

Utilization of Herbicide by Farmers in Kogi State, Nigeria

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Abstract

A survey experiment was conducted during the 2018 cropping season to assess the utilization of herbicides by farmers in Kogi state. The study was carried out through the use of structured questionnaires administered to nine hundred (900) farmers across five (5) Local Government Areas (LGAs), (three villages per LGA and 20 farmers in each village were sampled) in each of the three senatorial districts of the state. Results showed that farmers across the three senatorial districts were mostly males (79%), married (78.7%) illiterates (55.31%) and aged (41-60 years). Very few farmers had post secondary education with Kogi west taking the lead (6.7%). A large proportion of farmers (94.6%) applied herbicides on their farms by using mostly (72.8%) CP15 sprayers which were most often borrowed. Results also indicated that in the three senatorial districts, majority of farmers (91%) did not put on protective attire during spraying operation and mostly (82.4%) used milk tin in dispensing herbicides into the spray tank. The survey revealed that in spite of high acceptability of herbicides as a means of weed control, most farmers did not observe safety measures and purchased chemicals from the open market. Therefore, there is the need for advocacy by the State Ministry of Agriculture and Agricultural Development Project (ADP) in order to reverse the trend for optimum herbicide utilization in the state.

Keywords: Herbicide; Questionnaire; Survey; Predominant; Sprayer; Purposeful.



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1. Introduction

Agriculture was the mainstay of the Nigerian economy until the late seventies (70s) when it shifted her attention to the oil economy. It is important to note that over the years, Nigeria got jolted back to consciousness (owing to the dwindling revenue accruing from the oil sector) that agriculture cannot be sidelined and consequently the upsurge in agricultural activities with the attendant increase in pesticide utilization [1]. Owing to massive drift of youth to urban centres in search of job, the few and infact the aged in communities find it difficult to cope with farming activities most especially weeding, making the use of herbicide inevitable [2]. The losses resulting from weed infestation can be staggering costing farmers enormous economic losses due to poor production [3]. Uncontrolled weed growth causes more crop yield loss and humans spend more time removing weeds in the tropics than in any other parts of the world [4]. Similarly, uncontrolled weed growth has been reported to cause yield reduction of 38-55% in grain legumes, 52% in oil fibre crops (sunflower) and 65-91% in roots and tuber crop [4]. By this, it is clear that the use of herbicide has indeed formed an integral component of the Nigerian farming system. This affirmed [5] finding that there is increase in the use of herbicides by small-holder farmers in Nigeria.

Moreover, the mechanical weeding method has some limitations; one of which is that its effectiveness is just for a short while making repeated operation inevitable [6].

Similarly, mechanical weeding operation is labour intensive. Corroborating this, Ayeni [7], asserted that as much as 15-30 man days are required to hand weed one hectare of land depending on the level of weed infestation and the cropping patterns. Based on the fact that there is paucity of labour force, coupled with drudgery associated with manual weeding among other factors, there is increasing awareness on the use of herbicides among farmers in Kogi State. The survey was therefore carried out to find out the extent to which herbicides are used in the state in addition to identifying problems limiting their use among farmers in the state.

2. Materials and Methods

The survey experiment was conducted in the three senatorial districts of Kogi State (consisting of 21 LGAs) during the 2018 cropping season. In this study, five (5) Local Government Areas (LGA) from each of the three senatorial districts were purposefully selected. In each LGA, three (3) villages were randomly selected and twenty (20) questionnaires were administered to twenty (20) farmers in each village bringing the total number of respondents in each LGA to sixty (60). This showed that three hundred farmers (300) were interviewed in each senatorial district indicating a total of nine hundred respondents (900) in the three senatorial districts of Kogi State. The data obtained from the questionnaire were sorted out according to the frequency of responses and this was expressed in percentages for the sake of making inference.

3. Results

As indicated in [Table 1](#), an overwhelming percentage of farmers in the study area were males (79.2%) and within the age bracket of 41-60 years (54%). Very few farmers were below the age of 20 years. Most farmers were married and with an average farm size of 4-6 ha (43.7%). There were more male farmers (99.2%) than female (20.8%). The highest number of male farmers (85.3%) was recorded in Kogi west while the highest number of female farmers (28.3%) came from Kogi east. Most farmers were illiterate (55.3%) across the three senatorial districts with a few of them having primary and secondary education. A negligible proportion of the farmers had post secondary education with Kogi west having the highest percentage (6.7%). None of the respondents in Kogi central had a post secondary education. A household size of 6 – 10 was predominant in the state (41.7%). A household size of more than 15 family members was more in Kogi Central than the other two senatorial districts. As shown in [Table 2](#) most of the farmers (94.6%) in the state agreed using herbicides for weed control with the highest usage (97%) among respondents from Kogi west. As revealed from the survey carried out, 46% of the farmers across the state had been using herbicides for between 16 – 20 years. On the other hand, some farmers in each of the three senatorial districts had been using herbicides for between 1 – 20 years giving a combined response of 91.6% of the total number of farmers sampled.

A few farmers in the state made use of herbicides for over 20 years.

Farmers across the state used herbicides, mostly on cereal crops (29%). This was closely followed by legumes (26%) and tubers (25.3%). Farmers across the three senatorial districts were not favourably disposed to the use of herbicides on vegetables (8.8%) and tree crops (11.7%). The results of the survey showed that majority of the farmers (78.8%) in the three senatorial districts applied herbicides for agricultural purposes. Most farmers (71.7 – 87.0%) used CP 15 sprayer while others used CP-3 (24.2%) in the application of herbicides on the field ([Table 3](#)). Majority of farmers (87.0%) who used CP-15 were from Kogi west senatorial district closely followed by those (71.7%) from Kogi east. None of the farmers sampled used boom or motorized sprayer in the study area. Surprisingly, some farmers made use of crude materials such as broom, perforated plastic bottles for the application of herbicides. [Table 3](#) shows that 24.1% of the farmers owned spraying equipment while 43% had to borrow. Across the three senatorial districts, 32.6% of the farmers resorted to hiring spraying equipment for their spraying operations. Majority of the farmers (55%) in the state made use of hired labour to assist them in the application of herbicides. A negligible proportion (21%) of the farmers had the capacity to apply herbicides on their own. Others used some members of their families in the application of herbicides.

Majority of the respondents across the districts used milk tin measurement in dispensing herbicides into the sprayer ranging from 87.3% in Kogi east to 82.4% in Kogi west. A few farmers measured herbicides by visual estimation ([Table 3](#)).

As shown in [Table 4](#), a large number of farmers (69.3%) in the study area indicated that herbicides were costly but agreed that they were readily available (91.6%).

It is also interesting to note that in all the three senatorial districts covered in this study, 48% of the farmers interviewed believed that the use of herbicides in the control of weeds was more effective than the manual operation, which involves the use of hoes. In all the districts, the farmers sampled agreed that the perceived advantages of herbicide ranged from increased yield (48.8%), time saving (28.1) to labour saving (23.1%). Results of the farmers' responses on the use of protective devices in the application of herbicides are shown in [Table 5](#). The results indicated that across the three senatorial districts of the state, only 9% of the respondents wore protective clothing. About 19% of farmers in Kogi west put on protective clothing while spraying, 14% in Kogiest with the least proportion (3.7%) from Kogi central. [Table 5](#) shows that an average of 47% of the farmers in the districts sold the herbicide empty containers after use. While 34% of farmers sampled in Kogi west buried empty herbicide containers, it was only 10.7% in Kogi east with the least (6.7%) in Kogi central. Majority of farmers (47.7%) that used empty herbicide containers domestically were from Kogi central.

A large number of farmers (70%) did not talk while spraying herbicide. The highest percentage of farmers (75.7%) that did not talk during spraying operation came from Kogi west.

Results of farmers' response on the sources of herbicides indicated that a large number of farmers in each senatorial district obtained herbicide from the open market with 67% combined effect ([Table 6](#)).

Considering the three senatorial districts, 16.7% obtained herbicides from Agricultural Development Project (ADP). Generally, farmers across the state depended less on company agents for the supply of herbicides with no single farmer in Kogi east obtaining it from this source.

4. Discussion

Farming activities when carried out manually are energy sapping operations [8]. Therefore, it is not surprising that a higher proportion of farmers in the state are males who are considered more energetic than the female counterpart and are better suited for such activities. This is contrary to the findings of [Iyagba and Nowokocho](#) [9], who stated that women were more involved in farming activities than the male folk in Rivers state, Nigeria. Since majority of the farmers were married, it would be expected that assistance would readily come from wives and children in the execution of farm work. Generally, adoption of agricultural innovation and practice is highly related to the literate level of the farmers [10], but this was apparently diffused to a certain extent as the adoption rate on herbicide use was high inspite of high illiteracy level. This could be due to the obvious advantages of the use of herbicide over manual weeding which among others help farmers to direct their energy and time to other pressing family issues. Corroborating this, [Kolo](#) [11], noted that chemical weed control will make weeding effective and

efficient thereby freeing farmers for other priority tasks. As revealed in this study, farmers applied herbicides mostly on cereal crops using borrowed spraying equipment. Usually, the spraying equipment used was the CP 15 knapsack sprayer probably on account of its ready availability and lighter weight compared to the CP 3 sprayer. The fact that none of the farmers in the state used boom and/or motorised sprayer could be attributed to high cost of the equipment and lack of operational capacity on the part of farmers. Measurement of herbicide into the sprayer by the use of milk tin predominate in the state owing probably to the instruction/guideline as provided by extension agent from the State Agricultural Development Project (ADP). Similarly, adoption of recommendation by the National Advisory Committee on weed control [12] could also be responsible for the use of milk tin in dispensing herbicide to the spray tank. As revealed in this study, farmers in the state unequivocally agreed that the use of herbicide in weed control was more effective compared to manual weeding operation with the use of hoe. This is in agreement with the findings of Anon [12], Avav [5], Baskaran and Solaimala [13], that chemical weed control is more adapted to large scale production, effective and labour saving than other weed control methods. Only a negligible proportion of farmers across the state wore protective clothing. The comparatively higher percentage of farmers from Kogi west putting on protective clothing during spraying operation could be due to higher literacy level in the area. In the same vein, the high literacy level could also be responsible for the low percentage of farmers in Kogi west converting the empty containers into domestic use. From this study, it is evident that the use of herbicide for weed control in Kogi State has come to stay inspite of high illiteracy level. It is therefore advocated that the extension unit in the State Ministry of Agriculture and the Agricultural Development Project (ADP) should step up actions in sensitizing farmers of the need to put on protective clothing, avoidance of the use of broom to spray and not to engage in conversation/talk during spraying operation. In addition, chemical companies should reach out to farmers so as to forestall or minimize the possibility of adulteration and/or sale of expired products.

5. Conclusion

From this study, it has been found most expedient that the state Agricultural Development Project (ADP) vis-à-vis Ministry of agriculture step up activities towards identifying with farmers on the best way to utilize herbicides for improved productivity. Also the state government should make credit facilities more readily accessible to farmers to increase the size of land put under cultivation and subsidize the pesticide (herbicide) input so that more farmers be involved in the use of herbicides in order to achieve a robust crop production in Kogi state, Nigeria

Table-1. Demographic Characteristics of Farmers in the three Senatorial Districts in Kogi State.

Parameters	Senatorial districts			Meam
	Kogi east (n=300)	Kogi central (n=300)	Kogi west (n=300)	
Gender	% Responents			
Male	71.7	80.7	85.3	79.2
Female	28.3	19.3	14.7	20.8
Age (years)				
10-20	1.3	5.3	9.3	5.3
21- 30	6.3	8.3	9.3	7.9
31- 40	13.7	10.3	12.3	12.1
41- 50	36.7	32.7	36.3	35.2
51- 60	40.0	39.3	17.7	31.3
>60	2.0	4.0	15.0	7.0
Materials				
Single	3.3	7.0	1.7	4.0
Married	71.7	75.3	89.0	78.7
Divorced	4.7	3.7	1.0	3.1
Window	20.3	14.0	8.3	14.2
Farm size				
< 1	6.7	12.0	8.0	8.9
1- 3	33.7	60.0	38.3	44.0
4-6	40.7	27.3	43.7	37.2
> 6	19.0	0.7	10.0	9.9
Education				
Illiterate	68.3	74.3	55.3	66.0
Primary	22.7	19.7	23.7	22.0
Secondary	6.7	6.0	14.3	9.0
tertiary	2.3	0	6.7	3.0
Household Size				
< 5	17.7	2.3	14.7	11.6
6-10	71.3	23.3	41.7	45.4
11-15	9.0	68.0	38.6	38.5
> 15	2.0	6.3	5.0	4.4

Table-2. Response of farmers on herbicide usage in Kogi State

Parameters	Senatorial districts			Meam
	Kogi east (n=300)	Kogi central (n=300)	Kogi west (n=300)	
	% Respondents			
Use of herbicide				
Yes	94.7	92.0	97.0	94.6
No	5.3	8.0	3.0	5.4
Length of use (year)				
1-4	4.3	9.7	2.7	5.65
5-9	11.0	13.7	2.7	9.1
10-15	20.0	59.0	13.0	31.0
16-20	63.7	14.3	59.6	45.9
> 20	1.0	3.3	22.0	8.8
Crop tupeson				
Which Herbicides are applied				
Cereals	26.7	30.0	28.7	28.5
Legumes	23.7	27.7	25.7	25.7
Roots/ tubers	24.3	27.7	27.0	25.3
Vegetables	4.7	16.3	5.3	8.8
Tree crops	20.6	1.3	13.3	11.7
Purpose of use				
Agricultural	89.7	76.7	70.0	78.8
Non- Agricultural	10.3	23.3	30.0	21.2

Table-3. Response of farmers on spray equipment and method of application

Parameters	Senatorial districts			Meam
	Kogi east (n=300)	Kogi central (n=300)	Kogi west (n=300)	
	% Resondents			
Types of sprayer				
CP-3	25.3	34.3	13.0	24.2
CP-15	71.7	59.7	87.0	72.8
Boom	-	-	-	-
Motorized	-	-	-	-
Others	3.0	6.0	-	3.0
Source of Spayer				
Own	8.3	15.3	48.7	24.1
Hire	24.3	43.3	30.3	32.6
Borrow	67.4	41.4	21.0	43.3
Herbicide applicartion				
Self	10.7	18.0	33.0	20.6
Use of family members	17.7	23.7	31.0	24.1
Hired laborers	71.6	58.3	36.0	55.3
Extension agent	-	-	-	-
Herbicide measures				
Milk tin	87.3	67.0	93.0	82.4
Visual estimate	5.7	9.3	2.7	5.9
Herbicide cover	7.0	23.7	4.3	11.7

Table-4. Costs, availability, effectiveness and importance of herbicides

Parameters	Senatorial districts			Meam
	Kogi east (n=300)	Kogi central (n=300)	Kogi west (n=300)	
	% Resondents			
Cost of gerbicides				
Cheap	32.7	24.7	34.7	30.7
Expensive (costly)	67.3	75.3	65.3	69.3
Availability				
Yes	91.7	89.3	93.7	91.6
No	8.3	10.7	6.3	8.4
Effectiveness				
Yes	96.7	91.3	96.3	94.8
No	3.3	8.7	3.7	5.2
Importance				
Increased filed	41.7	49.3	55.3	48.8
Time saving	30.0	26.0	28.3	28.1
Labour Saving	28.3	24.7	16.4	23.1

Table-5. Response of famers towards the observance of safety rules

Parameters	Senatorial districts			Meam
	Kogi east (n=300)	Kogi central (n=300)	Kogi west (n=300)	
	% Resondents			
Wear protective clothing				
Yes	4.7	3.7	18.7	9.1
No	95.3	96.3	81.3	90.8
Disposal of empty container				
Domestic use	40.0	47.7	20.7.	36.1
Bury	10.7	6.7	34.0	17.2
Sell	49.3	45.6	45.3	46.7
Talk/conversation				
Yess	31.7	33.7	24.3	29.9
No	68.3	66.3	75.7	70.1

Table-6. Response of famers on sources of herbicide in Kogi state

Parameters	Senatorial districts			Meam
	Kogi east (n=300)	Kogi central (n=300)	Kogi west (n=300)	
	% Resondents			
Herbicide Sources				
Ministry of Agriculture	3.3	3.0	8.0	4.7
Agric. Dev. Project (ADP)	14.0	16.0	20.3	16.7
Accredited retailer	6.7	17.3	7.7	10.5
Open market	79.0	63.0	59.0	67.0
Company agent	-	6.7	5.0	3.9

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