489, -0.0283, -0.0103 and -0.0245 on education, housing, clothes and *others* (transportation and recreation) respectively. These imply that any addition of a member to a household would result in an increase in the expenditure on education but a decrease in expenditure on housing, clothes and *others* by N4.89, N2.83, N0.10 and N2.45 of every N100 conditional income of a typical household in the study area.

The results show that households with the highest level of education hold a significantly lower share of their conditional income on education and housing but higher expenditure share on health. While education level had a positive effect on the expenditure share on education, there was a negative effect of education level on the expenditure share on housing and health. The negative effects of education level on the expenditure share on these commodities may also be attributed to the economics of scale as members of household tend to consume these commodities as common goods such as living under the same roof and using about the same health facilities for cases of minor ill-health.

The marginal effects for education level were significant at 1% level of significance with 0.1073, -0.0452 and -0.0125 for those household heads that have move from the level of non-formal education to secondary education level while the marginal effects are 0.094, -0.0284 and -0.0188 respectively for household heads that have moved from the level of non-formal education to tertiary education level. These imply that as a household head moves from non-formal education level to secondary education level, expenditure share on education increases by N10.73 but decreases by N4.52 and N1.25 respectively on housing and health of every N100 conditional income of a typical household resulting from a shift in such education level minimum to its maximum, across all households in the study area. Presumably, this is because they need to spend more to acquire higher education level while such higher level of education allows them process information on housing and health more easily so that they can take advantage of the potentially higher satisfaction of their consumption.

The results of the Fractional Multinomial Logit also showed that households expend more of their conditional income on food (0.35), followed by education (0.21), then housing (0.12) and least on health (0.07). This implies that the households are possibly poor as they spend 75% of their conditional income on the necessities of life with expenditure on food taking about 50% of the commodities.

The results of the marginal effects for the Fractional Multinomial Logit model for food are shown in Table 2. Like results in Table 1, the reported standard errors are based on fully robust standard errors clustered at the household level. The effects for most covariates are largely as expected either from theoretical consideration, prior empirical work, or what one might anticipate intuitively.

The effect of age on household behavior is significant for expenditure on meat and fish at 5% and 10% respectively. The age of a household head plays an inverse role in the share of conditional income expended on fish, but a direct role in the share of conditional income on meat. Age, in continuous form, negatively affects the expenditure share on fish while it has a positive effect on the expenditure on meat. This pattern probably reflects the place of fish and meat category as protein source in the diet of households in Nigeria as the age of household head increases (National Bureau of Statistics, NBS, 2014). The results show that the marginal effects of age on fish and meat for a household head were -0.00058 and 0.00062 respectively. These imply that an additional increase in the age of a household head would result in a decrease in the expenditure on fish but an increase in expenditure on meat by N0.10 and N0.10 of every N100 conditional income of the household on food. Age, in continuous form, also negatively affects the expenditure share on plantain while it has a positive effect on the expenditure on beans. The results show that the marginal effects of age on plantain and beans for a household head were -0.00043 and 0.00062 respectively.

Household size exhibits the anticipated effect on the expenditure share of household on food commodities. It has effects on expenditure share for rice, potato, pepper and fish. The marginal effects of household size on these household commodities were significant at 5% except rice that is significant at 10%. While household size had a positive effect on the expenditure share on rice and fish, there was a negative effect of household size on the expenditure share on potato and pepper. The negative effects of household size on the expenditure share on these commodities may be attributed to the fact that these food items are seemingly preferred for sustenance in the household of large size but whose expenditure

could decrease with increase in income. The marginal effects were 0.132, -0.0049, -0.0037 and 0.0123 on rice, potato, pepper and fish respectively. These imply that any addition of a member to a household would result in an increase in the expenditure on rice and fish but a decrease in expenditure on potato and pepper by ₦13.20, ₦1.23, ₦0.49 and ₦0.37 of every ₦100 conditional income of a typical household in southern Nigeria.

The results show that households with the highest level of education hold a significantly lower share of their conditional income on basic food item like *gari*, *fufu*, potato and pepper with an increase in their conditional income, but increase their expenditure share on meat and fish. While education level had a positive effect on the expenditure share on meat and fish, there was a negative effect of education level on the expenditure share on *gari*, *fufu*, potato and pepper. The negative effects of education level on the expenditure share on these commodities may also be attributed to the fact that these food items are seemingly the food items for sustenance for seemingly large households but whose expenditure could decrease with increase in income. The marginal effects of tertiary education level on *gari*, potato, pepper, meat and fish were significant at

least 10% level of significance with -0.383, -0.061, -0.0109, 0.0435 and 0.0247 respectively for those household heads that have move from the level of non-formal education to tertiary education level. These imply that as a household head moves from non-formal education level to tertiary education level, expenditure share on *gari*, potato, pepper, meat and fish decreases by ₦38.03, 6.10, and 1.09 respectively for *gari*, potato and pepper but increases by ₦4.35 and ₦2.47 respectively for meat and fish respectively of every ₦100 conditional income of a typical household resulting from a shift in such education level minimum to its maximum across all households in the south-eastern Nigeria. Presumably, this is because they acquire higher income with higher education and reduce the consumption *gari*, potato and pepper as basic food commodities, and gain a higher understanding of the need for meat and fish with higher education and the attendant income.

The results of the Fractional Multinomial Logit also showed that households expend more of their conditional income on rice (0.1793), followed by (0.1472), then fish (0.1128) and least on pepper (0.0345). This implies that the households are possibly poor as they spend 75% of their conditional income on starchy food and less on meat and fish.

**Table 2: Estimated Marginal Effects and the associated standard errors from the Fractional Multinomial Logit model for Food Expenditure structure**

| Variable                           | Wppl       | wg         | wr        | Wy         | wpo        | wfu        | Wb        | wt        | wpe        | wm         | wfi        |
|------------------------------------|------------|------------|-----------|------------|------------|------------|-----------|-----------|------------|------------|------------|
| Age                                | -4.3e-04** | -1.5e-04   | 2.1e-04   | 7.8e-05    | -2.1e-04   | 6.4e-05    | 6.9e-04** | -2.7e-04  | -2.6e-05   | 6.2e-04*   | -5.8e-04** |
|                                    | 1.9e-04    | 2.4e-04    | 3.6e-04   | 2.1e-04    | 1.3e-04    | 3.0e-04    | 2.9e-04   | 2.0e-04   | 9.4e-05    | 3.7e-04    | 2.8e-04    |
| Age<br>(Discrete)                  | -0.0213    | -0.0074    | 0.0099    | 0.0037     | -0.0102    | 0.003      | 0.0348    | 0.0118    | -0.0014    | 0.0309     | -0.0285    |
| Hhs                                | 0.4985     | 0.1779     | 0.3226    | 0.126      | 0.2817     | 0.1176     | 0.5031    | 0.4957    | 0.0568     | 0.4332     | 0.4575     |
|                                    | -8.4e-04   | -0.0067    | 0.0132**  | -0.0028    | -0.0049**  | -0.0033    | 0.0042    | -0.0026   | -0.0037**  | -0.005     | 0.0123**   |
|                                    | 0.0039     | 0.0046     | 0.0071    | 0.0042     | 0.0023     | 0.0038     | 0.0052    | 0.0037    | 0.0018     | 0.0084     | 0.0063     |
| male                               | -0.0025    | 0.0011     | 9.2e-06   | -0.0049    | 0.0043     | -0.004     | -1.6e-04  | 0.0044    | -0.0014    | 0.0058     | -0.0025    |
|                                    | 0.0045     | 0.0052     | 0.0077    | 0.0045     | 0.0031     | 0.0055     | 0.0055    | 0.0041    | 0.0021     | 0.0077     | 0.0064     |
| Pedu                               | 0.027      | -0.0193*** | -0.0134   | -0.0101    | 2.2e-04    | -0.0057    | 0.0101    | 0.0137    | -0.0108*** | 0.0094     | -0.0012    |
|                                    | 0.0161     | 0.008      | 0.0225    | 0.0188     | 0.0087     | 0.0116     | 0.0121    | 0.0231    | 0.0037     | 0.0163     | 0.0137     |
| Sedu                               | 0.0143     | -0.0259*** | 0.0159    | -0.0167*** | -0.0027    | -0.0163*   | -0.009    | 0.0165    | -0.0074**  | 0.0231     | 0.0083     |
|                                    | 0.0128     | 0.0091     | 0.0202    | 0.018      | 0.0063     | 0.0092     | 0.01      | 0.0217    | 0.0034     | 0.0163     | 0.0123     |
| Tedu                               | 0.012      | -0.0383*** | -0.0097   | -0.0163    | -0.0061*** | -0.0066    | -0.0043   | 0.012     | -0.0109*** | 0.0435**   | 0.0247*    |
|                                    | 0.0128     | 0.0085     | 0.0169    | 0.0158     | 0.005      | 0.0066     | 0.0078    | 0.023     | 0.0031     | 0.0195     | 0.0135     |
| Divorce                            | -0.0186**  | 0.0195*    | -0.0281** | 0.0234***  | -9.9e-04   | -0.0374*** | -0.0224*  | 0.0404*** | 0.0179***  | -0.0058*** | 0.0121***  |
|                                    | 0.0086     | 0.0113     | 0.0144    | 0.0087     | 0.0059     | 0.014      | 0.0129    | 0.0126    | 0.0049     | 0.012      | 0.012      |
| Married                            | -0.0027    | 0.0048     | -0.0083   | 0.0146*    | -0.0044    | -0.0419*** | -0.0085   | 0.0156*   | 0.0055     | 0.0197**   | 0.0054     |
|                                    | 0.0084     | 0.0085     | 0.0132    | 0.0082     | 0.0051     | 0.0147     | 0.0105    | 0.0091    | 0.0036     | 0.0098     | 0.0092     |
| Widow                              | 0.0062     | 0.0136     | -0.0091   | 0.0149     | -0.0045    | -0.0309**  | -0.0125   | 0.0087    | 0.0073     | 0.0144     | -0.008     |
|                                    | 0.0097     | 0.0111     | 0.0177    | 0.01       | 0.0062     | 0.0134     | 0.0118    | 0.0085    | 0.0052     | 0.0131     | 0.012      |
| $E(w_i   x)$                       | 0.0688     | 0.0911     | 0.1793    | 0.094      | 0.0362     | 0.0635     | 0.1016    | 0.0711    | 0.0345     | 0.1472     | 0.1128     |
| Log pseudo-likelihood = -466.76175 |            |            |           |            |            |            |           |           |            |            |            |

**Source** Computed from Field Data, 2018, values in parentheses are standard errors, \*\*\*significant at 1%, \*\*significant at 5%, \*significant at 10%, Hhs is household size, Pedu is primary education of household head, Sedu is secondary education of household head, Tedu is tertiary education of household head, wppl, wg, wr, wy, wpo, wfu, wb, wt, wpe, wm and wfi are respectively the budget shares of plantain, *garri*, rice, yam, potato, *fufu*, beans, tomato, pepper and fish.

This is difficult in a situation where households choose more than two commodities as complement or as substitutes as is the case of plantain consumers in Nigeria who will not eat plantain alone. The fractions of expenditure on these classes of food in household consumption food patterns correspond to a set of shares for a given number of exhaustive and mutually exclusive categories, positive continuous data with a corresponding simplex sample space that is quite different from the real Euclidean space associated with unconstrained data.

For continuous variables, the coefficients represent the mean of the change in crop shares as a result of a marginal change in the explanatory variables for all observations. For binary variables, the coefficients represent the average change in crop shares resulting from a shift in the variables' minimum to its maximum, across all households. Furthermore, because crop shares must always sum to one—as they are defined by a finite amount of total cultivated hectares—the sum of the average marginal effects for any one independent variable is zero; in other words, what an independent variable takes away from one crop's share, it gives to others' shares.

## CONCLUSION

The study examined socio-economics of expenditure structure using the Fractional Multinomial Logit Model (FMLM) on data from a cross-section of two hundred and sixty-four rural households in south-eastern Nigeria. Households in the region spend 75% of their conditional income on the necessities of life with about one-fifth on education and two-fifth on food with rice, *gari* and yam as their Nigerian staples while rice and meat takes the larger proportions of the expenditure share on food. Age and education level have a significant effect on the expenditure pattern of households in the region. Increase in the age of a household head would result in a decrease in the expenditure on food by N0.11. Households expend lower expenditure share on education and housing but higher expenditure share on health and lower share on basic food item given an increase in their conditional income as their education level improve from non-formal to tertiary education.

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