

# **NIGERIAN SOUTHEAST JOURNAL OF AGRICULTURAL ECONOMICS & EXTENSION**

**Volume 5 Numbers 1 & 2 June 2003**

**ISSN: 1182-9622**

## **CONTENTS**

Evaluating fertilizer procurement and distributive efficiency in Akwa Ibom State, Nigeria: <i>Udoth, E.J., N.A. Etim and I.C. Idiong</i> ... ... ... ...	1
Influence of age and time of transplanting on the number of leaves, leaf production interval and leaf extension rate of oil palm polybag seedlings transplanted into the field: <i>Willis Ubi</i> ... ... ... ...	10
Stimulating private honey hunters/beekeepers in sustainable agroforestry in Ikom, Nigeria: <i>I. Ojating</i> ... ... ... ...	19
Effect of cutting frequency and levels of applied nitrogen on yield digestible organic matter (DOM) of herbage of three tropical grasses: <i>Willis Ubi</i> ...	25
The prevalence and the economic importance of <i>Bovine fascioliasis</i> in Cross River state: <i>Patrick U. Owai</i> ... ... ... ...	34
Resource use efficiency and (income) sustainability of pineapple farmers in Cross River state, Nigeria: <i>Abang, S.O., O.E. Akpan &amp; O.A. Nsan</i> ...	42
Beliefs, norms and social values in the fishing communities of West African sub-region: Akwa Ibom State experience: <i>A.J. Udoth</i> ... ...	55
The role of indigenous knowledge in research development: Implication for farmers participation in Nigeria agricultural research and extension: <i>Ogbonna, K.I. &amp; Okoroafor, E.</i> ... ... ...	70
Supply response of selected fishes in Nigeria (1980-1998): <i>Etuk E.A., D.S. Udom &amp; I.A. Isangedighi</i> ... ... ...	85

**Published by the Departments of Agricultural Economics & Extension,  
University of Uyo & University of Calabar, Nigeria.**

## **EVALUATING FERTILIZER PROCUREMENT AND DISTRIBUTIVE EFFICIENCY IN AKWA IBOM STATE, NIGERIA**

**UDOH, E.J.<sup>1</sup> ETIM, N.A<sup>1</sup>. IDIONG, I.C<sup>2</sup>**

<sup>1</sup> Department Of Agricultural Economics and Extension, University Of Uyo – Akwa Ibom State

<sup>2</sup> Department Of Agricultural Economics and Extension, University Of Calabar, Calabar

### **Abstract**

This study empirically assessed the efficiency of procurement and distribution of fertilizer by Fertilizer Procurement and Distribution unit (FPDU) and also determines the growth and instability, or otherwise, of quantity of different types of fertilizer procured between 1993 and 2001. Analysis of the data collected from FPDU with indices of efficiency, instability and growth rate indicate rather dismal fertilizer situation in the State. Specifically, the study reveals that fertilizer is procured in larger quantities after period of intense demand, which is an indication of poor procurement efficiency for both first and second planting season. For price (distributive) efficiency index, the study reveals increasing price disparity between the official price and the black market price, thus decreasing efficiency over the period. In terms of annual growth rate and level of instability, the study further reveals that NPK brand of fertilizer has a higher negative growth rate and higher variability indices than Urea brand of fertilizer. This implies that NPK brand procurement is more inconsistent and lower than Urea brand of fertilizer. Based on the findings, the study concludes that the level of fertilizer procurement and distribution efficiency in the State has been very low for the period under review and as such the fertilizer needs of the farmers in the state is not met. The study therefore recommend timely delivery of fertilizer to farmers during peak period by: multiplication of warehouse; direct sale of fertilizer at local market places; strong and close cooperation with the State Agricultural Development Project (AKADEP) and its extension agents in the dissemination of information on fertilizer availability.

### **Introduction**

The multifaceted and competitive demand for land for both agricultural and non-agricultural purposes, coupled with the loss of about 16, 000 hectares of land annually through various forms of land

degradation, has impacted negatively on food production in Nigeria (IITA, 1999). To a considerable extent, supply of land for agricultural purpose have been constrained, thereby creating a demand – supply disequilibrium situation. Consequent upon

this situation, there have been a paradigm shift from the traditional practice of shifting cultivation, [which allows for natural replenishment of depleted soil nutrients] to an intensive and continuous cropping, which leads to a decline in soil fertility. The evolving farming systems have affected crop production and food supply situation overtime. As pointed out by various authors, when soil nutrients have been lost, either by natural or man-made factors, the yield of crops will be adversely affected or the turnover per hectare cannot be optimized (Henao and Baanante, 2001; Breman, 2002 and Pretty, 2003).

Meeting the food demand of a teeming population of Nigeria therefore requires a high level of agricultural productivity, which under the present condition of declining supply of land is partially dependent on fertilizer use. Adequate fertilization of crops is accepted as a panacea for sustainable crop production among the resource poor farmers (IFA, 2002; Singh, 2002; Effiong *et al*, 1997). Fertilizer use has been identified as an important component of agricultural development. Bhilegaonke [1979] observed that if high yielding dwarf wheat and rice varieties were the catalysts that ignited the green revolution, then chemical fertilizer was the fuel that powered its forward thrust. In the Nigerian agricultural system, the concept of fertilizer use has been cardinal issue in the

introduction and transfer of improved agricultural technologies by various State Ministries of agriculture and their extension agencies to farmers.

There have been high level of awareness and adoption of fertilizer use by farmers. This invariably has pushed up demand for fertilizer more proportionately above supply, thereby creating situation of scarcity, high cost and other sharp practices of marketing and distribution. FAO (1983) reported a steady increase and growth in the demand for fertilizer over the years, which have not been marched with commensurate increase and growth in supply of fertilizer.

In Akwa Ibom State, a predominantly agrarian State, fertilizer availability has generated a lot of controversy. There are overwhelming complaints and claims of unavailability/insufficiency and high cost of fertilizer by practicing farmers. Various empirical studies carried out in this State identified the problem of fertilizer unavailability as a major crop production constraint (Effiong *et al*, 1997; Udoh, 2001; Esumo, 2002). The farmer's complains and claims strongly negate government incessant claims or perhaps propaganda of procuring, distributing and heavily subsidizing the cost of fertilizer to farmers. Principally, the establishment of Fertilizer Procurement and Distribution Unit (FPDU) and subsidization of fertilizer cost by the State government was

aimed primarily at circumventing the market disequilibrium problems associated with fertilizer availability. But this noble effort by the government seems to yield little or no dividend. Fertilizer is still elusive to majority of farmers. Besides, there are complaints of late arrival of fertilizer and even procurement of wrong consignment. Under this circumstance, farmers are likely to use the wrong type of fertilizers on their crops, apply inadequate quantities, and also apply fertilizer late on their crops. The purchasing cost would also be high. This situation therefore limits optimum and efficient use of fertilizer in the State and therefore the resultant low crop yield. The imperativeness of this study is therefore to empirically assess the efficiency of procurement and distribution of fertilizer by FPDU and also determine the growth and instability, or otherwise, of quantity of the different brands of fertilizer procured between 1993 and 2001 in the State.

### **Fertilizer Procurement And Distribution System In Akwa Ibom State**

The Fertilizer Procurement and Distribution Unit (FPDU) handle the activities of procuring and distributing fertilizer, which is a specialized arm of the State Ministry of Agriculture. The unit was established in 1993 with the aim of facilitating fertilizer procurement and

distribution and thus promotes fertilizer availability in the State.

Fertilizer procured for use in the State is always received by FPDU, which then distributes the fertilizer to farmers in different parts of the state through established channels. Presently, FPDU has only ten warehouses to cover the thirty-one Local Government Areas in the State. The operation of FPDU is such that Local Government Areas should constitute channels through which the procured fertilizers are distributed to farmers in the respective LGAs. But only a few LGAs have been collecting and distributing fertilizer quota meant for their areas.

The State government bears the cost of transporting the procured fertilizers to the different sales outlets. This is to ensure that every farmer in the State gets fertilizer at a recommended price per 50kg bag irrespective of the farmer's location. However, this is rarely the situation in the state even with the presence of FPDU. There are reported rampant cases of sales of fertilizer at exorbitant prices far above official prices, black-marketeering and diversion of fertilizer for sale across the State borders. Even with the presence of FPDU, fertilizer procurement and distribution system does not guarantee timely and adequate delivery of fertilizer to the end users.

## Methodology

The study relied on secondary data collected from records of FPDU. Information on months of procurement, distribution, quantity and types of fertilizer were collected for the period between 1993 and 2001.

Based on the stated objectives, a combination of indices of efficiency, instability and exponential growth functions were employed in analyzing the collected data. These analytical tools are specified as follows:

### *Fertilizer Procurement Efficiency Index (FPEI)*

$$FPEI = \frac{\text{Period of highest fertilizer procurement (in weeks)}}{\text{Period of highest demand.}}$$

Where the period of highest demand denotes the first and second planting season in the state when fertilizer demand is highest. FPEI lies between 0 and  $\infty$ . the higher the value, the lower the efficiency, but optimum is at unity.

### *Fertilizer (price) Distribution Efficiency Index F<sub>P</sub>DEI*

$$F_{PDEI} = \frac{\text{Average price at which farmers Buy fertilizer/unit}}{\text{Recommended Price.}}$$

F<sub>P</sub>DEI lies between 0 and  $\infty$ . The higher the value, the lower the efficiency, but optimum at 1.

### *Exponential Growth Function*

This is expresses as,  $Y_i = AB^t$ ,

Where  $Y_i$  = quantity of it type of fertilizer procured per year,  $t$  = time trend variable, denoting every consignment period. A and B are the parameters to be estimated,

### *Index of Instability*

$$I.I = \left( \frac{1}{n} \sum_{i=1}^n \left| Y_i - \bar{Y} \right| \right) \bar{Y}$$

Where  $y_i$  = quantity of ith type of fertilizer in the year,  $\hat{y}$  is the estimated quantity of fertilizer,  $\bar{y}$  = geometric mean quantity of fertilizer and  $n$  = number of observations.

### **Empirical Results And Discussions**

#### **Frequency of procurement and distribution of different brands of fertilizer.**

Table 1 shows the number of times fertilizer was procured and distributed to farmers annually for the period 1993 – 2001. It is clear from the table that 1993, 1997 and 1998 were the years with least number of deliveries while 1994, 1999, 2000 and 2001 recorded highest frequency of delivery.

**Table 1:** Frequency of Procurement and Distribution of Different Brands of Fertilizer, 1993 - 2001

Years	Frequency	Qty of NPK (Tons)	Qty of Urea (ton)	Total Qty procured and distributed
1993	2	32,168	9,884	42,052
1994	11	96,722	7,353	104,075
1995	8	6,103	2,600	8,703
1996	6	15,776	1,800	17,576
1997	2	6,000	0	6,000
1998	2	1,235	591	1,826
1999	11	18,240	1,906	20,146
2000	11	2,759	1,203	3,962
2001	12	56,818	5,657	62,475
Total	65	235,821	30,995	266,815
Mean	7.2	26,202.33	3,443.78	29,979.44

Source: Computed from Record of FPDU, 2002

According to the table, yearly quantity of NPK brand of fertilizer procured and distributed was more than the quantity of Urea. The pattern of procurement and distribution for the period under review is quite erratic. Based on the total number of time of delivery, average quantities of 3628.01 tons, and 476.83 tons of NPK and Urea respectively were delivered for every consignment. This translates to average of 4104.84.84 tons for both brand of fertilizer. It is clear from the table that the annual quantity of fertilizer available in the State did not entirely depend on the frequency of

procurement, but to a great extent, on the quantity received per delivery. Compare 1993 and 1995:

A lot of factors could be responsible for the erratic distribution of total quantity of fertilizer procured for the time period as shown in the table. The closure of NAFCON, in 1996 which was the largest internal source of supply and subsequent dependence on Golden Fertilizer Company which only imports almost finished chemicals and processed for bagging is a very important factor.

As shown in the table, the quantity of fertilizer procured and distributed dropped drastically after 1997, but only picked up since 1999. This recovery trend since 1999 to 2001 could be attributed to government increased interest in subsidizing and providing fertilizer to many farmers as a dividend of democracy. Other conceivable reason could be the problem of bottlenecks in getting the consignments to the FPDU warehouses.

#### Efficiency Of Fertilizer Procurement And Distribution

To effectively evaluate the efficiency of fertilizer procurement, table 2 shows the average monthly quantity of fertilizer received (procured) in the state from 1993 to 2001. The table reveals that over the period, the bulk of annual quantity of fertilizer

received in the State were usually in the months of April, May, November and December. In other months relatively small quantities were received with January having the smallest level of procurement.

**Table 2: Average Monthly Quantity of Fertilizer Procured in the State (1993-2001)**

Month	Average	Percentage of total
January	918	2.79
February	1,091	3.31
March	1,594	4.84
April	4,855	14.74
May	6,792	20.62
June	926	2.81
July	2,044	6.21
August	1,327	4.03
September	1,498	4.55
October	2,290	6.89
November	6,254	18.99
December	3,366	10.24

**Source:** Computed from FPDU records, 2002

According to the table, there was a steady increase in average monthly quantity of fertilizer procured from January through May, there after, a sharp decline in June, followed by cyclical pattern from July to December.

The distribution of months with highest procurement does not however fall within the planting seasons when the demand is high. In Akwa Ibom State, there are two planting seasons – the first planting season between February and March, while the second

planting season falls between August and September.

A close examination of table 2 therefore reveals that fertilizer is received in (largest quantities after periods of intense demand. This result agrees with Idachaba (1980) contention of late arrival of fertilizer.

### Procurement Efficiency Index

Following the distribution of months with higher consignment, the procurement efficiency indices for both first and second planting season are estimated. For the first planting season,

$$FPEI = \frac{18^{\text{th}} \text{ week}}{10^{\text{th}} \text{ week}} = \frac{18}{10} = 1.8$$

With  $FPEI = 1.8$ , this indicates rather a poor procurement efficiency

For the second planting season

$$FPEI = \frac{42^{\text{nd}} \text{ week}}{32^{\text{nd}} \text{ week}} = \frac{42}{32} = 1.3$$

With  $FPEI$  for second planting season = 1.3, this indicates rather a poor procurement efficiency. Comparatively the procurement efficiency index for second planting season is higher than the first planting season. This is an indication that fertilizer is more readily available to local farmers in second planting season than during the first.

The average annual  $FPEI$  is 1.6, implying that the state FPDU receives

fertilizer for onward delivery to local farmers about 6 weeks after planting season.

### **Distribution Efficiency Index**

One major objective of setting up FPDU was to ensure that every local farmer purchases fertilizer at the official recommended price irrespective of location. Estimating distributive efficiency index involves evaluating for price disparity between official prices and the prevailing selling prices.

**Table 3. Official and Black Market Price of Fertilizer in Akwa Ibom state for 1993 – 2001**

Years	Official price	Black market price	F <sub>p</sub> DEI
1993	80	100	1.25
1994	160	250	1.56
1995	160	265	1.66
1996	160	250	1.56
1997	160	300	1.88
1998	880	1,100	1.25
1999	800	1,000	1.25
2000	1,500	1,800	1.2
2001	1,200	1,400	1.17

**Source:** Computed from the record of FPDU

Table 3 shows that in all the years, there were records of inefficiency in the distribution system of fertilizer in the state.

That is, for every year under review, the farmers bought fertilizer at higher price than

the official price. On the average, the F<sub>p</sub>DEI stood at 1.42.

The existence of price inefficiency in the distribution of fertilizer suggests the presence of black marketeering, hoarding and other sharp practices. Therefore, it is an indication that FPDU have not sufficiently assisted farmers in getting fertilizer at the recommended prices.

Late arrival of fertilizer and inability of the FPDU to distribute the fertilizer to farmers without involvement of rent-seeking middlemen could be some of the reasons for the poor distributive efficiency.

### **Growth And Instability In The Quantity Of Different Brands Of Fertilizer Procured**

As shown in table 1, the state FPDU had about 65 consignments between 1993 and 2001 with erratic distribution. The flow of fertilizer into the state therefore was characterized by inconsistent supply pattern, which is shown on the estimated growth model and instability indices.

### **Growth Of Different Types Of Fertilizer Procured**

#### **Growth Equations:**

- (i)  $Y = 3.86 - 0.84 T$  For NPK Brand  
(1.21) (0.07)
- (ii)  $Y = 1.57 - 0.56 T$  For UREA Brand  
(1.12) (0.002)
- (iii)  $Y = 3.37 - 0.78 T$  For Total quantity  
(1.34) (0.31)

The growth model estimated indicates that NPK brand for fertilizer has a higher

negative growth than Urea brand and total quantity. This implies that the quantity of fertilizer procured into the state by FPDU here been on a steady decline. That is, for the 65 consignments received by FPDU, the absolute volume of the different brands of fertilizer was on a decline for the entire period. This is translated into a depressed supply and decreasing stock.

### **Instability Indices Of Different Types Of Fertilizer**

The instability indices calculated for NPK, Urea and Total quantity stood as 1.11, 0.69 and 1.05 respectively. These are relatively high instability indices showing high levels of variability and inconsistency in procurement pattern over the period. These values further suggest that throughout the period the quantity of Fertilizer Procured by FPDU did not follow a regular pattern and that the agency did not or does not know the actual quantity of fertilizer that is demanded in the state.

### **Conclusion And Recommendations**

The analysis of procurement and distribution activities of FPDU for 1993-2004 indicates dismay fertilizer situation in the state for the period, and that the market disequilibrium problem associated with supply chain of fertilizer is yet to be solved. Specifically, the study reveals untimeliness of procurement, inadequacy of quantity

procured, lack of adequate information flows between FPDU and farmers, existence of black marketeering. Further, the study reveals high levels of instability and inconsistency of quantity of different brands of fertilizer procured. It is also shown that the annual growth pattern of fertilizer procured was relatively low and not enough to meet the level of fertilizer demand in the state.

Based on the findings, the study professes the following recommendations.

- \* FPDU should ensure delivery of about 60% of total annual quantity of fertilizer on or before February and 40% on or before August.
- \* FPDU should increase its warehouse from present 10 to at least 31 for each L.G.A to have a distribution unit.
- \* FPDU should have retail outlet at local market places in each local government area and should commission contact farmers in each agricultural cell to act as its sale representative. This will ensure that only practicing farmers have access to these fertilizers and at the recommended prices.
- \* FPDU should involve local farmers in its activities and should be involved in field survey to gather enough information as regards demand potentials.

### **References**

Bhilegaonke, M. G. (1979) shift in fertilizer use and constraints *Journal of Extension Education*, Vol. 3 (3): 1 – 4.

Bremen, H. (2002) Integrated soil fertilizer management Recreating living soil, Low External Input and Sustainable Agriculture – *LEISA*, Vol. 18 (3): P

Effiong, G. S., Ogban, P.I, Ibia, T. O. and Edem, S. O. (1997) Fertilizer use and sustainable Agricultural Development in sub –Sahara Africa, In: Nyienakuna, M. G. *Issues in Sustainable Agriculture*, University of Uyo, Uyo

Esumo, E. O. (2002) Procurement, Distribution and Availability of Fertilizer for crop production in Akwa Ibom state, unpublished B. Agric Project, University of Uyo, Uyo

FAO, (1983) *Fertilizer Year Book*, Food and Agriculture organization, Rome

Henao, J. and Baanant, C. (2001) Nutrient Depletion in the Agricultural Soils of Africa. In *The Unfinished Agenda – perspectives on over coming Hunger, Poverty and Environment degradation*. Eds. P. Pinstrup-Anderson and R. Pandya - Lorch, IPFRI Publication, Washington.

Idachaba, F.S. (1980) *Foundation and Project on Food Pricing and incomes Policies in Nigeria*, Ibadan University press, Ibadan

IFA (2002) *Fertilizer Indicators*, International Fertilizer Industry Association,

IITA (1994) *Dealing with Issues of our Times*, International Institute of Tropical Agriculture, Ibadan

Pretty, J. (2003) *Agriculture: Reconnecting People Land and Nature*, Earthsan Publication Limited, London

Singh, (2002) The state of Food and Agriculture in Asia and The Pacific: challenges and opportunities. FAO, Rome

Udoh, E. J. and Akintola, J.O. (2001) *Land management and Resource – use Efficiency among Farmers in South – Eastern, Nigeria*, Elshaddai Global ventures Ltd, Ibadan.