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# ANALYSIS OF EFFECTS OF PUBLIC SPENDINGS ON FISHERIES SUBSECTOR OUTPUT IN NIGERIA (1980 -2017): IMPLICATIONS FOR POVERTY REDUCTION

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***Abstract***

*This study analysed effects of public spendings on the fisheries sub-sector output and its implications for poverty reduction in Nigeria, using annual time series data from National Bureau of Statistics (NBS) and Nucleic Acid Phylogenetic Profiling (NAAP) Policy data from 1980-2017, The data were analysed through trend, growth, ARDL models and Bound Test. The results revealed fluctuating trends in public spendings, fisheries outputs, and inflation. The growth model showed that public spendings accelerated (0.0024), while fisheries output (-0.0000887) and inflation (-0.00012) decelerated. The Bounds test confirmed a long-run relationship between agricultural spending and fisheries output with F-value: 7.057 at 5% level of probability. The ARDL model indicated that a unit increase in public spending reduced fisheries output by 0.033%, while higher fisheries output reduced poverty by 1.205%. The result showed that public spending has significant effect on fishery subsector output and fishery subsector output has significant effect on poverty reduction. The study recommends that the Maputo Agreement should be implemented by providing training, and offering low-interest loans to fish farmers to improve fisheries production and reduce poverty.*

***Keywords:*** *Analysis, Public spending. Fisheries, subsector, output.*

## 1.0 Introduction

Nigeria, despite being rich in human and natural resources, remains trapped in poverty (Ogujiuba, 2014). Although the economy grew at an average rate of 7.3% from 2000 to 2007, poverty persists. The National Bureau of Statistics (2012) reported a 69%

poverty incidence, with 112.47 million people living in poverty, despite the country's paradoxical economic growth. While agriculture holds significant potential, its impact on poverty reduction and self-sufficiency remains limited (Ajumon & Ogwumike, 2013). The sector could drive growth if value chains for key commodities are optimized to reduce waste and prevent oversupply (Gnansounou, 2011).

Nigeria is one of the world's poorest and most unequal countries, with over 80 million people (64% of the population) living below the poverty line (Seun, 2016). This situation has worsened over time, with key factors including low private investment in agriculture, limited access to resources, poor technology, and unreliable power supply (Ajumon & Ogwumike, 2013). However, countries that have significantly boosted agricultural productivity have also seen the greatest reduction in poverty (Ajumon & Ogwumike, 2013). Agriculture, as the largest employer in Nigeria, has the potential to create wealth, generate employment, and drive sustainable poverty reduction through increased investment.

Fish farming is considered a key solution to poverty, nutritional deficiencies, and food insecurity, especially in developing countries like Nigeria. It provides high-quality protein and essential nutrients at affordable prices for poorer communities, along with employment and income opportunities. Given these benefits, fish farming has been one of the fastest-growing food production sectors globally (Tacon, 2001). Despite strong demand and booming trade in fish, Nigeria has yet to fully leverage fish farming to reduce poverty. Over 100 million Nigerians, including fish farmers, still live in poverty (NBS, 2012), and the country spends about N125 billion annually on fish imports (Nnodim, 2014).

While studies on public agricultural spending and agricultural output exist, few

have examined the link between public agricultural spending and sub-sector output, particularly its implications for poverty reduction in Nigeria. Notable studies include Timmer (1994), who explored the connection between agricultural development, food availability, and poverty reduction; Asiru and Ben (2016), who assessed fish farming's potential for poverty reduction in Ondo State; and Ihugba *et al.* (2013), who analysed government spending on agriculture and its economic impact. However, most studies focus on aggregate agricultural growth, with limited attention to the fisheries sub-sector or specific time frames. This study aims at filling this gap by analysing the effects of public agricultural spendings on the fisheries subsector, for poverty reduction in Nigeria, using time series data. It will examine trends in agricultural spending, poverty, livestock output, inflation, agricultural land, and labour from 1980 to 2017.

### 1.1 Statement of the Problem

Despite significant efforts by successive governments to reduce poverty, little progress has been made in addressing this issue (Foluso *et al.*, 2005).

Timmer (1994) noted from his study that there existed a direct link between agricultural development, food availability, caloric intake by the poor and reduction in poverty. According to him, the essential first step in breaking the cycle of poverty is to increase agricultural productivity.

Ogunfiditimi (1996) noted that until the late 1950s, agriculture accounted for over 60% of Nigeria's GDP. Although its contribution has declined due to the oil boom and industrial growth, agriculture still provides employment for over 70% of Nigerians through farming and agro-allied industries. Abayomi (1997) supported this view, stating that agriculture is both a traditional staple and a driver of sustained economic growth in developing countries. He emphasized that agricultural progress has supported

industrialization, contributing at least 40% of Nigeria's GDP and over 60% of employment. Ihimodu (2007) argued that the country's high poverty levels are linked to the declining status of agriculture.

Asiru and Ben (2016), examined poverty reduction potential of fish farming in Ondo State. The study examined fish farming business and its capability to reduce poverty and invariably foster wealth creation in Akure South and Owo Local Government Areas of Ondo State, Nigeria. The result of the study revealed that fish farming was profitable in the study areas with a net farm income of N2423.37/$m^2$ being realised at the end of the production cycle, a poverty line value of N461.89/day among the fish farmers which is higher than the one dollar a day benchmark of the World Bank.

Iruo *et al.* (2018) in their study on the economics of smallholder fish farming to poverty alleviation in the Niger Delta region of Nigeria using enterprise budgeting, Foster-Greer-Thorbecke and Tobit regression models, we found that fish farming in the region is profitable and the depth of poverty on fish farming households is high. The effects of socioeconomic variables, farm size and assets on poverty were generally negative, indicating several interactions between poverty and the variables analysed.

Ihugba *et al.* (2013) analyzed the relationship between Nigeria's government expenditure on agriculture and its impact on economic growth using time series data from 1980 to 2011. They applied the Engle-Granger two-step modeling (EGM) procedure, which included co-integration, the unrestricted Error Correction Model, and Pairwise Granger Causality tests. Their findings showed that agricultural contribution to GDP and government expenditure on agriculture are cointegrated. They concluded that reducing government spending on agriculture would negatively affect Nigeria's economic growth.

Despite these major roles agriculture plays, Hasan and Quibria (2004) cautioned

against what they call the misplaced 'agricultural fundamentalism', or the argument that agricultural growth always lead to more rapid poverty reduction, because they also found that while agriculture was the most effective in poverty reduction in South Asia and sub-Saharan Africa, poverty reduction in East Asia resulted more from the industrial sector and in Latin America from the services sector.

## 2.0 Objectives of the Study

The broad objective of this study was to assess effects of public agricultural spending on fisheries subsector output and poverty reduction in Nigeria. The specific objectives were to:

i. examine the trends in public agricultural spendings, fisheries subsector output in Nigeria;
ii. ascertain the direction and growth rates of public agricultural spendings, fisheries subsector output;
iii. analyze effects of public agricultural spendings on fisheries subsector output in both short and long run;
iv. determine effects of fisheries subsector output on poverty in both short and long run.

## 3.0 Methodology

This study adopted a documentary analysis form of survey, which made use of time series data from 1980 to 2017. Data were collected from National Bureau of Statistics (NBS) and Nucleic Acid Phylogenetic Profiling (NAAP) Policy data. Analysis was done using both descriptive and inferential statistics. Also preliminary unit root tests such as the Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) tests were conducted on all the series. Growth model, Autoregressive Distributed Lag (ARDL) model were used.

Test of hypotheses was done using Bounds test and T-test.

**Measurement of Variables**

Table 1 below shows the measurement of variables as used in the analysis. Fishery sub-sector output was measured in tonns and sourced from NAAP Policy data with the symbol fishery. Agricultural spending and inflation rate were measured in Naira and percentages, respectively and sourced from CBN, while poverty rate was measured in percentage sourced from NBS.

**Table 1: Measurement of Variables**

| Variables | Measurement | Source | Symbol |
|---|---|---|---|
| **Fisheries** | Tonns | NAAP Policy Data | FIshery |
| **Agricultural spending** | Naira | CBN | Agrspdin |
| **Inflation rate** | Percentage | CBN | Inflrt |
| **Poverty rate** | Percentage | NBS | Pov |

Author's Computation, 2020

**Growth model**

Growth model was used to ascertain direction and growth rates of variables of interest and was specifically stated for the variables of interest as below:

$$\ln Y_t = \alpha + \beta_{fish} t + \mu_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

$$\ln Y_t = \alpha + \beta_{pagr} t + \mu_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

$$\ln Y_t = \alpha + \beta_{pov} t + \mu_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

where: $\alpha$ = intercept;

$\beta$ = vector of the trend variable and $\mu$ is the econometric error term.

$\beta_{fish}$, $\beta_{pagr}$, $\beta_{pov}$ = coefficients of the trend variable for fisheries sub-sector production, public agricultural spending, and poverty respectively.

A semi-log growth rate model was developed for this study instead of a linear trend model because the study was interested in both absolute and relative change in

the parameters of interest. The parameter of utmost interest in equations (1 – 3) is coefficient of β, the slope coefficient which measures the constant proportional/relative change in Y for a given absolute change in the value of the regressor, t.

Firstly, multiplying β by 100, gives the instantaneous growth rate (IGR) at a point in time.

IGR= β X 100 ……..… (4)

where: IGR = Instantaneous growth rate and

β = is the least-square estimate of the slope coefficient

Secondly, taking the anti-log of β subtracting 1 from it and then multiplying the difference by 100 gives the compound growth rate (CGR) over a period of time. The compound growth rate (CGR) in percentage in each of the five cases can be recovered from the equations 1 – 3 in the following manner:

$CGR = (e^{\beta i}-1)*100$ ……. (5)

Where $\beta_i$ = the coefficient of the trend variable in the respective cases

Further, the quadratic form of the model was estimated as:

$$lnY = \alpha + \beta_{1t} + \beta_{2t}{}^{2} + u_t \quad \ldots\ldots (6)$$

If is positive and statistically significant there is acceleration in growth, if $\beta_2$ is negative $\beta_2$ and statistically significant there is deceleration in growth, if $\beta_2$ is not statistically significant there is stagnation in the growth process.

**ARDL model for the effect of public agricultural spending on fishery sub-sector output**

Once the existence of a long run co-integration relationship was established, the

conditional ARDL long run model for *fishery* were estimated following the unrestricted error correction model as:

$$Y_t = \beta_0 + \sum_{i=1}^{p1} \theta_1 Y_{t-i} + \sum_{i=1}^{q1} \beta_1 X_{1t-i} + \sum_{i=1}^{q2} \beta_2 X_{2t-i} + \varepsilon_t \quad \ldots\ldots\ldots\ldots \quad (7)$$

Finally, the short run dynamic parameters from estimating an error correction model associated with the long run estimates is specified as follows:

$$\Delta Y_t = \delta_0 + \sum_{i=1}^{p} \varphi_1 \Delta Y_{t-i} + \sum_{i=1}^{q1} \delta_1 \Delta X_{1t-i} + \sum_{i=1}^{q2} \delta_2 \Delta X_{2t-i} + \pi ECM_{t-1} + \varepsilon_t \quad (8)$$

Where $Y_t$ is fisheries (fIshery) sub-sector output in tons

$X_{1t}$ is public agricultural spending (agrspdin) in Naira

$X_2$t is inflation rate (inflrt) in percentage

$ECM_{t-1}$ is the error correction term

$E_t$ is the error term

$\pi$ is speed of adjustment

p and q are lags.

**ARDL model for the effect of fishery sub-sector output on poverty**

Once the existence of a long run co-integration relationship was established, the conditional ARDL long run model for *poverty* was estimated following the unrestricted error correction model as:

$$Y_t = \beta_0 + \sum_{i=1}^{p} \beta_1 Y_{t-i} + \sum_{i=1}^{q1} \beta_1 X_{1t-i} + \sum_{i=1}^{q2} \beta_2 X_{2t-i} + \varepsilon_t \quad (9)$$

Finally, the short run dynamic parameters from estimating an error correction model associated with the long run estimates was specified as follows:

$$\Delta Y_t = \delta_0 + \sum_{i=1}^{p} \varphi_1 \Delta Y_{t-i} + \sum_{i=1}^{q1} \delta_1 \Delta X_{1t-i} + \sum_{i=1}^{q2} \delta_2 \Delta X_{2t-i} + \pi ECM_{t-1} + \varepsilon_t \quad (10)$$

Where $Y_t$ is poverty rate (in percentages)

$X_{1t}$ is fisheries sub-sector output (tons)

$X_{2t}$ is inflation rate (inflrt) in percentage

$ECT_{t-1}$ is the error correction term

$E_t$ is the error term

p and q are lags

## 4.0 Results and Discussion

### 4.1 Summary Statistics of Variables Used

The summary statistics of the variables used for analysis are presented in Table 2. The results show that all the variables have positive mean values. This implies that on the average public agricultural spending (agrspdin), fishery sub-sector output (fshry), inflation rate (inflrt) and poverty rate (pov) are increasing over the years.

Table 2: Summary Statistics

| Variable | Agrspdn | Fshry | inflrt | Pov |
|---|---|---|---|---|
| Minimum | 11.230 | 158445.0 | 5.400 | 12 |
| Maximum | 63637822 | 1154778 | 72.800 | 86 |
| Mean | 1694289 | 528734.7 | 19.266 | 49 |
| Observations | 38 | 38 | 38 | 38 |

Source: Author 's computation (2020).

### 4.2 Augmented Dickey-Fuller (ADF) Unit root tests

The unit root test results, presented in Table 3, tested the null hypothesis of unit root (non-stationarity) against the alternative hypothesis of no unit root (stationarity). The findings indicate that public agricultural spending (agrspdin), fishery subsector output (fshry), inflation rate (inflrt), and poverty rate (pov) were not stationary at their levels, as evidenced by the Augmented Dickey-Fuller (ADF) statistics, which were lower than the critical values at 10%, 5%, and 1%. However, these variables became stationary after first differencing.

Table 3: Results of Augmented Dickey-Fuller (ADF) Unit Root Tests

| Variables | | Levels | | 1ST Diff. | |
|---|---|---|---|---|---|
| | ADF | CRITICAL VALUE | ADF | CRITICAL VALUE | DECISION |
| LGFSHRY | -0. 633 | -2.943 | -6. 499 | -2.946 | I(1) |
| LGAGRSPDIN | -0.597 | -3.633 | -6.948 | -3.633 | I(1) |
| LGAGRLND | -1.757 | -2.943 | -6.630 | -2.946 | I(1) |
| LGAGRLAB | 0.017 | -2.946 | -9.158 | -2.946 | I(1) |
| LGINFLRT | -3.400 | -2.943 | -6.156 | -2.946 | I(1) |
| LGPOV | -1.307 | -2.943 | -7.304 | -2.946 | I(1) |

Source: Author's Computation (2020)

### 4.3 Trends in Nigeria's Fisheries Output (1980 – 2017)

Figure 1 summarizes the trends in fishery output from 1980 to 2017. Between 1980 and 1997, fishery production steadily increased, consistent with Omeje (2008), who noted that private sector investment in fisheries led to rapid expansion to meet growing demand. From 1998 to 2017, fishery output continued to rise, although with fluctuations. This contrasts with Udah *et al.* (2015), who analyzed agricultural sub-sector growth in Nigeria from 1960 to 2010 and found a deceleration in all agricultural sub-sectors, with their contribution to growth declining from 64% to 46%.

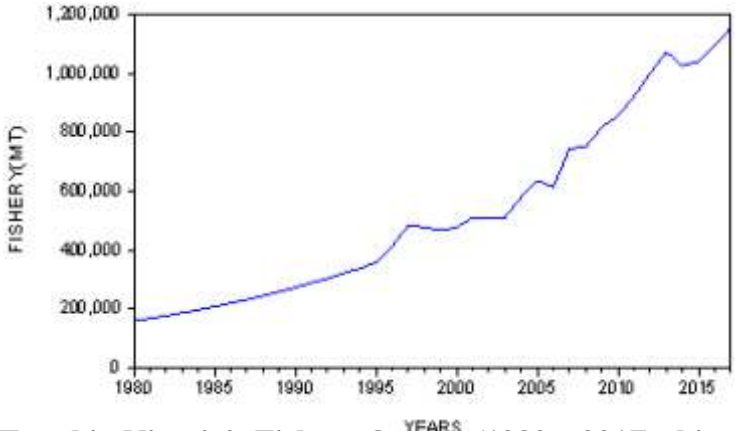


**Figure 1: Trend in Nigeria's Fishery Output (1980 – 2017)-this should have been updated to 2023 at least. 2017 is seven years ago and a lot has happened.**

**Source: Author's Compilation (2020).**

### 4.4 Trends in Nigeria's inflation rate (1980 – 2017)

Figure 2 summarized the inflation rate trends in Nigeria (1980-2017) showing significant fluctuations. From 1980 to 1985, inflation ranged from 10% to 23.2%, before dropping to 5.7% in 1986. This aligns with Ogbokor's (2004) study, which highlighted imported inflation's negative impact on growth. Between 1986 and 1988, inflation spiked from 7% to 54.5%, likely due to the Naira's devaluation and the Structural Adjustment Programme (SAP). This is consistent with Dikeogu's (2018) findings on public spending and inflation which showed a negative impact. From 1989 to 1990, inflation fell from 50.5% to 7.4%, supporting Dikeogu, (2018) that inflation rate has been on double digit and has moved up and down within the period of discussion.

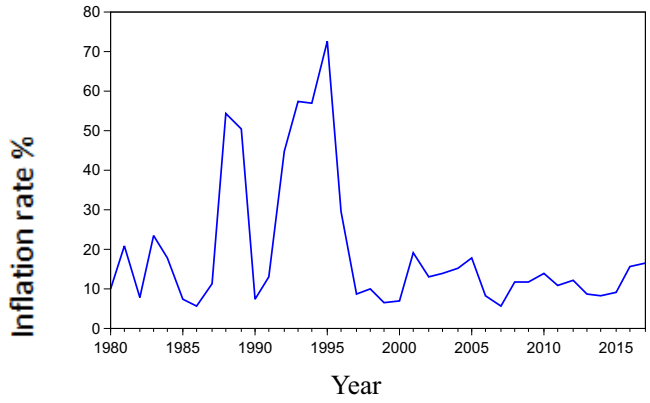


Figure 2: Trend in Nigeria 's Inflation Rate (1980 – 2017)

Source: Author 's compilation (2020).

### 4.5 Trends in Nigeria's poverty rate (1980 – 2017)

Figure 3 shows Nigeria's poverty trends from 1980 to 2017. Poverty steadily increased from 1980 to 2002, despite fluctuations, as reported by NBS (2012) due to high unemployment. Between 2002 and 2003, poverty sharply declined, supporting Adigun et al. (2011), who found a link between income growth and poverty reduction. Poverty rose

again from 2003 to 2008, as Nigeria struggled to convert oil wealth into development (Akanbi & Du Toit, 2011). From 2009 to 2010, poverty dropped, aligning with Ijaiya et al. (2011) whose studies found out that economic growth reduces poverty. From 1980 to 2008, poverty increased despite fluctuations, confirming reports by the African Development Bank (2010) and Ugwu (2012) on declining per capita income and Nigeria's decline from a middle-income to one of the world's poorest nations. Between 2013 and 2014, poverty declined again, supporting Hassan *et al.* (2014), who linked poverty reduction to economic growth. However, from 2014 to 2017, poverty steadily rose, consistent with Oyeranti and Olayiwola (2005), who noted that poverty persisted despite efforts from the Nigerian government.

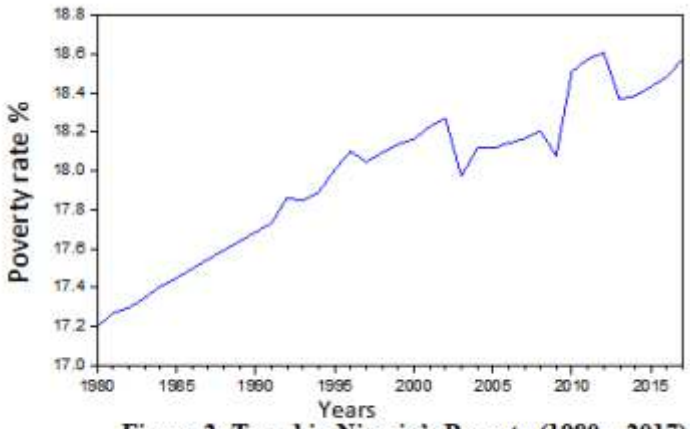


**Figure 3: Trend in Nigeria's Poverty (1980 – 2017)**
**Source: Author's compilation**

### 4.6 Trends in Agricultural Spending (1980 - 2017)

Figure 4 summarized the trends in agricultural spending. Specifically, between 1980 and 2016, agricultural spending increased from 13.9 million Naira in 1980 to 637,378 million Naira in 2016 and 63,637,822 million Naira in 2017 during the period under review. This result is in line with Ogbodo *et al,* (2020) findings, stating that the

figures for average capital expenditure for the period 2011 to 2018 was N72.06 billion as compared to N71.14 billion within 2001 to 2011.

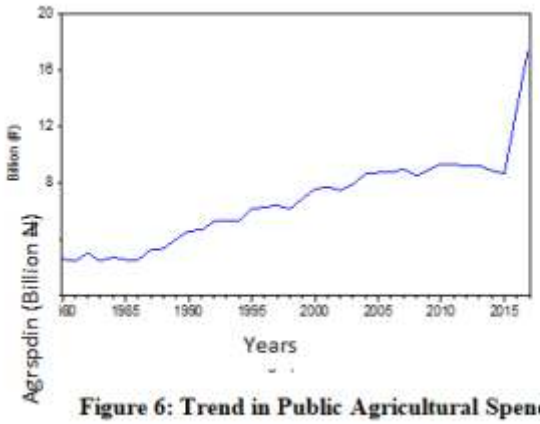


**Figure 6: Trend in Public Agricultural Spending (1980 – 2017)**

**Source: Author's compilation**

The results of the growth rate and direction of growth are presented in Tables 4 and 5. The direction of growth showed that the coefficients for public spending (0.0024) was positive and significant at the 1% level. This suggests that public spending increased during the period, possibly due to government efforts to diversify the economy from oil to agriculture. The coefficient of fishery sub-sector output (-8.87E-05) was negative and significant at 1%. This implies that fishery sub-sector output decelerated over the period under review. This may be due to inadequate investment in agriculture, Nigeria's failure to implement the Maputo Agreement, and challenges like high feed costs, animal diseases, and poor infrastructure. This aligns with McKay (2012) and Bamaiyi (2014), who noted that farmers lack the resources needed for optimal productivity. Further, the result of growth rate showed that instantaneous growth were positive for agrspdin, fshry, inflrt and pov and their corresponding values were 1.31%, 1.05%, 1.15%, and 1.03% respectively while on the other hand the compound growth rate were 1.36%, 1.05%, 1.16% and 1.03% respectively. This implied that higher fisheries output reduced poverty.

Table 4: Instantaneous and Compound Growth Rate

| | Instantaneous % Growth Rate | Compound Growth rate % |
|---|---|---|
| Public agric spending (lnagrspdn) | 1.31 | 1.36 |
| Fishery subsector (lnfshry) | 1.05 | 1.05 |
| Inflation Rate (lninflrt) | 1.15 | 1.16 |
| Poverty (lnpov) | 1.03 | 1.03 |

Source: Author 's computation (2020)

5: Direction of Growth of Nigeria 's agricultural spending and fisheries subsector output (1980 – 2017)

| | Agrspdin | Fshry | Inflrt | pov |
|---|---|---|---|---|
| Constant | 2.225 | 11.958 | 2.671 | 17.203 |
| @Trend | 0.180 | 0.059 | 0.032 | 0.057 |
| @Trend $^2$ | 0.002 | -8.87E-05 | -0.001 | -0.001 |
| t-value | (2.371)** | (19.239)*** | (0.794) | (9.357) |
| $R^2$ | 0.849 | 0.993 | 0.091 | 0.936 |
| F-value | 98.429 | 2517.422 | 1.749 | 257.530 |
| Akaike criterion | 3.456 | -2.973 | 2.172 | -1.603 |
| Durbin-watson stat | 0.708 | 0.887 | 1.078 | 1.099 |
| Pro(f-statistic) | 0.000 | 0.000 | 0.189 | 0.000 |
| Decision | Accelerated | Decelerated | Decelerated | Decelerated |

*, ** and *** indicate significance at 1 %, 5 % and 10 % levels respectively
Source: Author 's computation (2020)

## 4.8 Effect of Agricultural Spending on Fishery Subsector Output in both Short and Long Run

### Bounds cointegration test for agricultural spending and fishery output

The result of Bounds co-integration test that shows whether long-run relationship exists among the variables is presented in Table 6. The F-statistics value of 7.057 is higher than the critical value of the I1 bound value of 3.34 at 5% probability level, showing that long run relationship exist among variables. Hence, we reject the null hypothesis which states that public spending in agriculture does not have long run relationship with fishery subsector output in Nigeria.

**Table 6: Bounds Test for co -integration between Public Spending and Fisheries Output**

| Test Statistic | Value | K |
|---|---|---|
| F-Statistics | 7.057 | 5 |
| Critical Value Bound | | |
| Significance | I0 Bound | I1 Bound |
| 10% | 1.81 | 2.93 |
| 5% | 2.14 | 3.34 |
| 2.5% | 2.44 | 3.71 |
| 1% | 2.82 | 4.21 |

**Source: Author's Computation (2020)**

**ARDL Estimates for long and short run effects of public agricultural spending on the fishery subsector**

The results of the short-run effects of public spending (lnagrspdin) on fishery subsector output (lnfshry) are presented in Table 7. The R-squared value is 0.998, indicating that 99.8% of the variation in fishery subsector output is explained by the explanatory variables in the model. The cointegration equation has a negative coefficient of -0.109, suggesting that the system has a self-adjustment mechanism. This means that any disequilibrium from the previous year will be corrected in the current year at a rate of 10.9%, allowing the model to return to equilibrium.

In the short run, fishery subsector output in the previous year was negative but significant at 1%, implying that, a unit increase in fishery subsector output decreases fishery subsector output by 0.762% in the previous year. This is against the findings of FAO that Nigeria fish import is on the rising side as fish importation is estimated 560,000 tonnes estimated at about US$400 million annually while annual domestic fish supply in Nigeria stands at about 400, 000 tonnes (FAO, 2016: Iheke and Nwagbara, 2004). In addition, fishery subsector output lag 2 was negative but significant at 5%, implying that a unit increase in fishery subsector output decrease fishery subsector output by 0.518%. In the same vein, a unit increase in public spending lag 2 decrease fishery subsector output by 0.033%. This may be due to inadequate budgetary allocation to the sector. This is in contrast to the findings of Cletus and Sunday (2018) who examined government expenditure on agriculture and economic growth in Nigeria (1985-2015) and found that there is a positive and significant relationship between government expenditure on agriculture and economic growth in Nigeria. However, in the long run, public agricultural spending have no significant effect on fishery subsector output during the

period under review.This could be as a result of change in government policies due to new administrations

Table 7: ARDL Estimates of the Effects of Agricultural Spending on the Fishery Sub-sector Output

| Short run estimates | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std Error | t-Statistic | Prob |
| D(LNFSHRY(-1)) | -0.762* | 0.238 | -3.206 | 0.008 |
| D(LNFSHRY(-2)) | -0.518** | 0.243 | -2.132 | 0.054 |
| D(LNAGRSPDIN) | 0.018 | 0.017 | 1.042 | 0.318 |
| D(LNAGRSPDIN(-1)) | 0.014 | 0.014 | 0.992 | 0.341 |
| D(LNAGRSPDIN(-2)) | -0.033** | 0.014 | -2.404 | 0.033 |
| D(LNINFLRT) | -0.009 | 0.017 | -0.516 | 0.615 |
| D(LNINFLRT(-1)) | -0.02 | 0.022 | -0.877 | 0.398 |
| CointEq(-1) | -0.109 | 0.164 | 0.665 | 0.519 |
| Long run estimates | | | | |
| Variable | Coefficient | Std Error | t-Statistic | Prob |
| LNAGRSPDIN | -0.35 | 0.636 | -0.55 | 0.592 |
| LNINFLRT | -0.693 | 1.008 | -0.687 | 0.505 |
| R-squared | 0.998 | | | |
| Adjusted R-squared | 0.995 | | | |
| F-statistic | 504.044 | | | |
| Prob(F-statistic) | 0.000 | | | |

Source: Author 's Computation (2020)

**Effect of fishery subsector output on poverty in both Short and Long Run**

**Bounds cointegration test for fishery output and poverty**

The bounds co-integration test result for fishery output is represented in Table 8 as shown below. The F statistics value of 6.065 is higher than the critical value of the I1 bound value of 3.34 at 5% probability level, showing that a long run relationship exist among variables, fishery, agricultural spending, agricultural labour, agricultural land, inflation rate and poverty.

Table 8: Bounds Test for Co-integration between Fisheries Output and Poverty

| Test Statistic | Value | K |
|---|---|---|
| F-statistic | 6.065 | 5 |
| Critical Value Bounds | | |
| Significance | I0 Bound | I1 Bound |
| 10% | 1.81 | 2.93 |
| 5% | 2.14 | 3.34 |
| 2.5% | 2.44 | 3.71 |
| 1% | 2.82 | 4.21 |

Source: Author 's Computation (2020)

**ARDL Estimates for long and short run effects of fishery subsector output on poverty**

Table 9 presents the short-run effects of fishery subsector output (LNFSHRY). The $R^2$ value of 0.998 indicates that 99.8% of the variation in fishery output is explained by the model's variables. The negative and significant cointegration coefficient (-1.742) at the 1% level of significance shows a self-adjustment mechanism, meaning errors from the previous year are corrected at a speed of 174.2%. In the short run, a 1% increase in poverty rate from the previous year raises poverty by 0.718%. Conversely, a 1% increase in fishery subsector output reduces poverty by 1.205%, supporting Omotayo (2010) who highlighted the importance of fish in Nigeria's diet. Public agricultural spending decreases poverty by 0.086%, consistent with Olujimi (2010), who noted significant investments in aquaculture.

Table 9: ARDL Estimates of the Effect of Fishery Subsector Output on Poverty

| Short run estimates | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(LNPOV(-1)) | 0.718* | 0.223 | 3.213 | 0.011 |
| D(LNPOV(-2)) | 0.443 | 0.197 | 2.247 | 0.051 |
| D(LNPOV(-3)) | 0.27 | 0.195 | 1.386 | 0.199 |
| D(LNFSHRY) | -0.382 | 0.425 | -0.898 | 0.393 |
| D(LNFSHRY(-1)) | -0.131 | 0.409 | -0.321 | 0.755 |
| D(LNFSHRY(-2)) | -1.205** | 0.392 | -3.074 | 0.013 |
| D(LNAGRSPDIN) | -0.086*** | 0.041 | -2.087 | 0.067 |
| D(LNAGRSPDIN(-1)) | 0.038 | 0.027 | 1.416 | 0.19 |
| D(LNAGRSPDIN(-2)) | -0.044 | 0.031 | -1.425 | 0.188 |
| D(LNINFLRT) | -0.023 | 0.028 | -0.813 | 0.437 |
| D(LNINFLRT(-1)) | -0.03 | 0.03 | -1.026 | 0.332 |
| CointEq(-1) | -1.742 | 0.318 | -5.484 | 0.000 |
| Long run estimates | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| LNFSHRY | 0.922 | 0.111 | 8.288 | 0.000 |
| LNAGRSPDIN | -0.067 | 0.022 | -3.068 | 0.013 |
| LNINFLRT | 0.047 | 0.019 | 2.542 | 0.032 |
| R-squared | 0.998 | | | |
| Adjusted R-squared | 0.995 | | | |
| F-statistic | 504.044 | | | |
| Prob(F-statistic) | 0 | | | |

Source: Author 's Computation (2020

## 5.0 Conclusion and Recommendations

### 5.1 Conclusion

This study assessed public spendings on fisheries subsector output and the implication for poverty reduction in Nigeria, using time series data from 1980 to 2017. It is concluded that the trends of public spendings, fishery subsector output, inflation and poverty rate were fluctuating during the period under review. The results show that public spendings accelerated, while fishery subsector output and inflation decelerated, during the period under review. The results further show that, public spending has significant effect on fishery subsector output in the short run, but no significant effect in the long run, during the period under review. The results also revealed that fishery subsector output has significant effect on poverty in both long and short run.

### 5.2 Recommendations

Based on the findings of this study, it is recommended that:

1. Given that public spending has significant effect on fishery subsector output, there is need for government and other stakeholders to implement the Maputo Agreement of 10% of budgetary allocation to the agricultural sector, which will in no doubt increase output. This would help the agricultural sector to contribute to poverty reduction in Nigeria.
2. Government through the Federal Ministry of Agriculture and Rural Development (FMARD) should spend more funds towards capacity building and training of entrepreneurs on fishery subsector and then provide soft loans at low interest rate to encourage more participation in agriculture.

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