

## **ZAdoption of Herbicides and Fertilizers Among Rural Farmers of Zone B Area of Kogi State Agricultural Development Project, Kogi State, Nigeria**

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**Abstract:** This study was designed to determine adoption of herbicides and fertilizers among rural farmers in Zone B area of Kogi State Agricultural Department Project (KADP). A total of 105 farmers were stratified and randomly interviewed. Frequency distribution and percentage were used to analyze the data. The result revealed that 88 and 96% of the farmers in the area were aware of herbicides and fertilizer respectively. Majority (74%) of the farmers obtained much of their information from extension agents. It was however stated that project scarcity (46%) and high cost of fertilizers (30%) were the major limitation to the usage of fertilizers while the major limitations to the usage of herbicides were the high cost (30%), lack of capital (30%) and technical know-how (19%). It was recommended that government and agenessis responsible for the procurement and distribution of herbicides and fertilizers ensure proper and timely delivery to target users at subsidized price to enable interested farmers afford them.

**Keywords:** Adoption, farmers, fertilizers, herbicides, Kogi State, zone B

### **INTRODUCTION**

Agriculture is the lynchpin of the Nigerian economy. It is not only the most important non-oil economic activity in Nigeria; it is the single largest employer of labour force (NBS, 2006). Thus, the agricultural sector is often seen as important for reducing poverty (Agenor *et al.*, 2003). In recognition of the importance of the agriculture, sector in Nigeria, the government has initiated and endorsed many national and international projects, programs and policies aimed at rapidly growing sector. These include the National Economic Empowerment and Development Strategies (NEEDS I and NEED II), the implementation of comprehensive African Agriculture Development Program (CAADP), the Seven-point Agenda of the Presidency, and the Nation Food Security Programme (NFSP), as well as product specific programs like the Presidential initiatives on cassava, rice and other crops. Also ensuring food security for the population with diminishing cultivable land resource, necessitate the use of high yielding variety of seeds, balance use of fertilizers, judicious use of quality pesticides along with education to farmers and the use of modern farming techniques.

For several years, farmers and growers have changed the ways they produce food in order to meet the expectations of consumers. In doing so, they have made many changes to the way they farm, including the

extensive use of pesticides and fertilizers in order to produce plentiful food at a reasonable price all year round.

Herbicides i.e. chemical substances used to kill or control unwanted vegetation are the most widely used type of pesticides and comprises around 50% of all crop protection chemicals used throughout the world, compared with insecticides and fungicides that are around 17% each (Itinal *et al.*, 1993). Using herbicides to reduce the drudgery of persistent of weeding make sense, especially in cases of chronic labour shortages. This does not necessary lead to dependency but can in many cases be classified as successful adoption of a cost-effective technology. Weed competition is the major constraint that limits yield in many crops. Without herbicides there would be no estimated US \$ 13.3billions loss in farm income in the US (Anon, 2003). He analyzed the primary and secondary productivity, and labour impacts of improved weed control as achieved with herbicides, on farmers and rural communities. He concluded that increased agricultural productivity creates direct economic benefits for farm families in terms of increased income, which in turn propagate throughout rural communities creating secondary benefits of rural development and stimulated regional economics. Herbicides also reduce seasonal variation in labour markets and the total labour needed for hand weeding, stabilizing labour requirement and freeing workers to

pursue higher value opportunities. Chikoye (2004) reported that weeds and shortage of labour for their removal are two of the most important production constraint in small holder farms and small-holder farmers spend 50-70% of their total available farm labour on weed control by hoe weeding.

FAO (2002) reported that pre capita food production in Nigeria has shown a downward trend. This was attributed to continuous cropping on the same soil without adequate fallow per hectare resulting in unfertile soil that should be replaced with fertilizer. Haiwel (2005) supported this view of fertilizer replacement by saying that a powerful engine for grain output is a boast in average yield through improved varieties and correct utilization of fertilizers.

Fertilizer extension forms part of the general extension programme of the government which has the Agricultural Development Project (ADP) as the focal point for the delivery of services (Ayoola, 2007). The adoption of fertilizers and herbicides in intensive farms is seen as the only hope of feeding the expanding world population.

The utilization of this agro-chemical e.g., chemical fertilizers by farmers in other countries have been noted to increase crop yields and hence the fertility status of the soil. In spite of this, it seems not to have effectively put into use by most farmers in Kogi State. Wrong application of chemical fertilizers and herbicides can lead to environmental degradation through destruction of biodiversity and pollution of the environment. Most researchers have paid more attention to the production and marketing of agro-chemicals in this country, but not many efforts have been made to find out those factors that determine the utilisation level of these agro-chemicals (herbicides and fertilizers). It is against this background that this research work is designed to fill a research vacuum created, using farmers in Zone B in Kogi Agricultural Development Project Area as a case study.

The objectives of the study are to:

- to describe the socio-economic characteristics of the farmers in the area
- determine the awareness level of herbicide and fertilizer usages among the rural farmers in the area.
- determine information sources available on knowledge of agro-chemicals
- determine the difference in usage level of herbicides and fertilizers
- describe problems associated with the usage of agro-chemicals in the area

## **MATERIALS AND METHODS**

The study area covered zone B OF Kogi Agricultural Development Project (KADP) which has six extension

blocks namely Ejume, Dekina, Odenyi, Gboloko, Ankpa and Abejukolo in Kogi state of Nigeria. The extension blocks were divided into 35 extension circles found in four local Government areas, namely Dekina, Bassa, Ankpa, and Omela. Geographically, this area falls within the rich savannah region which is known to be ideal for crop production.

Stratified and simple random sampling techniques were used to select three (3) farmers from each of the thirty-five (35) extension circles i.e., (3 farmers x 35 extension circles = 105). A total of 105 respondents were interviewed. Percentage was used to analyse the data.

## **RESULTS AND DISCUSSION**

Table 1 shows that 33% of the respondents had non-formal education followed by 27% that had primary education. Twenty-four percent (24%) of the respondents had tertiary education. Majority (87%) of the farmers had between 1-5 ha of land under cultivation. It was found that majority (61%) of the farmers had 21 or more years of farming experience and 32% of the farmers had annual income between ₦40, 000.00 - ₦79, 000.00. Formal education helps farmers to understand the usefulness and usage of agro-chemicals (Chikoye, 2002).

The annual incomes earned by the farmer in this area seemed very low. Their small land holdings could be responsible for the low annual income and poor adoption of farm technology.

In Table 2, majority (88%) of the rural farmers were aware of the availability of herbicides and 96% aware of the availability of fertilizers for farming.

It is worthy of note that the first phase of adoption of innovation starts when individual first hear of the innovation and began to find out about it. This result was a clear indication that there was information in the usage of herbicides and fertilizers in the areas, was widespread.

Table 3 revealed that the majority of the farmers (75%) received information on herbicides from extension agents and 38% received information on herbicides through radio/television. On the other hand, most of the farmers (75%) received information on fertilizers from extension agents followed by 45% of the farmers that received information on fertilizers through radio/television. The use of religious agencies in disseminating agro-chemicals information to farmers was very poor (0.94% on herbicides and 6% on fertilizers). These poor agricultural services on the part of the religious institution may be due to the fact that religious institutions have their cardinal objectives (spiritual and moral teaching) as their primary focus.

Table 4 revealed that many herbicides and fertilizers under different trade names are known to be farmers. It was found that about 71% of the farmers adopted Delsate herbicide, while 48% of them adopted Roundup herbicide

Table 1: Socio-economic characteristics of rural farmers in zone B area of Kogi State agricultural development project

Socio-economic characteristic	Frequency	Percentage
<b>Education</b>		
Non formal education	35	3.33
Primary	28	26.67
Secondary	16	15.56
Tertiary	26	24.44
Total	10	5100.00
<b>Land under cultivation (ha)</b>		
1 - 5	91	86.79
6 - 10	10	9.43
11 - 15	2	1.89
16 - 20	2	1.89
Total	105	100.00
<b>Farm income per annum (N)</b>		
<9,000	6	5.40
10,000 - 39,000	30	28.38
40,000 - 79,000	34	32.43
80,000 - 119,000	18	17.37
>119,000	17	16.22
Total	105	100.00

Field survey (2010)

Table 2: Distribution of awareness level of herbicides and fertilizers

Awareness	Frequency	Percentage
<b>Herbicides</b>		
Awareness of herbicides	92	88.00
Not aware of herbicides	13	12.00
Total	105	100.00
<b>Fertilizers</b>		
Aware of fertilizers	101	96.20
Not aware of fertilizers	4	3.80
Total	105	100.00

Field survey (2010)

Table 3: Distribution of respondents according to the information source available on the usage of agro-chemicals

Information source	Herbicides % of farmers	Fertilizers % of farmers
Extension agents	74.53	74.53
Radio/Television	37.73	45.25
Local leader	5.66	9.43
Contact farmers	16.03	23.58
Relative/Friends	15.0	99.43
Religious organization	0.94	5.66
Politicians	1.89	9.43

Field Survey (2010); Multiple Responses recorded

in the study area. On the other, majority, 94 and 71% of the farmers preferred and adopted compound fertilizer (NPK) and urea as indicated in table 4 respectively. Darkwa *et al.* (2001) mentioned that weed is the most notorious thing that planted crops of utilizing adequate spoil fertility even if fertilizer is applied. Farmers' choice of preference exhibited in the area could be attributed to type of crop grown in the area and the effectiveness of the agro-chemical perceived by the farmers. This support (Akogun *et al.*, 2000) who indicated that widespread adoption of innovation by farmers is linked to clear advantages of such innovations perceived by the farmers.

Table 5 shows low level of usages of herbicides by farmers in the area. About 83% of the farmers used quantities below 10 L of herbicides annually while

Table 4: Percentage distribution of farmers according to herbicides and fertilizers known, used and preferred

Agro-chemical known herbicides	Percentages of farmers used	Preferred
Delsate	70.45	58.49
Roundup	47.72	40.57
Touch down	17.04	14.15
Saroset	13.62	11.32
Primextra	11.36	9.43
Atrazine	10.36	8.49
Atrofos	7.95	6.6
Orizo	4.54	3.77
Pilmigram	3.40	2.83
Paraquat	2.30	1.89
Delgine	4.54	3.77
Glycel	11.36	9.43
Cymbus	3.24	2.83
<b>Fertilizers</b>		
Compound (NPK)	93.75	82.22
Urea	70.83	82.22
CAN	15.62	22.06
Single superphosphate	20.83	29.41
Agrolizer	6.25	8.82

Multiple responses recorded

Table 5: Distribution of farmers according to level of herbicides and fertilizers used in the area

Quality	Percentage
<b>Herbicides (L)</b>	
1 - 5	56.75
6 - 10	25.70
11 - 15	8.10
16 - 20	9.45
21 and above	0.00
Total	100.00
<b>Fertilizers (kg)</b>	
50 - 200	83.80
250 - 400	6.67
450 - 600	4.05
650 - 800	2.70
850 and above	2.7
Total	100
<b>Frequency of usage herbicides</b>	
Never	17.98
Sometimes	65.98
Always	32.99
Total	100

50 kg: 1 bag of fertilizer

Table 6: Distribution of respondents according to problems associated with the usage of herbicides and fertilizers

Problems	Herbicides % of Farmers	Fertilizers % of Farmers
Scarcity of product	7.50	45.83
Lack of technical know-how	19.40	4.17
Toxicity to plant	13.43	12.50
Cost of chemicals	29.85	30.21
Lack of capital	29.83	2.08
Labour intensive	-	5.21
Total	100.00	100.00

Field Survey (2010)

84% of the respondents used below 250 kg of fertilizers per farmer annually. Most (51%) of the farmers of herbicides and 66% of them apply fertilizers on their farms always. This low level of herbicides and fertilizers used by rural farmers in the area could be due to small-

land holding, meagre financial returns from farms and non-availability of agro-chemicals at appropriate time of need. This finding supports Brain (1990) who stated respectively that farmers are ready to use modern agricultural inputs, but the materials (inputs) are not readily available and where available, price charges are far beyond the reach of the poor farmers.

Table 6 shows that 30% of the farmers identified high cost of herbicides, 30% also identified lack of capital to purchase same as problems associated with the usage of herbicide. On the other hand, 30% and 46% of the farmers identified high cost and scarcity of the products as problems associated with usage of fertilizers. This confirms (Brain, 1990) who reported on the deficiencies in the procurement and delivering system of agro-chemicals.

### CONCLUSION

Agricultural extension service is mainly concerned with educating farmers and communicating useful information that will ensure adoption of improved farm technologies for better yield and income. The technologies cut across a wide variety of crops that will need the support of fertilizers and herbicides to actualize their full potentials. The availability and accessibility to good technological management of fertilizers and herbicides, appropriate and right quantity, quality and timely supply of them will influence the utilization by farmers as well as adoption of the said farm technologies. The adoption of herbicides and fertilizers in intensive farms is seen as the only hope of feeding the expanding world population.

### RECOMMENDATION

On this note, the following recommendations are made:

- Government and agencies responsible for the procurement and distribution of herbicides and fertilizers should ensure proper and timely delivery to target users at subsidized price to enable interested farmers afford them.
- There should be enlightenment campaign among the rural farmers on the usage of agro-chemicals and this should not be left in the hands of extension agents nor radio/television along since poor socio-economic situations of the rural community had made it difficult for them to have access to extension agents, radio/television. Non-governmental organisations should be empowered to sponsor the campaign for agro-chemical usage

- At lower level of educational system (primary level) practical agricultural training should be included in the curriculum and made compulsory so as to enable every citizen of the country acquire basic, modern and scientific agricultural training.

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