

Evaluation of the Effect of Price Variations of Inorganic Fertilizer on Farmer's Productivity in Giwa L. G. A of Kaduna State Nigeria.

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The research work was primarily carried out to evaluate the effect of price variation of inorganic fertilizer on farmer's productivity in Giwa L.G.A of Kaduna State. The research examined the major effects of price of chemical fertilizer on the farmers output .The causes of these price variations were also identified and problems associated with the marketing of the fertilizer were also considered .Eighty (80) questionnaires were used for the data collection ,forty for the farmers and forty for the marketers. Randomised sampling technique was used to collect the data while frequency and percentages were used for the analysis. From the result of the analysis, it showed that some of the effect of price variation on farmer's productivity included, change of crops to be cultivated, reduction in size of land cultivated and reduction in application dose resulting to poor yield. Also, from the result, it showed that the prices of the N.P.K and Urea fertilizers increases from ₦3000 and ₦ 2500 naira in 2011to ₦7000 naira and ₦6500 in 2015 respectively .This increase in prices also led to a reduction in the quantity of fertilizer being purchased by the farmers from 10 bags in 2011 to 3 bags in 2015. The reduction in the number of bags of fertilizer used by the farmers also resulted in a decrease in the yield of the crop per hectare. The problem associated with fertilizer marketing were also identified to include high transportation cost, high purchasing cost and poor market demand of the commodity. To reduce the negative effect of price variation of fertilizer on farmer's productivity, the government should set up a board responsible for pricing of agric products and those of chemical fertilizer .The government should also break the monotony of the fertilizer producers by allowing individuals to set up their own manufacturing industries which will make the product readily available hence forcing the prices to be steady. Loans should also be made available to the farmers to enable them expand their farming business

Introduction

Increasing the sustainability of cropping systems involves the reduction of agrochemical and fertilizer inputs through the reliance in soil ecosystem processes and biological interactions for the provision of plant nutrients. Management of soil fertility through organic fertilizers has always been a pivotal principle of sustainable agriculture. Yet, the impacts of these fertilizers on soil microbial community structure and function as well as on nutrient availability can vary widely, having extremely different impacts on crop productivity (Chivenge, & Herentia. 2011). Better understanding of the microbial processes that take place in soil under organic fertilization could help identify the main drivers determining nutrient availability in order to improve crop growth. In Nigeria, the aggregate of all these practices gradually subjected the soil to the danger of erosion at the same time destroying the soil micro-organisms and its mineral content (Mathais, 2015). An attempt to revive the infertile or less productive Nigerian soil in other to produce crop with high yields to provide food for

the fast growing population of the country was fully recognized in the nation's six year development plan. The major objective of the plan was to increase the productivity of the soil, increase the agricultural income and to raise the standard of living of the farmers who constitute over 75% of the country's population. The importance of agriculture was even more evidence when people realized that it does not only supply food but also raw material for industries, trade and export. The farmer can decide not to produce if he can no longer earn reasonable profit or cover his cost. (Ahmed, 1985).

Background of the study

Soil fertility is diminishing gradually due to soil erosions, loss of nutrient, accumulation of salts and other toxic elements, water logging and unbalanced nutrient compensation. Hausa (1970) in his long term experience concluded that continuous use of sulphate of ammonia as the nitrogen carrier will lead to lowering of soil PH and consequently lowering of yield. Organic wastes and bio-fertilizers are the alternate sources to meet the nutrient requirement of crops and to bridge the future gaps. Many efforts are being exercised to combat the adverse consequences of chemical farming (Faheed et al. 2008). Bio-fertilizer, organic manure and biocontrol have emerged as a promising component of integrating nutrient supply system in agriculture. Organic farming production system aims at promoting and enhancing agroecosystem health, biodiversity, biological cycles and soil biological activities. Crop plants remove varying amounts of different nutrients from soil and to compensate the loss from the soil, organic amendments rich in nutrients must be added. The seaweeds are used directly or after composting (Jones, 2009). Microbiological fertilizers are important to environment friendly sustainable agricultural practices (Zacaro, S & Ordo E. 1999). It is clearly indicated under the law of demand that less of a commodity will be bought if the price is high and more is bought if the price is low. However, based on this factor, farmers often complain of high cost of chemical fertilizers, despite its surplus in the market, but less could be purchased by the farmers for their production. This is due to the fact that farmers have to sell 2-3 bags of their farm produce in order to obtain one bag of inorganic fertilizer (Adamu, 2000). The concepts of price however, explain the reason why speculative middle men usually hoard chemical fertilizers and refuse to sell it when the price is low, but could only sell it when fertilizer price in the market has gone up. A change in the price of a product will generally lead to change in its supply. The higher the price of a product, the more the producers will be willing to supply on the other hand, if the price falls down, it may not pay producers to supply the product at all. They may, instead, even withdraw the supply already brought to the market rather than selling it at low prices.

However, the law of demand states that more is demanded or bought at a lower price than at a higher price. If the price of fertilizers will be reduced in the market, certainly more of it will be demanded by the farmers.

Statement of the Problem

The recognition and introduction of inorganic fertilizers in Nigeria was also successful in terms of grain yield/hectare of most cultivated crops in the country as obtained in the first world countries.

However, the demand and supply of these inorganic fertilizers are affected by price variation over the years. The causes of this price variation ranges from change in government and government policies, changes in distribution channel, market structure, problems generated by speculative middlemen and mismanagement of the home base fertilizer companies etc (Mathais, 2015). It has been observed that the price of fertilizer has not been steady over the years. For instance the price of N.P.K increased from ₦3000 in 2011 to ₦4000 naira in 2012, from 2012 it increases to ₦5000 in 2013. Also in 2014 it went up to ₦6000 which increased to ₦7000 in the year 2015. This shows that there is a yearly increase in the prices of fertilizer hence the need to find out why and also to check the effects of the price variation on the farmers productivity.

Objectives of the Study

The main objective of this study is to evaluate the effect of price variation of inorganic fertilizer on the farmer's productivity in Giwa Local Government area of Kaduna state, with the following specific objectives;

- i. To determine the effect of fertilizer price variation on the number of bags obtainable by the farmers and the corresponding crop yield.
- ii. To identify the factors that causes price variations of inorganic fertilizers in the study area.
- iii. To identify the problems associated with fertilizer marketing.
- iv. To determine the effect of price variation of crop production in different cultures.

Research Questions

- i. What is the effect of price variation on fertilizer bought by the farmers and the correspondent crop yield?
- ii. What are the factors of price variation of inorganic fertilizer in the study area? iii. What are the problems associated with the fertilizer marketing?
- iv. What is the effect of price variation on the types of cultural practices involved in crop production?

Significance of the Study

The study becomes necessary because fertilizer is one of the major input required in crop production but it has been discovered that the price has not been steady. Result from this study will reveal to us the reasons for such variation in prices and its effects on the productivity of the farmers. With the fact that the area is highly recognised in fertilizer marketing, there is the need for price stability so that farmers could project effectively their little resources in procuring inorganic fertilizers without fear of price fluctuation.

Thus, the use of chemical fertilizers in crop production has become necessary, due to the fact that most cereals such as Maize, Millet, Rice and sorghum with other related crop, are highly fertilizers demanding. Similarly, the present day soil has become highly adoptable to the use of inorganic fertilizers.

Research Methodology

Both primary and secondary data were used for this study. The primary data was collected by administering 80 copies of structured questionnaires consisting of close and open ended questions to the farmers and the fertilizer traders in the study area. The secondary data were obtained from published books and journals. The research work was based on maize crop which is the major crop being cultivated in the study area. Furthermore, the two basic types of fertilizers that are used during maize production is N.P.K and Urea were considered. The prices of these two types of fertilizers from the year 2011 to 2015 were considered for the purpose of this work. However, the research findings were only limited to Giwa Local Government Area of Kaduna state because of resource constraint

Data collection

Questionnaires were distributed to three villages Tsahazom in Giwa districts. Shika in shika district and Angwan Lanle in Fatika district. Simple randomized sampling techniques were used to collect data from the respondents. A total number of eighty (80) respondents consisting of forty (40) fertilizer traders and forty (40) farmers where interviewed for the purpose of the research.

Data Analysis

The questionnaires were administered and collected after they have been filled by the respondents. All the analysis and presentations in this study is based on the information supplied by the respondents. Frequency and simple percentage were employed to determine the degree of responses.

Results and Discussion

With respect to the research questions stated above the following results are hereby presented sequentially,

Table1. Effects of fertilizer price variation on the quantity of fertilizer purchased and the yield of crops.

YEAR	TYPE FERTILIZER	OF PRICE/BAG (₦)	QUANTITY/HEC (BAG)	YIELD/HEC (BAG)
2011	NPK UREA	3000	6	60
		2500	4	
2012	NPK UREA	4000	5	50
		3500	3	

2013	NPK	UREA	5000	3	45
			4000	3	
2014	NPK	UREA	6000	2	35
			5500	3	
2015	NPK	UREA	7000	2	25
			6500	1	

Table 1. above shows the trend of the variation in the prices of the two types of fertilizers under consideration, from the table it could be seen that the prices of the NPK and Urea in 2011 increased from ₦3000 and ₦2500 per bag to ₦4000 and ₦3500 per bag respectively in 2012. In the year 2011 the farmers were able to purchase 6 bags of NPK and 4 bags of Urea which at the end of the season they were able to harvest 60 bags of the crop. However, in 2012 because of the rise in prices the farmers were only able to purchase 5 bags of NPK and 3 bags of Urea. The yield also dropped from 60 bags to 50 bags due to the decrease in the amount of fertilizer applied to the crop per hectare. In 2013, the prices increased again from ₦4000 and ₦3500 to ₦5000 and ₦4000 respectively. The quantity of the fertilizer purchased by the farmers also dropped from 5 bags of NPK and 3 bags of Urea to 3 bags each of the NPK and Urea. At the end of the season, the farmers were only able to get 45 bags of the crops. In 2014 the prices of the fertilizers were ₦6000 and ₦5500 which increases to ₦7000 and ₦6500 respectively in 2015. The quantity of fertilizer purchased further dropped from 2 bags of NPK and 3 bags of Urea to 2 bags and 1 bag respectively. It could also be seen that due to the increase in the prices of the fertilizers, there was a drop in the quantity purchased by the farmers. This reduction in the quantity of fertilizer applied to the crop by the farmers also resulted in a decrease in the quantity of the crops harvested. The yield dropped from 35 bags in 2014 to 25 bags in 2015. This analysis is based on the assumption that all other cultural practices on the production of the crop are carried out correctly.

This result indicated that the lower the prices of the fertilizer the higher the quantity purchased by the farmers. Invariably it also showed that the higher the quantity of fertilizer applied to the crop per hectare the higher the yield with all other factors normal.

Table.2 Factors of price variation of fertilizer

Factors	Respondents	Percentage
Railway transportation	10	25
Transportation cost	19	47.5
Taxation and rent fees	5	12.5
Government policies	6	15
Total	40	100

Table.2 above reveals that 19 respondent representing 47.5% maintained that, transportation cost is the major factor associated with price fluctuation of inorganic fertilizers. While 10 respondents representing 25% disclosed that demand and supply factor results to price fluctuation of inorganic fertilizers. Similarly, 6 respondent representing 15% of the sampled traders maintained that government policies with regard to chemical fertilizers result to its price fluctuation. However, only 5 respondents representing 12.5% disclosed that taxation and rent fees stands also as cause of price fluctuation of chemical fertilizers.

From the above analysis, transportation cost stand as the major factors that is responsible for price fluctuation of chemical fertilizers in the study area.

Table 3. Problems associated with fertilizer marketing

Problems of Fertilizer Marketing	Respondents	Percentage
High transportation cost	20	50
Purchasing cost	10	25
Conservation of the farmers	4	10
Poor demand of the market	6	15
Total	40	100

Table 3. above reveals that 20 respondents representing 50% considered high transportation cost as the problem associated with fertilizer marketing. Also 10 respondents, representing 25% disclosed that cost of purchasing chemical fertilizers is the major problem associated with fertilizer marketing. Similarly, 6 respondents, representing 15% considered poor demand of chemical fertilizer in the market by the farmers as the major problem associated with fertilizer marketing. However, 4 respondents representing 10% disclosed that conservation of the farmers towards fertilizer usage is the problem associated with fertilizer marketing.

Based on the analysis above, cost of transportation and purchase prices are said to be the major problem that hinders fertilizer marketing. Traders in the study area advocated that, after paying for the commodity at the production company, one has to hire a vehicle at a high cost per each bag of fertilizer, paying for loading and offloading. All these according to them contributed to its high price per bag. Another problem is that, the demand for fertilizer product is often seasonal. Farmers only buy when the rainy season has set in; otherwise traders always remain in their shop without customers.

Table4. Effect of price variation on the cultural practices involved in crop production

Effect of price variation	Respondents	Percentage
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Change in crops under cultivation	6	15
Reducing the size of land under cultivation	3	7.5
Inadequate application dose which result to poor yield	13	32.5
All of the above	18	45
Total	40	100

Table 4. above reveals that 6 respondents, representing 15% disclosed that variation of prices of chemical fertilizers urge them to change from the type of crop they were producing. That is from high fertilizer demanding crops to low fertilizer demanding crops. While 3 respondents representing 7.5% disclosed that price variation of chemical fertilizers forces them to reduce the number of plots put under cultivation from previous years. Also 13 respondents representing 32.5% disclosed that fertilizer price variation leads to inadequate dose application, thereby resulting in poor yield. Finally, 18 respondent representing 45% maintains that all the factors stated above are associated with price variation of chemical fertilizers.

Thus, the analysis shows that, instability of fertilizer prices in the market affect the farmer's productivity level. In the sense that they cannot project effectively on the input they propose to use because of the uncertainty of fertilizer price in the market. This may lead to poor in yield

Conclusion

Data for the study were collected with the help of structured questionnaire by simple random sampling method. The data were analyzed using simple descriptive statistical tools, frequencies and percentages. The factors of price variation of fertilizer were identified to include transportation cost, taxation, rent fees and government policies. The marketing of fertilizer in the study area is also faced with a lot of problems which includes high cost of transportation, low purchasing power of the famers due to continuous increase in the prices of the fertilizers, poor demand for the commodity in the market and conservation of the farmers towards the use of fertilizer. Furthermore the study was able to identify the effects of price variation on the types of cultural practices the famers adopt during their crop cultivation due to lack of enough fertilizer. These cultural practices include the change in the crop to be cultivated by the famers from those that demand high amount of fertilizer to those that requires small quantity of fertilizer. Because of the high cost of the fertilizer the famers also reduced the sizes of their farmlands. The farmers also resorted into the reduction of the application dose of the fertilizer which gave rise to poor crop yield.

From the result of the research, it could be concluded that the lower the prices of the fertilizer the higher the quantity that is being purchased by the farmers and vice versa. Invariably it showed that the higher the quantity of fertilizer applied to the crop per hectare the higher the yield obtained with all other cultural practices maintained.

Recommendations

From the results obtained, it indicates that the variation in the prices of inorganic fertilizer is a major problem to the farmers because it affects their productivity. In an effort to change the situation, the following recommendations are hereby proffered;

- 1) Establishment of price control board of inorganic fertilizers in the market, where fixed or standard price of fertilizers could be maintained throughout a season.
- 2) Government also need to set up a board that will be responsible in relating price of agricultural produce with those of chemical fertilizers. This is because, farmers can always offer their farm produce at any time to the market in order to sell and obtain fertilizers.
- 3) Financial institutions such as the Agric Banks and commercial banks as well as individual traders, friends, relatives and government should give financial support to both farmers and fertilizers traders within the study area.
- 4) Government should break the monopoly of the fertilizer production by allowing individuals to set up their own fertilizer manufacturing companies which will make the product to be readily available hence forcing the prices to be steady.

References

- Adamu, I. (2000): The Effect of Inorganic Fertilizer Price Variation on Farmer's Productivity in Sabon gari Local Government Area of Kaduna State. An unpublished N. C. E Project Submitted to the Department of Agricultural Education, F. C. E Zaria.
- Chivenge, N. & Herentia, N. (2011): Recommendations for Fertilizer: Ministry of Agriculture, Food and Fisheries. Bulletin 208.
- Faheed, D, & Herentia, N. (2008). Fertilizer Problems and Plants Analysis on the Effects of Salinity on Mineral Composition and Growth of Plants. Vol. 4 pp 20 – 30.
- Jones, M. (2000): Changes in Soil Properties Resulting from Fertilizer use and their Effect on Crop Yields. Samaru conference paper No. 2 pp 27 – 30
- Mathais, J. (2015): Assessment of the Effect of Price Variations of Inorganic Fertilizer on Farmers Productivity. A Case Study of Giwa L.G.A Kaduna State. An unpublished N.C.E Project Submitted to Department of Agricultural Education, F.C.E. Zaria.
- Zaccaro, H. & Ordo I. (1999): The Present use and Efficiency of Fertilizers and their Future Potential in Agricultural Production Systems. Pp 163 – 206.

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