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Assessment of Farm Level Pesticide Use among Maize Farmers in Oyo State, Nigeria

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Abstract

This study assessed the harmful and beneficial effects of pesticide use in maize production. It also assessed the knowledge, attitude and practice of farmers about the use of pesticides. Data for the study were collected from 120 randomly sampled maize farmers across nine (9) local government areas of Oyo state. Majority (65%) found pesticides to be harmful while 39 per cent found it to be beneficial. Results further shows diverse attitude of farmers to pesticide use. About 95 per cent make use of hygienic practices while large numbers (66%) neglect safety rules due to poor education and awareness. Overall, there is evidence of excessive use of pesticide by farmers which consequently affects their health negatively. The use of pesticide is also found to contaminate water body. Major policy thrusts for devising pesticide regulation and effective implementation, increasing farmers' awareness of the effects of pesticide use, and increase provision safety materials are suggested to safeguard maize farmers in their pursuit of agricultural livelihoods.

Key words: Pesticide use, Maize, Farmers' awareness

1. Introduction

Maize (Zea mays) is an important cereal being cultivated in the rainforest and the derived savannah zones of Nigeria. It is a very important staple food consumed by millions of Nigerians. Studies in maize production and marketing in different parts of the country have shown an increasing importance of this crop, amidst growing utilization by food processing industries and livestock feed mills. The crop has thus become a local "cash crop" most especially in the south western part of Nigeria, where at least 30 per cent of the cropland has been put to maize production under various cropping systems (Ayeni, et al., 1991).

The continued cultivation of maize as a staple food is however threatened by a number of problems, including those of diseases and pests. Most of maize varieties are highly susceptible to downy mildew disease, maize rust, leaf blight, maize streak, maize mottle / chronic stunt, curvularia leaf spot, stalk and ear rots (Iken, .et al., 2004.). Insect pests, such as stem borers, armyworms, silkworms, grasshoppers, termites and weevils also affect the yield of the crop.

Effective control of these pests and diseases require the use of chemical agents called pesticides. The chemical agents called pesticides include herbicides (for weed control), insecticides, and fungicides. Although some pesticides have been termed as major organic pollutants due to effects of their source chemicals both on human health and the environment at large, yet some of these chemicals are safe.

There is a high probability that pesticide use and pesticide – induced side effects will grow more rapidly in developing countries as a whole than in the developed ones (Yudelman et al., 1998). This is because of weak regulations banning the importation and use of dangerous chemicals and the inactivity or absence of government and non - government environmental control agencies.

Despite the fact that dozens of pesticides are banned, severely restricted or unregistered in many countries and despite their having been listed as hazardous by the World Health Organisation (WHO) and Fajewonyomi (1995) stated that many of them are still widely promoted and applied especially in developing countries where weak controls and dangerous work conditions make their impact even more devastating. Papworth and Paharia (1978) stated that since pesticides by their very nature are toxic and can be hazardous to users if not handled properly, their regulation through registration is of great value to developing countries. It is not the increasing use of pesticides that warrants regulation

through suitable legislations but the tendency, through ignorance, for overuse, misuse or abuse of pesticides. Pesticides are generally known to be toxic and can be hazardous to users if not properly handled. This means that the high probability of pesticides use and pesticides induced side effect growing in developing countries would be a reality if the farmers' rate of awareness, knowledge, attitudes and practices on pesticides use are not properly considered with necessary actions taken in accordance to the recommendations. This study therefore assessed the general awareness of maize farmers in Oyo State on their use of farm level pesticides. Specifically, the study seeks to assess the socio economics of pesticide users; the level of awareness on the harmful and beneficial effects of pesticides use as well as knowledge, attitudes and practice of pesticide use among maize farmers in the study area.

The purpose of this study therefore is to expose the various levels of use of farm pesticides, and also to reveal the various level of adoption by farmers in the study area. This would lead to a conspicuous increase in overall maize production with a corresponding reduction in cost which is normally incurred as a result of damages caused by the various maize pests and diseases known to be prevalent in maize production.

2. METHODOLOGY

The study was conducted in Oyo state in the South-western part of Nigeria. The state is located between latitudes 7 0 3′ and 9 0 12′ north of the equator and longitudes 2 0 47′ and 4 0 23′ east of the Meridian, and covers a total land area of about 27, 249 square kilometers, with a ratio of almost 1:1 distribution of male to female population. The state has three agro-ecological zones, namely: rainforest, savannah and derived savannah. The rainforest is characterized by high relative humidity and supports the cultivation of tree crops like citrus, oil palm and cocoa as well as arable crops like cassava, maize and yam. The vegetation of the savannah zone mainly supports the cultivation of crops such as sorghum, maize, cowpea and yam, while the derived savannah combines the peculiar characteristics of the first two.

Primary data for the study were collected in nine (9), maize producing local government area in Oyo-state through the use of structured questionnaire. The nine local governments are Saki-west, Atisbo, Saki-east, Orelope, Olorunsogo, Itesiwaju, Iwajowa, Kajola and Iseyin in the maize production year of 2009/2010 cropping season. A multistage purposive sampling technique was used to select one-hundred and twenty (120) respondents were randomly sampled from the study area.

3. RESULTS AND DISCUSSION

The results of the analysis show the relevance of socio economic characteristics of respondents to pesticide use. Age is an important factor among the socio economic characteristics that determines the level of awareness of the farmers about the approved and banned chemicals. Aged farmers might not be aware of the use of new chemicals due to lack of information or his inability to read government directive. Most of them are more familiar and prefers the alchaic method of controlling pest some of which are outdated, banned and no more in use again. Old age reduces the farmers' ability to take risk and hence their adoption of new techniques and ideas. The farmer tends to believe the old method since it has been working for him over the years. The result from the field shows that the average age of farmers in the maize farming in Oyo state is 50.1 years with a standard error of 9.08. Table 1 show that the modal class of age is 41-50 years which constitute 46.0 per cent of the total respondents. This shows that the people who are actively involved in the production of maize fall within the age of 41-50. They are followed by the farmers within the age bracket 51-60 years which also constitute 27.0per cent of the total respondents. The reason for this difference is that most of the maize farmers who seem to be young are ready to go into maize production despise its risk compared to farmers who are relatively old.

The marital status is an important factor that determines the per capita income of the farmer. When a farmer has so many wives, that there will also be more children, this tends to reduce the farmers per capita income because more number of people will depend on him for survival hence reducing his real income. On the other hand, the family member could serve as source of labour for the farmer on his farm. With a large family, application of pesticide on the farm will be easier and lesser number of hired labour will be used. This will work if the children are youth. From Table 2, it is shown that majority of the farmers in the area are married. The married maize farmers constitute 91.1 per cent of the total population. None of the farmers are widow while very few percentage of the population 6.1 per cent is

single. This implies that the farmers will make use of their family members as sources of labour in maize production.

Farmers' awareness about pesticides should correlate with the educational status. Educated farmers can read publications and access information on the internet while the uneducated ones cannot do this, thus limiting their level of awareness due to lack of information. Moreover, illiterate farmers will find it difficult in the correct application of the pesticides in the correct proportion. From Table 3, majority of the respondents are illiterate taking 68 per cent of the total respondents while 32 percent are illiterates. As the farmers level of education increase, its' effects on agricultural production is meant to be positive. This is due to the fact that an educated farmer is at advantage in understanding and adopting new techniques of production. The more educated a farmer is, the more his decision making on the farm is enhanced as he becomes a better manager of farm resources for increased productivity from the set of farm inputs. From Table 4, farmers with only the primary education constitute the highest. They constitute 47.0 per cent of the total population and this is followed by the famers with only secondary education which also constitute 27.3 per cent of the total population. Farmers with tertiary education constitute the lowest percentage which is 25.8 per cent. Illiterate farmers constitute above half of the sampled respondents. This could hamper productivity and make enlightenment about the approved pesticides by extension agent more tedious.

The size of the household has a significant effect on the resources available to the farmer in terms of the labour and cost. Large household size poses a negative effect on the income. It reduces the available income to the farmers because of the number of people that depends on the farmer for survival. When the income is already reduced, farmers may find it difficult to incur more cost on pesticides, hence large family size could reduce pesticide use. On the other hand, large family size could reduce the hired labour cost required in the application of cocoa pesticides on the farm.

From the survey (Table 5), the modal class of the respondents falls within the range of 6 and 10. This depicts that 44% of the respondents have a household size of between 6 and 10 people. If the constituents of the household are mainly children, it is going to constitute an economic burden on the farmer because they would rather be consumers rather than contributing whether directly or indirectly to the farm labour. This modal class is followed by class 1-5 which has a total of 36 and this is also followed directly by the class11-15 with 13% of the total respondents while the class 21-25 and 26-30 have least number of respondents summing up to 2% of the total respondents.

The distribution of farmers by primary occupation (Table 6) shows the proportion of the farmers that are actively involved in coca farming and not the ones involved in the production of other crops. This will reveal the level of active involvement and consequently high productivity that should be expected from the primary enterprise. Some maize farmers are only involved as secondary cultivators. Table 6 shows that 78.0% of the total respondents in the area are actively involved in the production of cocoa, 5.0% are involved in trading, 3.0% are involved artisan and 14.0% are civil servant. This shows that the right peg was put into the right hole by directing the survey to the farmers that are actively involved in maize production.

Secondary occupation will help to determine the proportion of farmers that are involved in other business or vocation. It shows whether the farmer is actually involved in the production of other crop to generate more income or the farmer is only involved in maize production. From Table 7, 63.0% of the respondents have farming as their major occupation i.e. they are not involved in any secondary occupation. It shows that 12.0% of the respondents are artisans and 6.0% are actively involved in civil service. Most of the farmers interviewed have their primary occupation to be farming.

Experience in farming is an important factor, because it is a significant element in skill acquisition. Experience makes improvements possible which could in turn bring about increase in output, quality of output, reduction in cost of production and brings about efficiency in the use of input. Experience is expected to have positive influence on the managerial ability of the farmer. However, in some cases, experience may have a negative effect on production as farmers might become discouraged after years of repeated failures.

3.1 Harmful and Beneficial effects of pesticide

The pesticides used by the farmer constitute both positively and negatively to the output level of maize produce by the respondents.

From Table 9, majority of the respondents attest that both control of insects and yielding of good quality produce is a major beneficial effect of pesticide use on their farm. This takes 39% of the total respondents. Most of the respondents acknowledged that pesticides use increases production, prevents disease infestation and enhances the growth of the cacao tree. Most of the respondents use fertilizer on their maize plot being an annual crop, this account for the reason why a few majorities of the respondents (15.6%) said the use of pesticides gives good quality of maize because much attention would have been drawn on the effect of fertilizer on yield of the crop.

Table 10 shows that the maize pesticides used by the respondents on their farm also pose some detrimental effect on the farmers' life, other property and the maize plant. It shows that excessive use of the pesticide could even damage the maize stand which will eventually lead to loss on the part of the farmer. About 64.9% of the respondents attested to the fact that pesticide usage affects their health while 24.6% attested that it has residual effects on the soil. The use of pesticide also contaminates water body thus killing the aquatic animals if it runs into the river. About 6% of the respondent are currently experience this water pollution on their farm.

3.2 Knowledge, attitudes and practice of pesticides use

Table 11 shows the farmers' knowledge, attitudes and practices of pesticides use. The farmers recommended washing if pesticides splashed on their bodies but did not seem convinced of the benefit of going to a health clinic. A few believed that working with pesticides should not be a problem at all, while some others seem not to have any idea on what to do. Written information on pesticides packaging was not read by most of the farmers and others do not give attention. Most of the respondents believed that pest control workers should wear protective equipments while very few believed in careful working as the protective measure during pesticides use. Although use of personal protective devices minimizes the risk of direct contact and inhalation of aerosol pesticide formulation, careful working is advisable in this kind of work.

Many of the respondents considered windy and sunny weather as a pertinent problem in the study area. Wind plays a role in pesticides spraying. If it is against the spraying direction, it can distract the proper spraying maneuver and take the chemical off target. Sunny weather usually results in rapid evaporation of the chemical formulation which is undesirable. A vast majority of the respondents believed that lack of personal protective devices is the major problem facing the application of pesticides.

Table 12 shows the personal hygiene and sanitation practices of the respondents during pesticide use. The vast majority of the respondents wash hands before they ate or drank i.e. 95.5% while 3.4% do not wash their hands and others summing up to 1.1% of the respondents wash their hands sometimes. On personal hygiene, 94.3% of the total respondents do not eat, drink or smoke while working with pesticides while 3.4% does and 2.3% claims to do it sometimes. Table 12 also shows that a vast majority of the respondents do not keep their meals near pesticides and that very few percentage of the respondents drink water near pesticide treated areas. The habit of taking a shower was apparently common among the respondents with 71.6% of the total respondent doing it while 13.6 does not and 14.8 does it sometimes.

The table also shows that an overwhelming majority of the respondents change their clothes before and after pesticide exposure. From the results observed generally, it is very obvious that there is a need to raise the awareness of the farmers and bring some attitudinal change towards their conventional practices. The level of education of the farmers could be one of the reasons for such behavior.

4. CONCLUSION AND RECOMMENDATION

The study assessed perception and awareness of maize farmers to the harmful and beneficial effects as well as attitudes and practice of farmers to pesticide use in maize production. The finding shows that the use of pesticide is generally beneficial. However, there is evidence of excessive use of pesticide by farmers which consequently affects their health negatively. The use of pesticide also contaminates water body thus killing the aquatic animals if it runs into the river. Pesticide regulatory policies and program through pesticide safety education to farmers' awareness of the harmful effects of pesticides should be made by the government to safeguard maize farmers in the use of pesticides.

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Table 1: Distribution of respondents by age

Age	Frequency	Percentage (%)
21-30	2	2.0
31-40	11	11.0
41-50	46	46.0
51-60	27	27.0
61-70	14	14.0
Total	100	100

Source: Field Survey, 2010

Table 2: Distribution of Respondent by Marital Status

Marital Status	Frequency	Percentage (%)
Single	6	6.1
Married	91	91.1
Divorce	1	1.0
Widow	0	0.0
Widower	1	1.0
Total	100	100.0

Source: Field survey, 2010

Table 3 Distribution of Respondents by their educational status

Educational status	frequency	percentage
Literate	32	32.0
Illiterate	68	68.0
Total	100	100.0

Source: Field survey, 2010

Table 4: Distribution of Respondents by their levels of education

Level of Education	frequency	Percentage
Primary school	31	47.0
Secondary school	18	27.3
Tertiary school	17	25.8
Total	66	100.0

Source: Field survey, 2010

Table 5: Distribution of Respondents by Household Size

Household size	Frequency	Percentage (%)
1-5	36	36.0
6-10	44	44.0
11-15	13	13.0
16-20	5	5.0
21-25	1	1.0
26-30	1	1.0
Total	100	100

Source: Field Survey, 2010

Table 6 Distribution of the Respondents by their Primary occupation

Primary occupation	Frequency	Percentage (%)
Farming	78	78.0
Trading	5	5.0
Artisan	3	3.0
Public service	14	14.0
Others	0	0.0
Total	100	100

Source: Field Survey, 2010

Table 7 Distribution of Respondents by Secondary Occupation

Secondary occupation	Frequency	Percentage (%)
Public Service	6	6.0
Trading	19	19.0
Artisan	12	12.0
None	63	63.0
Total	100	100

Source: Field Survey, 2010

Table 8 Distribution of respondent by experience in maize production

Years of experience	frequency	percentage
1-10	8	8.0
11-20	32	32.0
21-30	25	25.0
31-40	22	22.0
41-50	10	10.0
51-60	3	3.0
Total	100	100

Source: Field survey, 2010.

Table 9 Distribution of respondents on beneficial effects of pesticides

Effects	Frequency	Percentage
1. Control of maize weevil	9	14.1
2. Give good quality of maize	10	15.6
3. Both control and good quality	25	39.1
4. Increase yield of crop	20	31.3
Total	64	100.0

Source: Field survey, 2010.

Table 10 perceptions of respondents on the harmful effects of pesticide use

Effects	Frequency	Percentage
Causes food poisoning	37	64.9
Has residual effect on soil	14	24.6
Causes pollution of water bodies	6	10.5
Total	57	100.0

Source: Field survey, 2010.

Table 11 Responses of farmers to the knowledge, attitude and practice questions during pesticide use

Questions and answers	frequency	percentage (%)
1. Have you ever split pesticide on your body?		
Yes	73	77.7
No	21	22.3
Total	94	100.0
2. How can you help a colleague during pesticide splash?		
Advice washing	61	65.6
Advice drink water	2	2.2
Go to health centre	15	16.1
No problem	1	1.0
No idea	14	15.1
Total	93	100.0
3. What protective measure do you take to protect yourself?		
Use of personal protective device	64	78.0
Careful working	18	22.0
Total	82	100.0
4. Can you understand information written on pesticide package?		
Could not understand	38	57.6
Do not give attention	28	2.4
Total	66	100
5. What are the major problems faced during pesticide use?		
Lack of protective device	55	62.5
Windy day	20	22.7
Sunny weather	12	13.6
Others	1	1.1
Total	88	100

6. What solution do you suggest to promote safe pesticide use?

Avoid windy and sunny weather	12	12.6
Proper use of personal protective device	26	27.4
Training	32	33.7
No solution	7	7.4
All of the above	18	18.9
Total	95	100.0

Source: Field survey, 2010.

Table 12 Responses (%) of the respondents to personal hygiene and sanitation practices

Activity	Yes	No	Sometimes
1.Wash hands	95.5	3.4	1.1
2. Eat/drink/smoke during work with pesticides	3.4	94.3	2.3
3. Keep meals near pesticides	2.3	96.6	1.1
4. Drink water near pesticide treated areas	2.3	90.8	6.9
5. Shower after pesticide exposure	71.6	13.6	14.8
6. Change clothing before and after pesticide exposure	85.4	2.2	12.4

Source: Field survey, 2010.