

## EFFECT OF SELECTED AGRO-PROCESSING INFRASTRUCTURES ON THE IMPROVEMENT OF LIVELIHOODS AMONG RURAL HOUSEHOLDS IN SOUTHEAST, NIGERIA

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Received 18<sup>th</sup> April, 2021 Accepted 10<sup>th</sup> September, 2021

### ABSTRACT

This paper assessed the effect of selected agro-processing infrastructure on the improvement of livelihoods among rural households in southeast, Nigeria. A multi-stage sampling procedure was used in selecting three hundred and twenty-four (324) respondents from three State (Abia, Enugu and Ebonyi States) for the study. Primary data was used for the study. Results were analyzed using both descriptive and inferential statistics such as multiple regression analysis. The socio-economic characteristics showed a mean of age of 45 years, level of education of 12 years, household size of 6 persons and income level of N88,546.75. The grand mean of  $\bar{X}=3.7$  showed a positive effect of agro-processing infrastructure on livelihood of the rural households. On the extent to which agro-processing has improved livelihoods of rural households, a grand mean of  $\bar{X}=3.6$  showed a high extent of improvement. Results on the multiple regression analysis age and educational level was significant at 10% and 5% respectively and were positively related to the utilization of agro-processing infrastructure, while household size and access to credit were significant at 1% and 5% respectively and were inversely related to the utilization of agro-processing infrastructure. In conclusion, agro-processing infrastructure positively improved the livelihoods of the rural households in the study area. Therefore, rural dwellers should be sensitized by government and private organizations on the need to sustain the infrastructure located in their area.

**Key words:** agro-processing, infrastructure, livelihoods, households

### INTRODUCTION

The development of infrastructural facilities has an important role to play to sustain development in Nigeria as the country matures. There is much variation in the state of rural infrastructure among developing countries, and lower income developing countries suffer severe rural infrastructural deficiencies (Aderamo and Aina, 2011). Infrastructural facilities refer to those basic services without which primary, secondary and tertiary productive activities cannot be performed (Abubakar, 2012).

The presence of agro-processing infrastructural facilities in the rural areas can have both direct and indirect effects on household livelihood and productivity improvement. The relative speed with which rural households access and use these infrastructure determines the extent these infrastructures would improve livelihood of the rural people.

it's obvious that one cannot expect rapid socio-economic development in the rural areas without adequate provision of infrastructural facilities. Omofonmwan (2004) reported that inadequate infrastructural facilities are one of the critical factors that contributed to the high level of poverty in the rural areas. While Poverty is real, endemic and devastating, Nigeria's rural population accounts for over 70 percent of poor households, with more than 98 million people, and about 17 million households (IFAD, 2010). Nigeria's rural households are the most deprived of all Nigerians, having least access to services such as health, educational facilities, and access to modern agricultural input.

Umoren *et al.* (2009) observed that access and utilization of agro-processing rural infrastructure has not been taken seriously in Nigeria, and it is often difficult to quantify its direct influence on the quality of life of the rural people. The livelihoods of the rural population in Nigeria are highly dependent on natural

resources. These resources are persistently under intense pressure in the quest of the populations to earn their living and improve livelihoods.

The presence of agro-processing infrastructure is expected to play significant role in boosting rural income and improved household livelihoods to better the living condition of the rural people, but the level of success recorded in this regard appears not very obvious. The level of progress made in this regard can only be established through assessing the performance of selected agro-processing infrastructure in improving household livelihoods in southeast, Nigeria, hence the study.

### **Objective of the Study**

The broad objective of the study is to assess the performance of selected agro-processing infrastructure in the improvement of livelihoods among rural households in Southeast, Nigeria. Specifically, the study seeks to;

1. describe the socio-economic characteristics of the rural households;
2. ascertain the perceived effect of agro-processing infrastructure in the improvement of livelihoods among rural households;
3. determine the extent to which agro-processing infrastructure have improved livelihoods among rural households;

### **Hypothesis**

**H<sub>0</sub>:** There is no significant relationship between selected socio-economic characteristics and utilization of processing infrastructure by the rural households.

## **METHODOLOGY**

### **The Study Area**

The study was conducted in South-east Nigeria. South-east Nigeria is located within latitudes 5°N to 6°N of the equator and longitudes 6°E and 8°E of the Greenwich (prime) meridian (M.S Corporation, 2009). Southeast zone of Nigeria made up of Enugu, Anambra, Imo, Abia and Ebonyi States. The zone occupies a total land mass of 10,952,400 hectares with a population of 16,381,729 people (NPC, 2006). The Southeast rainforest zone of Nigeria is a belt of tall trees with dense undergrowth of shorter species dominated by climbing plants (Nwajiuba and Onyenike, 2010). There are two major seasons

experienced in this zone. These are the Dry season and the Rainy season. The zone experiences an average annual temperature, rainfall, relative humidity, number of rain-days and hours of sunshine per day, of 27°C, 1800mm, 72%, 4.4hours, and 142days respectively.

### **Population and Sampling Procedure**

The population of the study constitutes all the rural households in the study areas. A multi-stage sampling procedure was used in selecting sample for the study. The first stage involved a purposive selection of three States out of the five States in Southeastern Nigeria because of the presence of rural infrastructural facilities in the areas namely; Abia, Enugu and Ebonyi States. The second stage involved a random selection of four local government areas from each of the selected States. The third stage involved a random selection of three communities from each of the selected local government area making 36 communities. Nine (9) rural households were randomly selected from each of the communities through the help of an ADP agent making total respondents of one hundred and eight (108) for each state. Therefore, the sample size for the study was three hundred and twenty-four (324) respondents for the study.

### **Data Collection**

Primary data was used for the study. Primary data was obtained from questions that were distributed to the respondents using questionnaire/interview schedule. A cross-sectional data was collected for the study.

### **Data Analysis**

#### **Model specification**

The data for this study was analyzed using both descriptive and inferential statistics. The descriptive statistics included percentages, means, and frequencies.

**Objective one (i)** was realized using mean, percentage and frequencies.

**Objectives two** which is to ascertain the perceived effect of agro-processing infrastructure in the improvement of livelihoods among the rural households was measured using a 5 point likert-rating scale of strongly agree (5), agree(4), undecided(3), disagree(2) and strongly disagree(1). The cut-off mean score was 3.05.

**Objective three** which determined the extent to which agro-processing infrastructure has improved the livelihoods of the rural households was measured using a 5 point likert rating scale of strongly agree (5), agree(4), undecided(3), disagree(2) and strongly disagree(1). The extent to which infrastructure have improved the livelihoods of rural households was categorized as follows;  
 > 4.00 = Very high  
 3.5 – 4.00 = High  
 3.05-3.499 = Average/Moderate  
 2.5 – 3.0 = low  
 < 2.5 = Very low

### Testing of Hypotheses

There is no significant relationship between selected socio-economic characteristics and utilization of agro-processing infrastructure by the rural households in the study area. This was analyzed using multiple regression analysis.

The implicit form of the regression model is specified as follows:

$$Y = F(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, e_i) \dots\dots (1)$$

Where;

Y= utilization of agro-processing infrastructures (mean score)

X<sub>1</sub>-X<sub>8</sub>= selected socio-economic characteristics

Where;

X<sub>1</sub> = age (years)

X<sub>2</sub> = sex (female=0, male=1)

X<sub>3</sub> = level of education (years)

X<sub>4</sub> = household size (number)

X<sub>5</sub> = total household income (Naira)

X<sub>6</sub> = proximity to processing plant (km)

X<sub>7</sub> = access to credit (yes=1, no=0)

X<sub>8</sub> = total household expenditure (Naira)

e<sub>i</sub> = error term

The four functional forms were explicitly specified as follows:

$$\text{Linear function: } Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + e_i \dots\dots\dots(2)$$

Double log function:

$$\text{Ln } (Y) = b_0 + b_1\text{Ln}X_1 + b_2\text{Ln}X_2 + b_3\text{Ln}X_3 + b_4\text{Ln}X_4 + b_5\text{Ln}X_5 + e_i \dots\dots\dots(3)$$

Semi-log function:

$$Y = b_0 + b_1\text{Ln}X_1 + b_2\text{Ln}X_2 + b_3\text{Ln}X_3 + b_4\text{Ln}X_4 + b_5\text{Ln}X_5 + e_i \dots\dots\dots(4)$$

Exponential function:

$$\text{Ln } (Y) = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + e_i \dots\dots\dots(5)$$

H02; Functionality of agro-processing plants does not significantly increase household income, food availability and reduce processing

labour. This was tested using simple regression analysis expressed as follows;

$$Y = \beta_1 + \beta_2X_1 \dots\dots\dots (6)$$

Where;

Y<sub>1</sub> = Household income (N),

Y<sub>2</sub> = food availability and

Y<sub>3</sub> = processing labour (N)

X = functionality of agro-processing infrastructure (mean score)

## RESULTS AND DISCUSSION

### Socio-Economic Characteristics of Rural Household Heads in the Study Area

The socioeconomic characteristics of the rural household heads in the study area was discussed under this section and presented in table 1. They include age, marital status, household size, educational level of household head, income of household head, sources of income and market distance.

#### Age of the Respondents

Table 1 showed that 24.1% of the respondents were within the age bracket of 21-30 years, 21.2% of the respondents were within the age bracket of 31-40 years and 22.8% of them were within the age bracket of 41-50 years, while 31.7% of the respondents were within the age bracket of 51-80 years. The mean age of the respondents was 45years. This implies that the rural household heads were middle aged and still active and could participate adequately in development programmes. This finding agrees with Muhammed (2009), who reported a mean age of 40 years in his findings, implying middle age household heads with active participation in development programmes in Yobe State. This further implies that majority of the households heads are in their economic active years, with an advantage of transferring innovations that enhance productivity in their respective activities.

#### Sex of the Respondents

The result showed that 57.4% of the rural household head were female while 42.6% of them were male. This implies that majority of the household head were female. Female respondents being dominant among the respondents could be the result of women being the backbone of agricultural sector and

agricultural production. This finding agrees with Nsoanya and Nenna (2011) but contradicts Kehinde *et al.*, (2017) who reported male respondents being dominants among the respondents because of males having greater access to farmland than females. It could also be the result of the tedious nature of activities engaged by rural dwellers such as farming, which is their main occupation.

#### **Level of education**

The educational background of the respondents showed that 35.2% of the respondents had tertiary education, 32.7% of them had secondary education, 23.8% of them had primary education, while 8.3% of the respondents had no formal education. The mean years of education was 12years indicating secondary level of education. This implies that majority of the household heads had one form of education or the other, thus, had the ability or advantage of utilizing infrastructural facilities since education helps in improving ones technical-know-how and capability of utilizing improved agricultural infrastructures as observed by Ozor and Madukwe (2005). Education creates awareness about opportunities existing elsewhere and the knowledge and skills acquired support individual's quest for better standard (job) outside the farm enterprise, hence, improving the livelihood of the rural households in the study area.

#### **Marital Status**

The result on the marital status of the respondents showed that 17.3% of the

respondents were single, 70.9% of them were married, 0.3% of them were divorced and 11.4% of them were widowed. This implies that majority of the respondents were married and have families.

#### **Household Size**

The study shows that 25.9% of the respondents had household sizes that ranges from 2-4 persons, 46.9% of them had household size within the range of 5-7 persons and 21.3% of them had household size ranging from 8-10 persons. The mean household size is 6 persons. This implies that large household size has tendency of contributing to the livelihood status of the households since having large household size brings an opportunity of expanding farm or firm size, generating more revenue and meeting the welfare need of the households, therefore, commanding infrastructural development in the area. Supply of family labour is accessible to larger households and is affirmed by Nwaru (2004) who observed that larger household size was desirable, as rural households depend on their members than hired sources of labour.

#### **Occupation**

Table 1 also showed the occupational status of the respondents, 20.7% of the respondents were full-time farmers, 25.9% of them were civil servants, 9.3% of them were retirees, 19.1% of them were part-time farmers and 25.0% of them were traders. This implies that majority of the rural household heads were involved in one livelihood activities or the other.

**Table 1: Socio-Economic Characteristics of Rural Household Head**

| Variables                | Abia<br>n=108 |      | Enugu<br>n=108 |      | Ebonyi<br>n=108 |      | Pooled<br>n=324 |      |
|--------------------------|---------------|------|----------------|------|-----------------|------|-----------------|------|
|                          | F             | %    | F              | %    | F               | %    | F               | %    |
| <b>Age</b>               |               |      |                |      |                 |      |                 |      |
| 21-30                    | 23            | 21.2 | 11             | 10.2 | 44              | 40.7 | 78              | 24.1 |
| 31-40                    | 28            | 25.9 | 19             | 17.6 | 22              | 20.4 | 69              | 21.3 |
| 41-50                    | 30            | 27.7 | 26             | 24.1 | 18              | 16.7 | 74              | 22.8 |
| 51-60                    | 13            | 12.0 | 23             | 21.3 | 11              | 10.2 | 47              | 14.5 |
| 61-70                    | 09            | 8.3  | 21             | 19.4 | 10              | 9.3  | 40              | 12.3 |
| 71-80                    | 05            | 4.6  | 8              | 7.4  | 03              | 2.7  | 16              | 4.9  |
| <b>Mean</b>              | <b>43</b>     |      | <b>50</b>      |      | <b>40</b>       |      | <b>45</b>       |      |
| <b>Gender</b>            |               |      |                |      |                 |      |                 |      |
| Female                   | 40            | 37.0 | 45             | 41.7 | 52              | 48.1 | 186             | 57.4 |
| Male                     | 68            | 63.0 | 63             | 58.3 | 56              | 51.9 | 138             | 42.6 |
| <b>Educational level</b> |               |      |                |      |                 |      |                 |      |
| No formal Education      | 01            | 0.9  | 17             | 15.7 | 09              | 8.3  | 27              | 8.33 |
| Primary Education        | 10            | 9.3  | 31             | 28.7 | 82              | 75.9 | 77              | 23.8 |
| Secondary Education      | 53            | 49.1 | 23             | 21.3 | 10              | 9.3  | 106             | 32.7 |
| Tertiary Education       | 44            | 40.7 | 37             | 34.3 | 07              | 6.5  | 114             | 35.2 |
| <b>Mean</b>              | <b>13</b>     |      | <b>14</b>      |      | <b>09</b>       |      | <b>12</b>       |      |
| <b>Marital Status</b>    |               |      |                |      |                 |      |                 |      |
| Single                   | 22            | 20.4 | 11             | 10.2 | 23              | 21.3 | 56              | 17.3 |
| Married                  | 73            | 67.6 | 76             | 70.4 | 81              | 75.0 | 230             | 70.9 |
| Divorced                 | 1             | 0.9  | 0              | 0    | 0               | 0    | 01              | 0.3  |
| Widowed                  | 12            | 11.1 | 21             | 19.4 | 4               | 3.7  | 37              | 11.4 |
| <b>Household Size</b>    |               |      |                |      |                 |      |                 |      |
| 2-4                      | 36            | 33.3 | 48             | 44.4 | 17              | 15.7 | 84              | 25.9 |
| 5-7                      | 54            | 50.0 | 46             | 42.6 | 49              | 45.3 | 152             | 46.9 |
| 8-10                     | 17            | 15.7 | 16             | 14.8 | 42              | 38.9 | 69              | 21.3 |
| 11-13                    | 1             | 0.9  | -              | -    | -               | -    | 19              | 5.7  |
| <b>Mean</b>              | <b>5</b>      |      | <b>6</b>       |      | <b>8</b>        |      | <b>6</b>        |      |
| <b>Occupation</b>        |               |      |                |      |                 |      |                 |      |
| Full-time Farming        | 13            | 12   | 11             | 10.2 | 43              | 39.8 | 67              | 20.7 |
| Civil Servants           | 33            | 30   | 41             | 38.0 | 10              | 9.3  | 84              | 25.9 |
| Retirees                 | 19            | 17.6 | 11             | 10.2 | 23              | 21.3 | 30              | 9.3  |
| Part-time Farming        | 25            | 23.1 | 14             | 13.0 | 22              | 20.4 | 62              | 19.1 |
| Trading                  | 18            | 16.7 | 31             | 28.7 | 10              | 9.3  | 81              | 25.0 |

**Source:** field survey, 2017

### Income level of the rural households in the study area

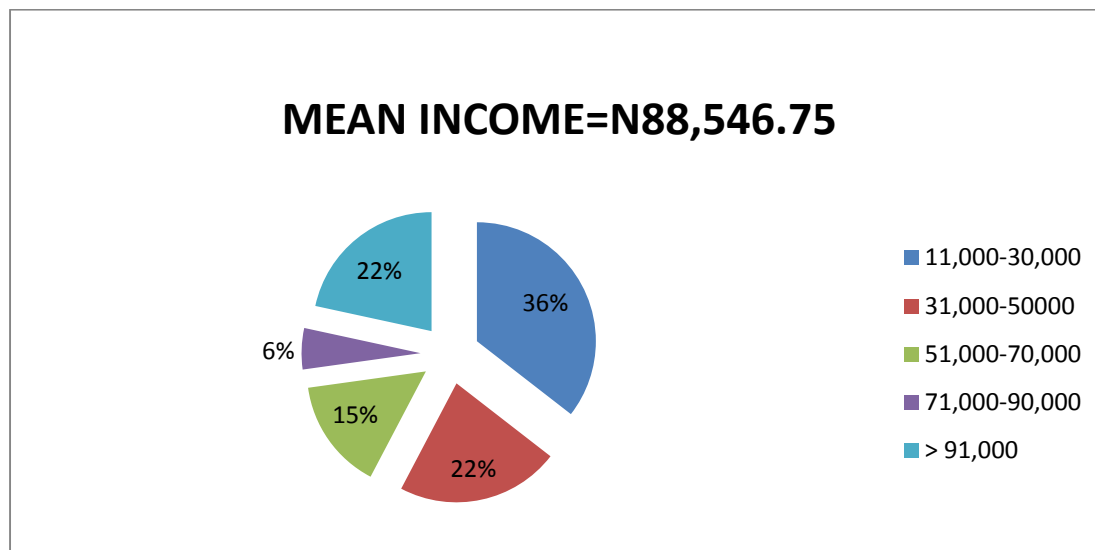


**Figure 1: Aggregate monthly income level of the rural household heads**

Source: field survey, 2017

The result in Fig 1 showed the income level of the rural households in the study area, 35% of the households had income ranging from N11, 000-30,000, 22% of them had income ranging from N31,000-50,000 and 51,000-70,000 respectively. About 15% of the respondents had income ranging from N71, 000-90,000 and 6% of them had income ranging from N91, 000 and above. Income is being considered as one of the livelihood indicators in this study. This result implied that majority of the rural households were low-income earners, and have need to improve their income thereby improving their livelihood.

#### **Perceived Effect of Agro-Processing Infrastructure on the Livelihood of Rural Households in South-East, Nigeria**

The perceived effect of agro-processing infrastructure on the livelihood of rural households is presented on the table 2. The result showed a grand mean of 3.4 implying a general positive. effect of agro-processing infrastructure on the livelihood of the rural household in the study area. Agro-processing

infrastructure is crucial for agriculture, agro-industries and overall economic development of rural areas. It also, incidentally, provides basic amenities that improve the quality of life of the rural households. Considering the importance of agro-processing infrastructures in the development perspectives of overall rural development, Chengappa (2004) reported that expanding this sector for achieving increasing employment opportunities and improved income level would help to overcome the emerging challenges of unemployment and poverty in rural areas. This agrees with the findings of this study because from the result, the rural households perceived that the presence of agro-processing infrastructure improved income ( $\bar{X}$  = 4.0), provide employment opportunities and empowerment of rural poor ( $\bar{X}$  = 3.7) respectively, increased food availability ( $\bar{X}$  = 4.0), improves storage of agricultural products ( $\bar{X}$  = 3.8), reduce processing labour and enhances processing of agricultural products ( $\bar{X}$  = 3.8).

**Table 2: Perceived Effect of Agro-Processing Infrastructure on Livelihood among Rural Households in South-East, Nigeria**

| S/N               | Effect                                                                          | Abia<br>$\bar{X}$ | SD   | Enugu<br>$\bar{X}$ | SD   | Ebonyi<br>$\bar{X}$ | SD   | South-East<br>$\bar{X}$ |
|-------------------|---------------------------------------------------------------------------------|-------------------|------|--------------------|------|---------------------|------|-------------------------|
| 1.                | Improved income                                                                 | 3.5               | 1.62 | 4.4                | .907 | 4.1                 | 1.15 | 4.0                     |
| 2.                | Local employment opportunity                                                    | 3.2               | 1.55 | 4.0                | .927 | 3.9                 | 1.04 | 3.7                     |
| 3.                | Empowerment of rural poor                                                       | 3.0               | 1.53 | 3.9                | 1.01 | 4.1                 | .944 | 3.7                     |
| 4.                | Increased food availability                                                     | 3.4               | 1.49 | 4.4                | .875 | 4.1                 | .885 | 4.0                     |
| 5.                | Increased skills for local management of resources                              | 3.2               | 1.34 | 3.4                | .919 | 3.9                 | .830 | 3.5                     |
| 6.                | Increased capacity building on technical skills of operators of infrastructures | 3.2               | 1.39 | 3.5                | 1.01 | 3.8                 | .843 | 3.5                     |
| 7.                | Increase access to market                                                       | 3.2               | 1.48 | 3.3                | .978 | 4.3                 | .753 | 3.6                     |
| 8.                | Improved value addition farm products                                           | 3.2               | 1.46 | 3.8                | .856 | 4.1                 | .659 | 3.7                     |
| 9.                | Livelihood diversified                                                          | 3.2               | 1.38 | 3.3                | .989 | 3.8                 | .731 | 3.4                     |
| 10.               | Development of new technology                                                   | 3.5               | 1.56 | 4.0                | 1.01 | 3.9                 | .783 | 3.9                     |
| 11.               | Improved storage and preservation of agricultural products                      | 3.5               | 1.42 | 4.1                | .851 | 3.9                 | .824 | 3.8                     |
| 12.               | Reduced labour for processing                                                   | 3.6               | 1.46 | 3.6                | 1.01 | 4.0                 | .766 | 3.8                     |
| 13.               | Enhancing processing of agricultural products                                   | 3.5               | 1.47 | 3.8                | 1.05 | 3.0                 | .835 | 3.8                     |
| <b>Grand mean</b> |                                                                                 | <b>3.05</b>       |      | <b>3.6</b>         |      | <b>3.9</b>          |      | <b>3.7</b>              |

Source: field survey, 2017

**Decision: mean > 3.05 indicates positive effect; mean scores < 3.05 indicates negative effect**

The grand mean for Abia, Enugu and Ebonyi State were 3.05, 3.6 and 3.9 respectively, implying a positive effect of the agro-processing infrastructures on the livelihood of the rural households. Agro-processing infrastructures are of great importance with positive effect to the rural communities. It can reduce wastage, enhance food security, improve livelihoods for low-income groups and empower women (Umar, 2012). It is particularly important as it adds value to agricultural products, which in turn translate into higher price and subsequently higher income. Processing of agricultural products not only increase the market value of produce, but also protect farmers from exposure to the price risks of unprocessed crop. In most developing countries like Nigeria, where 75% of the poor live in rural areas, agro-processing can play a deliberate role in pro-poor growth strategies (Ekong, 2003).

Comparing the effect of these infrastructure in Abia, Enugu and Ebonyi State, there was a positive effect of agro-processing

infrastructures on the livelihood of the people in Ebonyi State, Enugu and Abia States. This is because rural farmers in Ebonyi State are mostly known for rice. production, which plays a very significant role in the food security, poverty alleviation and human development chains (Amaza and Maurice, 2006). Rice is a major source of livelihood for smallholder farmers, processors and traders in the State and is a major food for urban and rural dwellers in West and Central Africa where the demand is growing at the rate of 6% per annum-faster than anywhere else in the world (Kormawa and Toure, 2005).

#### **Extent to Which the Infrastructure Have Improved Livelihood among Rural Households in the Study Area**

The result on Table 3 showed that the extent to which agro-processing infrastructure have improve livelihood include; improved the livelihood of the rural household by stabilizing food processing ( $\bar{X}$  = 3.8), increased value addition of agricultural produce, reduced cost of labour in processing, increased income and enhanced food security.

**Table 3: Extent to which the Agro-Processing Infrastructure has Improved Livelihood of the Respondents**

| Infrastruct<br>ure  | Improvement<br>Variables             |      | Abia       |      | Enugu      |      | Ebonyi     |      | South-<br>East |
|---------------------|--------------------------------------|------|------------|------|------------|------|------------|------|----------------|
|                     |                                      |      | $\bar{X}$  | SD   | $\bar{X}$  | SD   | $\bar{X}$  | SD   | $\bar{X}$      |
| Agro-<br>processing | Stabilize processing                 | food | 3.3        | 1.38 | 3.9        | .986 | 4.2        | .945 | 3.8            |
|                     | Increase value addition              |      | 3.2        | 1.47 | 3.5        | .961 | 4.0        | .760 | 3.6            |
|                     | Proper management of time and inputs |      | 2.9        | 1.50 | 3.5        | .879 | 3.9        | .774 | 3.5            |
|                     | Reduced cost of labour in processing |      | 3.0        | 1.49 | 3.7        | 1.07 | 4.0        | .784 | 3.6            |
|                     | Reduced processing labour            |      | 3.1        | 1.53 | 3.6        | 1.10 | 3.9        | 1.20 | 3.6            |
|                     | Increase income                      |      | 2.9        | 1.49 | 4.3        | 1.09 | 3.7        | 1.24 | 3.7            |
|                     | Enhancing food security              |      | 3.2        | 1.67 | 3.9        | .902 | 4.0        | .875 | 3.7            |
|                     | <b>Grand mean</b>                    |      | <b>3.1</b> |      | <b>3.6</b> |      | <b>3.7</b> |      | <b>3.6</b>     |

Source: field survey, 2017

The grand mean is 3.6, implying the general positive extent to which agro-processing infrastructure can improve livelihood among rural household in the study area. It is widely acknowledged that the contribution of agro-processing infrastructure in reducing poverty is more significant than the other goals (Willoughby, 2004).

**HO<sub>1</sub>:** There is no significant relationship between selected socio-economic characteristics and utilization of agro-processing infrastructures by the rural households in the study area. This was analyzed using multiple regression analysis.

**Table 4: Regression Estimate on the Relationship between Selected Socio-Economic Characteristics and Utilization of Agro-Processing Infrastructure by the Rural Households**

| Variables                    | Abia<br>(semi-log) | Enugu<br>(semi-log) | Ebonyi<br>(linear) | South-East<br>(exponential) |
|------------------------------|--------------------|---------------------|--------------------|-----------------------------|
| Constant                     | 1.324(5.702)***    | 1.318(8.970)***     | 1.2218(3.686)***   | .575(3.539)***              |
| Age                          | -.266(-2.001)*     | -.158(-1.316)*      | .053(.430)         | .005(1.753)*                |
| Sex                          | .372(3.079)***     | .081(.794)          | -.172(-1.579)*     | -.015(-.561)                |
| Household Level of education | -.228(-1.876)*     | -.054(-.473)        | -.170(-1.375)      | .016(2.665)**               |
| Household size               | .089(.744)         | -.054(-.513)        | -.241(-2.148)*     | -.039(-3.321)***            |
| Household income             | -.212(-1.330)      | .043(.354)          | .058(.351)         | 3.855(.730)                 |
| Distance to Market           | .166(1.594)        | -.044(-.422)        | -.018(-.169)       | -.001(-.305)                |
| Access to credit             | .088(.779)         | .263(2.056)*        | -.001(-.006)       | .001(2.255)**               |
| Household expenditure        | .262(1.720)*       | .119(.926)          | .103(.563)         | -1.141(-1.049)              |
| f-statistics                 | 1.887*             | 2.544**             | 1.283              | 3.753***                    |
| R <sup>2</sup>               | .388               | .444                | .327               | .300                        |

Source: field survey, 2017

\*keys: \*\*\* = significant at 1%, \*\* = significant at 5%

**HO rejected at 5% level**

The exponential model was chosen as the lead equation. The coefficient of

determination was 0.300, which indicates that 30.0% of the variation in the utilization of the agro-processing infrastructures was explained

by the explanatory variables stated in the model. Age, household level of education, household sizes were significant at 10%, 5% and 1% levels respectively.

The level of education was significant at 5% level and was directly related to the utilization of agro-processing infrastructure. This implies that increase in the educational level of the household heads will increase the level of agro-processing infrastructures since processing creates value addition to primary products, reduces post-harvest loss and creates more opportunities for rural economy therefore increasing the family income streams (Kehinde *et al.*, 2017).

The coefficient of household size was significant at 1% level and was inversely related to utilization of agro-processing infrastructures. This implies that a unit increase in household size of the respondents will decrease the utilization of processing infrastructures. This conforms to the a priori expectation since increase in family size has tendency of contributing to the livelihood status of the households by reducing the cost of processing labour, brings an opportunity of expanding farm or firm size, generating more revenue and meeting the welfare need of the rural households in the study area. Smith (2007) showed that increasing the number of male and female adults leads to reduce cost of farm labour and increased income. This means that households with more male and female adults in the study area are associated with decrease in the utilization of agro-processing infrastructure.

The coefficient of access to credit was significant at 5% level and was positively related to the utilization of agro-processing infrastructures. This implies that a unit increase in credit access of the respondents in the study area, will lead to a unit increase in the utilization of agro-processing infrastructures. Households that have access to credit have the ability to invest not only in agricultural production but in other income generating activities that will improve their livelihood as well. Lack of it makes the poor unable to meet investment requirements for entry into remunerative activities (Barrett *et al.*, 2001). This agrees with the finding as households that accessed credit in form of loans managed to

increase their production and processing of agricultural products throughout the year.

Age was directly related to the utilization of agro-processing infrastructures. This implies that an increase in age of the household heads would increase the level of utilization of the agro-processing infrastructures in the study area. This could be attributed to the fact that rural household heads acquired more experience as they aged in agricultural practices. This is consistent with the findings of Carolyn *et al.* (2015) who found the years of experience of household heads as a significant factor that influence households' livelihood. This could be due to the mastery of the households' livelihood activities, there, resulting, in improved productivity implying improved livelihood in the study area.

The F-value was significant at 1% level; this shows the goodness of fit of the model and the overall significance of the model.

## CONCLUSION AND RECOMMENDATIONS

The provision of rural infrastructure is basic to rural economic development, which encompasses improving the livelihood and well-being of rural households. The presence and availability of agro-processing infrastructure in southeast, Nigeria positively influenced the livelihoods of the people. Utilization of agro-processing infrastructure enables rural people increased their income portfolio and ensure households from insufficiency of food, thereby improving their food security status, while equally lessening their vulnerability to hunger, diseases and sudden death. It is therefore recommended that policy makers should emphasize in their developmental programmes the need to encourage the development of rural infrastructural facilities for rural services and urban patronage. In addition, communities where agro-processing infrastructures are located should ensure adequate maintenance and sustainability of such infrastructure. This should be done by the help of government educating the rural dwellers on the need to effectively maintain such infrastructure located in their environment.

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