

Full Length Research Paper

Herbicide utilization by farmers in Moro Local Government Area of Kwara State

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A survey was conducted in 2013, to determine the extent of use of herbicides by farmers in Moro Local Government Area of Kwara State. Five major villages, namely, Malete, Jehunkunu, Shao, Elemere and Olooru were selected, which constituted a representative sample for the survey. Questionnaires were administered on 150 farmers consisting of 30 farmers each from the above five villages of Moro local Government Area. Results show that a greater percentage of farmers (48.7%) were above the age of 50 years. Also, majority of the respondents (72.2%) were males, married (96.3%), in full-time farming (75.0%) and were mostly illiterate (62.1%). Most of the respondents (79.3%) were subsistence farmers, cultivating between 1 – 6 hectares (ha) of land without access to funds (84.5%). Most of the respondents (55.4%) used herbicides to control weeds on their farms, however, greater percentage of them (56.2%) purchased herbicides from the open market. Furthermore, 100% of the respondents did not calibrate their knapsack sprayer before using it. However, 79.2% of the respondents use one type of protective clothing or the other while applying herbicide, but 20.8% of the respondents did not protect themselves at all during the application of herbicides. It is recommended that farmers need to be subjected to training in the safe and profitable use of herbicides in Moro Local Government Area.

Key words: Herbicide, utilization, farmers, Moro Local Government Area, Kwara State, Nigeria.

INTRODUCTION

The ability of herbicides to control weeds has been known to man for centuries and they have played, and will continue to play important role in world agriculture. The increasing population of developing countries and the attendant need to increase food production is a pointer that herbicides must be used in an increasing proportion in order to increase the much needed food, and produce it efficiently. Chemical method of weed control, widely used in advanced nations is nascent in the third world and is one of the factors responsible for wide disparity in crop productivity between the developing and developed nations. Ado (2007), stated that while 80% of the world herbicide production is consumed in advanced countries, only 20% is left for developing countries in which Nigeria belongs. Also, out of 13 pesticides in use in the world, 44% are herbicides in the advanced world while in the developing countries most widely sold pesticides are insecticides.

The above figures in relation to herbicide use indicate the high potential of herbicides in increasing crop productivity.

Labrada (1996), reported that the main weed control method by small – holder farmers in the developing countries is either hand–weeding or hoe weeding. Adigun and Lagoke (2003), also reported that hoe weeding which is the commonest method of weed control by farmers in the Sudan Savanna Zone of Nigeria is not only labour intensive, expensive and strenuous, but also cause mechanical damage to growing branches and roots of plants. In addition to high cost, labour availability is uncertain, thus making timeliness of weeding difficult to attain, leading to greater yield loss (Adigun and Lagoke, 2003).

Herbicide use is more adapted to large scale production than other weed control methods and it is labour saving (Anon, 1994). Similarly, herbicide use has been reported to be more profitable than hoe weeding in the production of various crops in Nigeria (Shrock and Manaco, 1980; Okereke, 1983; Usoroh, 1983; Sinha and Lagoke, 1984; Ogungbile and Lagoke, 1986; Adigun et al., 1993 and Imoloame et al., 2010). Also judicious use of herbicides has been reported to reduce labour require-

ments for and cost of weed control, increased crop yields by reducing weed competition and consequently increased profitability (Ogunbible et al., 1982; Sinha et al., 1982).

In Nigeria, the high cost of herbicides, as well as poor extension to enlighten people on the importance of herbicides and how safely to use them as well as their poor distribution have limited their use (Ado, 2007). Fadayomi (1991), noted that there was adoption of chemical weed control option to a large extent in Nigeria however, it should be noted that many problems are associated with chemical weed control method in developing countries to make it as an alternative to hand weeding. It was observed by Akobundu (1997) and Fadayomi (1991), that a cross-section of Nigeria farmers do not have formal education, secondly, the chemicals and spray equipment are imported, hence making price control by Government difficult. Also Adedzwa and Ortese (2004), reported that while farmers in Benue State of Nigeria acknowledge the efficiency of herbicides in the control of *Imperata cylindrical*, the adoption of herbicides was limited by availability and cost. In a survey carried out by Ikuenobe et al. (2005) to find out the adoption of improved weed control technology in three main agro-geo-political zones of Nigeria, it was reported that the cost of herbicides and limited knowledge of herbicide use ranked the most important factors limiting herbicide usage across all zones. Water supply, sprayer maintenance and limited skills in sprayer operation ranked next as limiting factors in herbicide use. Also, according to the farmers, in the zones, delayed farm operations, inadequate weed control and low crop yield were indicated by respondents as some of the consequences of non-use of herbicides. On the other hand, majority of farmers using herbicides indicated savings in labour and cost of production, better weed control and higher crop yield as benefits derived in using herbicides.

As observed by Hillman (2003), peasant agriculture confines its practitioners to grinding poverty and little dignity. Therefore, raising agricultural productivity levels in Nigeria is an important step in improving the welfare of the majority of the nation's people who derive their livelihood from farming. Nalor (1994), observed that the adoption of herbicides use contributed greatly to increased rice production and consequently welfare of the farmers in Asia. In view of Kwara State Government's determination to modernize agriculture and increase food production and the recognition of the potentiality of herbicides to achieve this goal, there is urgent need to carry out this research. The specific objectives of this study were:

- i) To determine the extent of use of herbicides by the farmers in Moro Local Government Area
- ii) To determine the problems faced by farmers in the use of herbicides.
- iii) To proffer solutions to the problems identified.

METHODOLOGY

A field survey was conducted in Moro Local Government Area of Kwara State. Five of the largest villages in different locations were selected within Moro Local Government were selected for the survey. Structured questionnaire was used to collect primary data. Thirty farmers were interviewed per village adding up to a total of 150 questionnaires that were administered on the farmers. The questionnaires sought information on the extent of herbicide use, crops that herbicides were applied on, techniques and safe use of herbicides, productivity and disposal of herbicides.

Data collected was analyzed by calculating the percentage response as frequency of response divided by total number of farmers multiplied by 100.

RESULTS AND DISCUSSION

Socio-demographic Characteristics of Farmers in Moro Local Government Area

Table 1, presents the socio-demographic characteristics of farmers in Moro Local Government Area of Kwara State. It shows that a greater percentage of farmers (48.7%) were above the age of 50 years, except in Jehunkunu village where youths between the age range of 31-50 years constituted a greater percentage (60%) of the total population of farmers. Majority of the respondents (72.2%) were males, married (96.3%), in full-time farming (75.0%) and were mostly illiterate (62.1%). Most of the respondents (79.3%) were subsistence farmers, cultivating between 1 – 6 hectares (ha) of land without access to funds (84.5%). The drift of most of the youths from the rural to the urban areas in search of white-collar jobs could have been responsible for a large percentage of farmers above the age of 50 years getting involved in farming. Kolo (2004), opined that the use of herbicides is inevitable by farmers in Nigeria as farm labour is fast diminishing because people are more in the white-collar jobs than in farming. The full-time status of most of the farmers underscores the importance of agriculture as an employer of labour and as a way out of the worsening employment problem in Nigeria. Agriculture in Nigeria is still a major provider of employment and a source of raw material in industries with 51.5% of the populace involved in agriculture (NBS, 2010; World Bank, 2010). Also, the fact that majority of the respondents are married will be a source of support to the older farmers who constitute majority of the farmers. Kolo (2004), opined that majority of farmers who are married in Niger State could receive various forms of assistance from their wives and children both at home and on the farm. Majority of the respondents were illiterate. This might pose a problem as the use of herbicides requires expertise which might be difficult to un-

Table 1. Socio-Demographic Characteristics of Farmers in Moro Local Government Area of Kwara State.

Variables	Malete%	Jehunkun u%	Olooru%	Shao%	Elemere%	Combine d %
<u>Age of Farmers</u>						
< 20	0.0	0.0	0.0	0.0	0.0	0.0
21-30	11.8	26.7	13.3	7.1	0.0	11.8
31-40	23.5	33.3	6.7	10.7	33.3	21.5
41-50	11.8	6.7	26.7	21.4	23.3	18.0
>50	52.9	33.3	53.3	60.7	43.3	48.7
<u>Marital Status</u>						
Married	88.2	96.7	96.7	100.0	100.0	96.3
Single	11.8	3.3	3.3	0.0	0.0	3.7
<u>Farming Status</u>						
Full-Time	76.5	63.3	86.7	78.6	70.0	75.0
Part-Time	23.5	36.7	13.3	21.4	30.0	25.0
<u>Gender</u>						
Male	100.0	50.0	60.0	100.0	75.9	77.2
Female	0.0	50.0	40.0	0.0	24.1	22.8
<u>Educational Status</u>						
Illiterate	70.6	57.1	83.3	46.4	53.3	62.1
Primary	17.6	35.7	6.7	21.4	30.0	22.5
Secondary	0.0	7.1	3.3	14.3	10.0	6.9
Tertiary	11.8	0.0	6.7	17.9	6.7	8.6
<u>Size of Land(ha)</u>						
<1	11.8	23.3	16.7	0.0	16.7	13.7
1-2	29.4	23.3	36.7	10.7	16.7	23.4
3-4	29.4	13.3	16.7	35.7	36.7	26.4
5-6	23.5	3.3	16.7	28.6	6.7	15.8
>6	5.9	36.7	13.3	25.0	23.3	20.8
<u>Accessibility to Fund</u>						
Yes	29.4	10	3.3	17.9	16.7	15.5
No	70.6	90	96.7	82.1	83.3	84.5

Field Survey, 2013.

derstand by farmers (Kolo, 2004). Fadayomi (1991) and Akobundu (1997), reported that most of Nigerian farmers have no formal education and this has made it difficult for them to read instructional labels on herbicide containers and understand the workings of herbicides. Majority of the respondents are subsistence farmers possibly as a result of inability to access funds which could have been used to embark on large scale farming.

The use of Herbicides by Farmers in Moro Local Government Area

Table 2, shows the use of herbicide in Moro Local Government of Kwara State. It shows that most of the respondents (55.4%) used herbicides to control weeds on their farms. Most of the respondents (97.6%) used

herbicides every season on their crops such as cereals, legumes, root and tuber, vegetables and plantain in a mixed cropping system. However, a great percentage of respondents (35%) use herbicides more on yam and cassava.

The fact that most of the farmers use herbicides for every season for the past 1 to 6 years testifies to the advantages and popularity of this chemical.

The sources and types of herbicides used are presented in Table 3. It shows that greater percentage of the respondents (56.2%) purchased herbicides from the open market, followed by Agro stores (40.7%). The herbicides mostly used were pre- and post-emergence herbicides although more of post emergence herbicides were used.

The purchase of herbicides in the open market by most of the farmers is in line with the findings of Kolo (2004), Ikuenobe

Table 2. Percentage response on use of herbicide in Moro Local Government Area of Kwara State.

Variables	Malete%	Jehunkun u%	Olooru%	Shao%	Elemere%	Combined%
<u>Have you used herbicide to control weeds before</u>						
Yes						
No	23.5	83.3	56.7	50.0	63.3	55.4
	76.5	16.7	43.3	50.0	36.7	44.5
<u>Do you apply herbicides every season</u>						
Yes						
No	100.0	100.0	88.2	100.0	100.0	97.6
	0.0	0.0	11.8	0.0	0.0	2.4
<u>How long have you been applying herbicides</u>						
1-3 years						
4-6 years	50.0	36.0	17.6	15.4	52.6	34.3
7-9 years	25.0	48.0	41.2	46.2	31.6	38.4
Above 10 years	0.0	8.8	23.5	23.1	5.3	12.0
	25.0	8.0	17.6	15.4	10.5	15.3
<u>What crop do you use herbicides on</u>						
Maize	27.3	16.3	21.3	21.4	19.1	21.1
Sorghum	27.3	14.8	17.3	14.3	14.6	17.7
Millet	20.0	4.4	0.0	1.8	2.2	1.7
Rice	0.0	1.5	0.0	8.9	0.0	2.0
Soybean	0.0	9.6	6.7	7.1	6.4	6.0
Cowpea	0.0	6.7	9.3	7.1	7.8	6.2
Groundnut	0.0	3.0	8.0	3.6	11.2	5.2
Plantain	0.0	1.5	0.0	1.8	0.0	0.7
Vegetables	0.0	8.1	4.0	1.8	7.8	4.3
Yam	27.3	16.9	16.0	14.3	13.4	17.6
Cassava	18.1	16.9	17.3	17.9	16.9	17.4
Okra	0.0	0.0	0.0	0.0	1.1	0.2
<u>Cropping System</u>						
Mixed cropping	83.3	78.6	89.5	65.0	73.9	78.1
Sole cropping	16.7	14.3	10.5	35.0	21.7	19.6
Mixing farming	0.0	7.1	0.0	0.0	4.3	2.3

Field Survey, 2013.

et al. (2005) and Iyagba and Nwokocha (2012), that farmers in Niger State, across three agro-ecological zones of Nigeria and Rivers State of Nigeria respectively, purchase herbicides from the open market and that this attitude puts the farmers at the risk of purchasing herbicides that are adulterated, expired and expensive. The farmers use more of post – emergence herbicides than other herbicides probably because they grow more of root and tuber crops.

Table 4, shows the response of farmers on the technique of application of herbicide. Most of the respondents (39.8%) and (39.4%) got information on the

quantity of herbicide to apply from the extension agents and friends respectively and they (71.8%) use milk-tin measure to dispense herbicide. However overwhelming percentage of the respondents (100%) did not calibrate their knapsack sprayer before using it. Majority of respondents (39.9%) and (38.7%) apply herbicide themselves or used family labour respectively with CP15 and CP3 knapsack sprayers. These sprayers are manually operated with a spray tank of maximum capacity of 20litres. Most the respondents (51.4%) owned their sprayers and were taught how to apply herbicide by friends (37.0%) and extension workers (36.0%).

Table 3. Percentage response on source and types of herbicides used.

Variables	Malete%	Jehunkunu%	Olooru%	Shao%	Elemere%	Combined%
<u>Source of herbicides used</u>						
(KWSADP)	0.0				0.0	3.1
Open Market	75.0	0.0	0.0	15.4	55.6	56.2
Manufactures Representative	0.0	44.0	52.6	53.8	0.0	0.0
Agro Stores	25.0	0.0	0.0	0.0	44.4	40.7
		56.0	47.4	30.8		
<u>Types of herbicides used</u>						
Pre-plant	28.6	13.2	4.3	17.6	12.5	15.2
Pre-emergence	14.3	34.2	60.9	47.1	40.6	39.4
Post emergence	57.1	52.6	34.8	35.3	46.9	45.3

Field Survey, 2013

However, a greater percentage of respondents (62.9%) do not use the same sprayer for herbicide and insecticide application except in Elemere village, where majority of respondents do otherwise. The fact that majority of the farmers don't calibrate their sprayers shows that they are deficient in the knowledge of herbicide usage. This can result in the uneven application of herbicides, over dose or under dose of herbicides application, poor weed control, environmental pollution and high crop mortality. Iyagba and Nwokocha (2012), have ascribed the lack of skill in sprayer calibration to the level of literacy of the farmers. Ikuenobe et al. (2005), suggested that training on calibration, herbicide types and dosages for common crops as well as safe handling should facilitate the adoption of herbicide use. Most of the respondents applied herbicide themselves or used family labour. This could be due to the tendency of the farmers to save cost of applying herbicide. The widespread use of milk-tin measurement (MTM) to measure out the quantity of herbicide into sprayer tank could have originated from the recommendation by the National Advisory Committee on Weed Control (NACWC), a committee of the Federal Department of Agriculture, Abuja (Anon, 1994). Majority of the respondents use CP15 and CP3 knapsack sprayer probably because they are easy to understand and are affordable by farmers compared with motorized sprayers. The fact that friends constitute a large percentage of the people who taught the farmers the application technique and quantity of herbicide to apply, put the farmers at risk of being advised wrongly.

Protection of Farmers from Injury and Practices after Herbicide Application

Response on how farmers protect themselves from injury and the practices they carry out after herbicide application is presented in Table 5. It shows that 79% of

the respondents use one type of protective clothing or the other while applying herbicide. A greater percentage of respondents (32%) used only rain boot. While 20.8% of the respondents did not protect themselves at all during the application of herbicides. Most of the farmers (58.8%) talked during the application of herbicide. However majority of the respondents (96.8%) bath and wash their knapsack sprayers (98.1%) after the application of herbicide. The majority of respondents (41.3%) threw away the herbicide containers or 25% converts it into domestic uses. Most of the respondents (92.6%) indicated that they have not had accident while applying herbicides. This result has further shown that farmers in Moro Local Government Area don't have sufficient knowledge and skill in the use of herbicide. Talking while spraying herbicides, not protecting oneself with all the protective clothing and throwing away or converting of herbicide containers to domestic use exposes the farmers and their animals to herbicide toxicity. There is the need to adopt the suggestion of Ikuenobe et al. (2005) that the chemical companies, apart from providing market outlets for their products, should be strengthened together with the Kwara State Development Program (KWADP) to assist in educating the farmers in Moro Local Government Area on herbicide usage. Also, the Kwara State University, which is a university for community development should allow its community development program me to cover this aspects of agriculture.

Observed Benefits of the use of Herbicides

The observed benefits of the use of herbicides is presented in Table 6. It shows that the overwhelming percentage of respondents (95.5%) believed that the use of herbicides is more effective, cheaper (93.8%), time saving (100.0%) profitable (100.0%), labour saving (100.0%)

Table 4. Percentage response on application of herbicides by farmers.

Variables	Malete%	Jehunkunu%	Olooru%	Shao%	Elemere%	Combined%
<u>Source of information on the quantity of herbicide to apply</u>						
Extension agent	50.0	42.3	17.6	41.7	47.4	39.8
Research institute	0.0	3.8	0.0	0.0	0.0	0.8
Friends	25.0	42.3	35.3	41.7	52.6	39.4
Relative	25.0	11.5	47.1	16.7	0.0	20.1
<u>How do you measure out the quantity of herbicides</u>						
Milk Measure	75.0	96.0	76.5	64.3	47.4	71.8
Graduated Cup	25.0	4.0	23.5	35.7	52.6	28.2
Eye Judgment	0.0	0.0	0.0	0.0	0.0	0.0
<u>Is the sprayer calibrated before use</u>						
Yes						
No	0.0	0.0	0.0	0.0	0.0	0.0
	100.0	100.0	100.0	100.0	100.0	100.0
<u>Who applies herbicide</u>						
Self						
Extension Agent	0.0	42.3	47.4	60.0	50.0	39.9
Family Labour	0.0	11.5	0.0	0.0	0.0	2.3
Hired Labour	75.0	34.6	47.4	6.7	30.0	38.7
	25.0	11.5	5.3	33.3	20.0	19.0
<u>What type of spray equipment do you use</u>						
CP 15						
CP 3	75.0	53.8	41.2	50.0	50.0	54.0
Boom Sprayer	25.0	46.2	58.8	50.0	50.0	46.0
Motorized Sprayer	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0
<u>Do you use the same sprayer for herbicide and insecticide application</u>						
Yes						
No	50.0	29.2	23.5	25.0	57.9	37.1
	50.0	70.8	76.5	75.0	42.1	62.9
<u>Who taught you how to apply herbicide</u>						
Self						
Extension Agent	0.0	3.8	0.0	0.0	0.0	0.8
Friend	50.0	15.4	23.5	35.7	55.6	36.0
Relative	25.0	42.3	23.5	50.0	44.4	37.0
	25.0	38.5	52.9	14.3	0.0	26.1
<u>What is source of sprayer</u>						
Owned			52.9	38.5	47.4	51.4
Borrowed	50.0	68.0	35.3	30.8	10.5	24.3
Hired	25.0	20.0	11.8	30.8	42.1	24.3
	25.0	12.0				

Field Survey, 2013.

and acceptable to the farmers than hoe-weeding. The acceptance of herbicide by farmers of Moro Local Government Area confirms the advantages of herbicide usage over hoe weeding which is time consuming, labour

intensive and generally expensive. It is estimated that 40-60% of production cost is spent on manual weeding (Remison, 1979; Joshua and Gworgwor, 2000; Adigun and Lagoke, 2003). The advantages of herbicides expressed

Table 5. Percentage response on how farmers protect themselves from injury and practices after herbicide application.

Variables	Malete	Jehunkun u	Olooru	Shao	Elemere	Combined
<u>How do you protect yourself from herbicide injury.</u>						
Wearing cover all	0.0	7.3	10.7	3.6	8.3	6.0
Face mask	16.7	19.5	10.7	35.7	25.0	21.5
Rain boot	50.0	26.8	25.0	25.0	33.3	32.0
Hand gloves	16.7	19.5	17.9	25.0	19.4	19.7
Not protect self	16.7	26.8	35.7	10.7	13.9	20.8
<u>Do you talk while spraying</u>						
Yes	50.0	79.1	52.9	38.5	73.7	58.0
No	50.0	20.8	47.1	61.5	26.3	41.1
<u>Do you bath after spraying</u>						
Yes	100.0	96.0	88.2	100.0	100.0	96.8
No	0.0	4.0	11.8	0.0	0.0	3.2
<u>Do you wash sprayer after use</u>						
Yes						
No	100.0	96.0	100.0	100.0	94.7	98.1
	0.0	4.0	0.0	0.0	5.3	1.9
<u>How do you dispose of herbicide containers</u>						
Bury it	25.0	14.3	29.4	23.0	15.8	21.5
Domestic use	25.0	17.9	17.6	38.5	26.3	25.1
Throw away	50.0	67.8	0.0	30.8	57.9	41.3
Sell it	0.0	0.0	52.9	7.7	0.0	12.1
<u>Have you ever had any accident while using herbicide?</u>						
Yes	0.0	4.0	11.8	0.0	21.1	7.4
No	100.0	96.0	88.2	100.0	78.9	92.6

Field Survey, 2013.

expressed by the respondents is in agreement with the findings of Ogungbile et al., 1982; Sinha et al., 1982; Adigun et al., 1993; Joshua and Gworgwor 2001; Kolo, 2004; Ikenobe et al., (2005); Imoloame et al., 2010, that herbicide reduces labour requirements, cost of weed control, increased crop yield and it is more profitable than hoe-weeding in the production of various crops in Nigeria. The use of herbicides to control weeds on the farm by farmers in Moro Local Government Area is likely to be on the increase as a result of the above advantages of herbicide usage. Kolo (2004) reported that chemical weed control will make weeding effective and efficient resulting in higher yields and freeing the farmers for other priority tasks. It has been estimated that an average African farmer is forced to spend more than half of his working time on weeding with the hoe and weeds in tropical agriculture destroy 25% - 100% of the harvest, if not properly managed (Collins, 1991).

Table 7, shows the factors that limit herbicide usage among farmers in Moro Local Government Area. It shows

that the greatest limiting factors were lack of finance, high cost of herbicide and lack of knowledge across the five villages sampled. The lack of finance could be as a result of the fact that farmers in this area do not have access to fund with which to buy the herbicides at the time of need. The lack of knowledge to use herbicide is a wakeup call for Kwara State University (KWASU), a university for community development Kwara State Agricultural Development Programme (KWADP) and the Agro stores to collaborate to train farmers on the use of herbicide to help them improve farm productivity.

CONCLUSION

It can be concluded that though it has not been too long that farmers in Moro Local Government Area started using herbicide for the control of weeds in their farms, this method of weed control has gained popularity and acceptance among the farmers over hoe weeding.

Table 6. Percentage response on observed benefits of herbicides.

Variables	Malete%	Jehunkun u%	Olooru%	Shao%	Elemere%	Combine d%
<u>How effective is herbicide compared to hoe-weeding</u>						
More effective	100.0	100.0	88.2	100.0	89.5	95.5
Equally effective	0.0	0.0	5.9	0.0	5.3	2.2
Less effective	0.0	0.0	5.9	0.0	5.3	2.2
<u>Cost of herbicides compared with hoe weeding</u>						
Cheaper	75.0	100.0	94.1	100.0	100.0	93.8
More expensive	25.0	0.0	5.9	0.0	0.0	6.2
Equally expensive	0.0	0.0	0.0	0.0	0.0	0.0
<u>Is herbicide more time saving than with hoe weedy</u>						
Yes	100.0	100.0	100.0	100.0	100.0	100.0
No	0.0	0.0	0.0	0.0	0.0	0.0
<u>Is herbicide labour saving than hoe weedy</u>						
Yes	100.0	100.0	100.0	100.0	100.0	100.0
No	0.0	0.0	0.0	0.0	0.0	0.0
<u>Is herbicide more acceptable to you than hoe weedy</u>						
Yes	100.0	100.0	100.0	100.0	100.0	100.0
No	0.0	0.0	0.0	0.0	0.0	0.0

Field Survey, 2013

Table 7. Ranking of factors limiting the use of herbicide in Moro Local Government Area.

Variables	Malete	Jehunkun u	Olooru	Shao	Elemere	Combine d
<u>Limiting factors</u>						
High cost of herbicide	4 th	2 nd	2 nd	2 nd	2 nd	2 nd
Lack of knowledge of herbicide use	2 nd	4 th	3 rd	3 rd	3 rd	3 rd
Lack of skill for application of herbicide	4 th	6 th	4 th	4 th	5 th	4 th
Herbicides are not available	6 th	7 th	6 th	8 th	6 th	5 th
Water is limiting	7 th	3 th	5 th	7 th	7 th	7 th
Not aware of how to maintain the sprayer	8 th	5 th	7 th	5 th	5 th	5 th
Safety	5 th	8 th	8 th	7 th	8 th	8 th
Finance	1 st	1 st	1 st	1 st	1 st	1 st

Field Survey, 2013.

However, this survey has revealed that the farmers are still deficient in the knowledge of proper use of herbicide. This gap calls for training of farmers on herbicide usage under the collaborative efforts of the KWADP, Agro-

chemical stones and KWASU in order for farmers to gain the full benefits of the use of herbicides which include among others, effective weed control, reduced cost of production, increased yield and profit.

RECOMMENDATION

- a) The three institutions Kwara State Agricultural Development Programme (KWADP), Kwara State University (Kwasu) and Agro stores should collaborate to provide training and education on the safe and profitable use of herbicides to farmers not only in Moro Local Area but to other Local Government Areas of Kwara State with emphasis on source of herbicides, types of herbicides, workings of herbicides, application and calibration, protection from injury, storage and disposal of herbicides.
- b) Federal and State Governments should develop a financial scheme from which farmers can easy access funds to enable then purchase essential inputs for boosting crop productivity
- c) Also provide training on bio-pesticide production and develop application methods in various crops. This technology will help both ecological and health promotion in rural and urban areas.

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