

Problems of Herbicides Application among Farmers in Zuru Local Government Area of Kebbi State, Nigeria

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Abstract: The study examined the problems of herbicides application in Zuru Local Government Area of Kebbi State. Simple random sampling technique was adopted in selecting farmers proportionate to the population. Data were collected through the use structured questionnaire administered to one hundred and twenty five (125) farmers. Data collected were analysed using descriptive statistics and Pearson product moment correlation. Result revealed that 32% of the farmers are within the age bracket of 31 – 40 years, majority (64%) of the farmers were males. The result also revealed that 64% of the farmers in the study area were married, majority (80%) of the farmers in the study had one form of formal education or the other ranging from primary, secondary or tertiary education, 64% of the farmers have a farm size of 1 – 5 hectares, while about 60% of the farmers in the study area had farming experience of between 1 – 10 years. The result further confirmed that 71.2% of the farmers applied herbicides in the morning, majority (78%) of the farmers used non-selective herbicides, while on the problems associated with herbicides application 48.8% of the farmers stated that they had laboured breathing while applying herbicides. Further revealed from the result is the fact that all the farmers use one form of precautionary measure or the other before applying herbicides. However, on the factors militating against herbicides application by farmers was high cost of herbicides as it was ranked first with 45.6%. The test of hypothesis revealed that only sex (0.280**) and educational level (0.188*) were found to have significant relationship with problems of herbicide application at 1% and 5% probability levels, respectively. It is therefore recommended that Agricultural Development Project (ADP) should organize training for farmers on application of herbicides and as a way of minimizing cost of herbicides, farmers should form associations so as to pull resources together so as to buy herbicides directly from the distributors and disburse among their members.

[Musa D Baba, Ishaq D Sanchi, Damana B Senchi and Taibat A Manga. **Problems of Herbicides Application among Farmers in Zuru Local Government Area of Kebbi State, Nigeria.** *Rep Opinion* 2014;6(9):1-5]. (ISSN: 1553-9873). <http://www.sciencepub.net/report>. 1

Key words: Problems, Herbicides Application, Farmers, Zuru, Kebbi

1.0 Introduction

Food production started from time immemorial, with the geometric increase in population of human beings the need to increase food production to feed large number of people led to the advent of technologies like machines, herbicides among others. New production technologies designed to revamp the agricultural sector and boost agricultural production has led to marked increase in crop yields (Blomme *et al.*, 2008). The issue of providing adequate food supply to meet requisite demand in Nigeria has been topical for a number of years, problems of food production and distribution has been elaborately analysed with a variety of policy recommendations, among which is the use of agrochemicals not only to increase food production but to reduce food waste and hopefully enhance food producers income. The conventional methods of raising farm productivity since the World War II has centred on employing the use of externally acquired inputs like fertilizers and protection chemicals among others (Avav and Calton, 2000).

Agrochemicals are important agricultural inputs to protect crops from diseases, pests and weeds. The uses of agrochemicals contribute not only to healthy growth of crops and animals but also to improve farm work efficiency and stable supply of tasty agricultural produce (Kellog *et al.*, 2008). Agricultural chemicals include fertilizers, pesticides, herbicides, rodenticides to mention but just a few used to eliminate the presence of living things that causes injury or diseases to crops and to improve production. Although many kinds of chemicals are used in agriculture, they can be categorized into simple groups according to the functions they performed. This includes insecticides, herbicides, fungicides, molluscides, and rodenticides, just to mention but a few (Jurewicz and Hanke, 2008).

Herbicides use is not limited to crop production alone, its use in animal production include antibiotics administered either by injection or combined with feed; to control infectious diseases and parasites that often arise when animals are raised under extremely crowded conditions. In similar way to tractors, ploughs and other implements, herbicides

have now become an integral part of the complex word of technical inputs required for modern agricultural production and are accepted as a standard tool of the trade by farmers throughout the world [1]. For several years humans have utilized herbicides to protect their crops. The first known agrochemical was sulfur-dusting used in ancient summer about 4,500 years ago in ancient Mesopotamia. By the 15th century, toxic chemicals such as arsenic, mercury and lead were being applied to crops to kill insects (Kettles *et al.*, 2001). In the 17th century, nicotine sulfate was extracted from tobacco leaves for use as an insecticide. The 19th century saw the introduction of more natural agrochemicals; pesticides and pyrethrum, which are derived from chrysanthemums, and rotenone, which is derived from the roots of tropical vegetables (Miller, 2002).

1.2 Specific Objectives of the Study

The objective of this study is to examine the problems of herbicides application by farmers in Zuru Local Government Area of Kebbi State, Nigeria. The specific objectives include: (1) Describe the socio-economic characteristics of the farmers in the study area. (2) Determine the precautionary measures used by farmers in herbicides application in the study area. (3) Determine the types of herbicides used by farmers in the study area. (4) Identify problems associated with herbicides application in the study area. (5) Identify factors militating against herbicides application in the study area.

1.3 Hypothesis

There is no significant relationship between problems of herbicide application and socio-economic characteristics of farmers.

2.0 Methodology

The study was carried out in Zuru Local Government Area (LGA) of Kebbi State. The Area is located within latitude 11° 35' and 11° 55'N and longitude 4° 45' and 5° 25'E of the equator approximately (Girma, 2008). Zuru LGA is geographically located in the south-eastern part of the state. The estimated population of the LGA is 165,547 people (NPC., 2006). The weather is marked by a single rainy season and long dry season, the average rainfall is 1025mm/annum, the rainy season is between May to October, the rainy season last for four – five months. The climatic condition of the area is characterized by hot and wet season as in the tropics; the month of November to January is the harmattan period. The soil type is sandy loam and rich, which makes it suitable for agriculture (Girma, 2008). The study area consists of six (6) administrative districts namely; Dabai, Rafin Zuru, Rikoto, Senchi, Manga and Ushe. Three districts were selected and two villages were selected in each of the districts selected

using simple random sampling technique, while farmers were selected proportionate to the population. Thus, a total number of One Hundred and Twenty Five (125) farmers constitute the sample size for the study. The instrument used for data collection was structured questionnaire containing both open and closed ended questions. Data were analyzed using descriptive statistics such as frequency count and percentage and Pearson product moment correlation.

2.1 Model Specification

Pearson Product Moment Correlation is a method used to measure the strength of linear relationship between variables x and y. r can range from +1, that is perfect positive correlation where the variables change value in the same direction as each other, to -1, that is perfect negative correlation where Y decreases linearly as X increases. A coefficient of zero or near zero generally indicates no correlation. Pearson Product Moment Correlation was used to test the stated hypothesis. This is denoted by;

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{(N\sum X^2 - (\sum X)^2)} \sqrt{(N\sum Y^2 - (\sum Y)^2)}} \dots\dots\dots (1)$$

Where,

Y = Problems of herbicides application

X₁ = Age

X₂ = Sex

X₃ = Educational level

X₄ = Farm size

X₅ = Farming experience

N = Number of observations

3.0 Results and Discussion

3.1 Socio-economic Characteristics of Farmers in the Study Area

Result showed that 32% of the farmers are within the age bracket of 31 – 40 years, 28% are within the range of 20 – 30 years, 24% are within the age of 41 – 50 years while the remaining 16% are between 51 and above years. This indicated that majority of the farmers in the study area are within the active and productive age. Majority (64%) of the farmers were males while the remaining 36% were females. This indicated that herbicides application for farming in the study area is dominated by males. This could be as a result of the tedious and hazardous nature of herbicides application which predisposes men to practice. The result further revealed that 64% of the farmers in the study area were married while 36% were single.

Majority (80%) of the farmers in the study are had one form of formal education or the other ranging from primary, secondary or tertiary education as against 20% that had no any form of formal education. Those that attended primary schools were ranked highest with 40%, followed by those that

attended secondary schools with 24% and those that attended tertiary education with 16%. This finding has therefore, reflected the importance of education in agricultural production activities. The more an individual is exposed to any form of education, the more he will have a better understanding of his environment. Result also revealed that 64% of the farmers have a farm size of 1 – 5 hectares, 20% have 6 – 10 hectares of farm and 16% have 11 and above hectares of farm land. Similarly, result also showed that about 60% of the farmers in the study area had farming experience of between 1 – 10 years, 24% 11 – 20 years and 16% had between 21 and above years' experience in farming. Years of farming experience in any form of production helps in determining the accuracy in decision making and in allocation of scarce resources wisely. Farmers with more experience would be more efficient, have better understanding of the environment and market situations.

Table 1: Socio-economic Characteristics of Farmers in the Study Area

Variables	Frequency	Percentage
Age (Years)		
20 – 30	35	28
31 – 40	40	32
41 – 50	30	24
51 and above	20	16
Total	125	100
Sex		
Male	80	64
Female	45	36
Total	125	100
Marital Status		
Married	80	64
Single	45	36
Total	125	100
Educational Background (Years)		
Primary	50	40
Secondary	30	24
Tertiary	20	16
No formal education	25	20
Total	125	100
Farm Size (ha)		
1 – 5	80	64
6 – 10	25	20
11 and above	20	16
Total	125	100
Farming Experience		
1 – 10	75	60
11 – 20	30	24
21 and above	20	16
Total	125	100

Source: Field Survey Data and Computation by the Researcher, (2014).

3.2 Time Herbicides Application by Farmers in the Study Area

Results in Table 2 showed that 71.2% of the farmers applied herbicides in the morning. This could be attributed to the fact that most of the people used for application of herbicides in the villages do not wear any head mask before applying herbicides, because they do not wear head mask or boot, the best time to apply herbicides is in the morning. Apart from that, herbicides can easily evaporate leaving nothing to the farmer especially in tropics where the temperature in the environment is usually very high; its application in the afternoon allows a reasonable quantity of it to evaporate, therefore if applied in the afternoon the aim of the application is not achieved. To ensure proper utilization of herbicide it is better applied in the morning or evening when the temperature is low. The application of the herbicides in the morning make it to be absorbed easily by the herbs better than when it is applied at any other time of the day.

Table 2: Distribution of Farmers According to Time of Herbicides Application

Time of Application	Frequency	Percentage
Morning	89	71.2
Afternoon	10	8.0
Evening	26	20.8
Total	125	100

Source: Field Survey Data and Computation by the Researcher, (2014).

3.3 Types of Herbicides Applied by Farmers in the Study Area

Results in Table 3 showed that majority (78%) of the farmers used non-selective herbicides. Non-selective herbicides are used in non-crop situation; land clearing and industrial weed control, railway tracks, and forestry sites. The study area belongs to vegetation belt that is characterized by high grasses (grassland area) therefore; farmers in their attempts to clear grasses/herbs for farming make use of non-selective herbicides. The use of herbicides for clearing herbs is faster, and energy conserving than the use of any other physical means especially hands. The use of herbicides for clearing herbs in preparation for farming is very common in the study area. Most farmers engage hired people who use herbicides and clear herbs which are very economical. If physical weeding is employed it may take farmers many months to clear preparatory to farming especially for those with large farms, however with the use of herbicides a few days are used to cover the same piece of land that could have taken the farmers many months to clear by weeding. The composition of herbicides when it is to be applied among crops and

grasses/herbs is also a major problem because most of the people involved in spraying do not undergo any form of training to make them understand herbicides composition and application.

Table 3: Distribution of Farmers According to Types of Herbicides Used

Type of Herbicide	Frequency*	Percentage
Selective	87	69.6
Non-selective	59	47.2
Contact	95	78
Systemic	62	49.6

Source: Field Survey and Computation by the Researcher, (2014). *Multiple Responses

3.4 Precautionary Measures Observed by Framers in Herbicides Application in the Study Area

Results in Table 4 showed that 32% of the farmers wear boot only before applying herbicides. This is an indication that most people that apply herbicides use one form of precautionary measure or the other. Majority of the farmers employ the services of commercial herbicide sprayers who sometimes go out from one house to another looking for farmers to hire them to do the job. Apart from farmers, schools (primary and secondary) and religious places make use of herbicides in clearing herbs in and around their premises. One thing with the commercial herbicide sprayers is that most of them are very familiar with the herbicides commonly used in the area and they handle these herbicides as if they were not poisonous, a situation that will present a very dangerous future for them but most of them are not aware of the long-time effect herbicides will have on their health.

Table 4: Distribution of Farmers According to Precautionary Measures Observed When Applying Herbicides

Precaution	Frequency	Percentage
Read label before use	2	1.6
Wear head mask only	20	16
Wear overall or apron only	15	12
Wear boot only	40	32
Wear head mask and apron	20	16
Wear head mask and boot	10	8
Wear apron and boot	8	6.4
Wear head mask, apron and boot	10	8
Total	125	100

Source: Field Survey Data and Computation by the Researcher, (2014).

3.5 Problems of Herbicides Application by Farmers in the Study Area

Table 5 showed that 48.8% of the farmers stated that they had laboured breathing while applying herbicides. This could be attributed to attempts to

cover large hectares of farmland within a short period of time and the use of faulty spraying equipment which cause linkages. Majority of the people hire spraying equipment for application of herbicides. Hiring of sprayers is time bound therefore, the farmers are eager to complete their job and returned the sprayers to the owners for fear of been sub charged. If it is a hired person, their attempts to cover large area of farmland often result to spraying fast which mostly results to eye irritation (42.4%), this also leads to haphazard application of herbicides which very often result to the poor death of the herbs. Furthermore, the poor death of the herbs after spraying herbicides on farmland could require a farmer to use other means in further clearing the herbs that were left over as a result of poor application of herbicides because most of the farm activities are done manually. The effective use of herbicides depends to a great extent on how they are applied. More so, much of the equipment used in developing countries is poor and some designs have proved unsuitable for use.

Table 5: Distribution of Farmers According to Problems of Herbicides Application

Problems	Frequency*	Percentage
Fatigue	16	12.8
Skin Irritation	35	28
Eye Irritation	53	42.4
Dizziness	23	18.4
Vomiting	19	15.2
Laboured Breathing	61	48.8
Headache	22	17.6

Source: Field Survey Data and Computation by the Researcher, (2014). *Multiple Responses

3.6 Factors Militating Against Herbicides Application by Farmers in the Study Area

Results in Table 6 depicted 50.4% high costs of herbicides. The high cost of herbicides is as a result of middle men's involvement in the sale and distribution of herbicides. The middle men in their attempt to maximize profit buy in large quantities and hike the price of herbicides almost beyond the average price making it difficult for the peasant farmers to buy. Apart from that most of the peasant farmers' farmland is not big enough to engage people outside their family as that will amount to waste of their little resources. So to those groups of farmers whose farmland is small it is not economical to use herbicides in any way on their farm as it will only amount to economic waste.

Table 6: Distribution of Farmers According to Factors Militating Against Herbicides Application

Factors	Frequency*	Percentage
High cost	57	45.6
Water pollution	10	8
Food poisoning	42	33.6
Killing of non-targeted organisms	34	27.2
Health hazards	63	50.4

Source: Field Survey Data and Computation by the Researcher, 2014. *Multiple Responses

3.7 Test of Hypothesis

The test of hypothesis revealed that age ($r=0.175$) and farming experience ($r=0.019$) of farmers were found to have positive but non-significant relationship with problems of herbicides application. Educational level ($r=-0.188$) was found to have positive and significant relationship with problems of herbicides application at 5% probability level. However, sex of farmers (-0.280) was found to have negative and significant relationship with problems of herbicides application at 1% probability level, while farm size was found to have negative but non-significant relationship with problems of herbicides application.

Table 7: Relationship between Socio-economic Characteristics of Farmers and Problems of Herbicides Application

Parameters	r-value
Age (X_1)	0.175
Sex (X_2)	0.280**
Educational Level (X_3)	0.188*
Farm Size (X_4)	-0.152
Farming Experience (X_5)	0.019

Source: Field Survey Data and Computation by the Researcher, 2014. ** and * = Significant at 1% and 5%.

Conclusion and Recommendations

The advent of herbicides has led to increase in crop yield and reduce drudgery among farmers; little time is now taken to clear herbs especially before farming. Most farmers applied herbicides in the morning the commonly used herbicide is non-selective. Furthermore, the common health hazard associated with application of herbicides is laboured breathing, though people employed labour for application of herbicides. High cost is one of the major factors militating against the use of herbicides. Herbicides are good especially for clearing of weed around our environment; they cause a lot of damage

by killing the non-targeted beneficial insects thereby creating more problems in the near future.

From the findings of this research and in order to minimize problems of herbicides application in the study area, the following recommendations were made:

Agricultural Development Projects (ADPs) should organize training for farmers on herbicides application and farmers should form associations so as to pull resources together, buy herbicides directly from the distributors in large quantity and disburse the herbicides among themselves to prevent been exploited especially the hike in price by the middle men.

Acknowledgement:

Authors are grateful to the management of College of Agriculture Zuru, Kebbi State for their support and cooperation towards the conduct of this research.

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