Original Research Article

FARMERS' KNOWLEDGE OF INSECTICIDES USAGE AND HAZARD IN SOME SELECTED COMMUNITIES IN DANKO/WASAGU LOCAL GOVERNMENT AREA OF KEBBI STATE, NIGERIA

ABSTRACT

A study was carried out to assess the farmer's knowledge of insecticides usage and hazard in some selected communities in Danko/Wasagu Local Government Area of Kebbi State. Data collected was analyzed using descriptive statistics. The result revealed that the majority (69 percent) of the respondents was men, 53 percent of them were within the age range of 41 – 60 years, and 50 percent of them had a family size of 1-5 persons. Many of the respondents (36 percent) had one form of formal education or the other. Most of the respondents 62 percent got their farm land through inheritance. Results also revealed that the majority of the respondents (95 percent) are aware of insecticides, with 55 percent using them to spray their crops. Many respondents 96 percent used insecticide before; majority of the respondents 75 percent used insecticides to control insect pests in their homes and farms. Result further revealed that majority (91 percent) of the respondents were aware about insecticide hazard and 70 percent are aware of health implication of these insecticides and result of the negative effect of insecticides revealed that high proportion 40 percent strongly agreed on negative effect of insecticides. More so the majority 89 percent of the respondents is aware about safety and precaution measures, and 82 percent agreed that the use of protective clothes during spraying is a safe and a precaution measure. It is concluded that the majority of the farmers are aware of insecticides and their health hazard. It is recommended that farmers should be more sensitized about the danger of insecticides and when handling them proper care should be taken and should always use protective clothes during their application (spray) to protect themselves and avoid body contact.

KEYWORDS: Knowledge, Farmers, Insecticides, Usage, and Hazard

1. INTRODUCTION

Pesticides are chemical substances used to kill pests. Insecticides are chemical substances used to kill insects, and insecticides are used for agricultural purposes (Wikipedia, 2014). They are widely used in most sectors of Agricultural production to prevent or reduce losses by pests' attacks and thus improve yield and quality of produce (Ooerke, 2004). There are many benefits that are attributed to pesticides, but often go unnoticed by the general public (Damale, 2009).

Therefore, insecticides can be considered as an economic, labour saving and efficient tool of pest management with great popularity in most sectors of Agricultural production (Boxall, 2001).

Despite their popularity and extensive use, they pose serious concerns on health hazards arising from the exposure of farmers when mixing and applying these insecticides. They used to form residues on food crops and affect drinking water. It causes food poisoning, and routine pesticides used can pose serious health problems to farmers both in short and long term usage, as well as environmental pollution and degradation (Soars, 2009). In developing countries, famers face great risks of exposure to insecticides, through wrong application techniques, poor maintenance and inappropriate spraying equipment, inadequate storage facilities, and use of old and banned or restricted pesticides (Ecobichon, 2001). Obviously, exposure to chemical substances poses continuous health problems (Ibitayo, 2006). Pesticides usage has raised serious concern not only on human health problems, but also their impact on wildlife and ecosystem (Asogwa and Dongo, 2009).

Application of insecticides prove counterproductive because they kill beneficial insect species such as natural enemies of pests, crop pollinators and increase the changes of development of pest resistance species (Stoal *et al.*, 2001), Many users of pesticides have poor knowledge of risks associated to them, correct application method and necessary precautions (Yassin *et al.*, 2002). Even farmers who are aware of the harmful effect of insecticides are sometimes unable to translate this awareness into practices (Damalas, 2006). Although insecticides has been developed with minimal risks to human health and the environment (Borny, 2007). We may never know whether insecticides are safe under all circumstances (Pemental, 2005).

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Despite many studies on the state and toxicity of the insecticides, there are research gaps of uncertainty in the production of their long term health and environmental effect (Buger, 2008). Insecticides pose health problems to workers during application and consumers are exposed to their residual effect in vegetables, drinking water and the environment (Mariyono, 2008). The present study intends to find out the perception of insecticide usage and health hazard in some selected communities in Danko/Wasagu Local Government Area of northern Nigeria.

2. Materials and methods

Danko/Wasagu Local Government is one of the twenty one (21) Local Governments Areas of Kebbi State. It covers an area of four thousand two hundred and eight (4,208km^2) square kilometers, with an estimated population of about two hundred and sixty five thousand, two hundred and seventy one (265,271) people (National Population Commission, 2006). It is bordered in the south with Sakaba Local Government Area, in the west with Zuru Local Government Area, while North-East by Bukkuyum Local Government Area of Zamfara State (Kebbi State Government, 2003). The area lies between latitude 11^{o}25" N and longitude 5^{o}40" E. The area is flat or low topography with fertile soil, covered by sandy soil, sometimes coarse in texture with several fadama and alluvial plain soils suitable for agricultural activities. The area is made up of eight (8) administrative districts namely; Danko, Wasagu, Ribah, Waje, Kanya, Bena, Kyabu and Wari Districts. The weather is marked by a single raining season and long dry season. The average rainfall is 720mm per annum, the rainy season period is between May to October, November to February is cold due to dry harmattan and March to April is hot and the average temperature is 37^{o}C. (Girma, 2008).

Purposive sampling technique was used to select five (5) villages namely; Awala, Machika, Waje, Kanya and Yar'ali for the study. Structured questionnaire was used to collect

data from the respondents (100) with the help of an interpreter for those that can read and write. The data collected from the administered questionnaires was analyzed using descriptive statistics such as frequency counts, means and percentages.

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3. RESULTS

Results obtained from the study in Table 1 shows that 69 percent of the respondents are men and 31 percent of the respondents are females. This could be as a result that 80 percent of farming activities are done by men, while women do less of farming activities compared to men. The age of the respondents was grouped into three categories, which revealed that 2 percent of the respondents were within the age range of 20 years and below, 53 percent were within the age range of 41–60 years, while 15 percent within the ages of 61-70. The result of household size presented in Table 1 revealed that 50 per cent of the respondents have family size between 1-5 persons, 29 percent of respondents had household size of 6-10 persons, and 21 percent of the respondents had household size of 11 persons and above. This implied that those people with small family size have limited supply of family labour compared to those with larger household size. Production varies according to family size since farming is a collective family responsibility. Result on the educational levels of the same table reveals that 27 percent of the respondents had adult education, 8 percent had primary education, 29 percent of the respondents had secondary education, while 36 percent of the respondents had tertiary education. The result indicated that the high proportion of 36 percent had one form of formal education or the other. The result of the respondents in respect of farming experience is presented in Table 1. It revealed that 45 percent of the respondents had farming experience of 1-5 years, 39 percent of the respondents had their farming experience of 6-10 years, and 16 percent of them had farming experience of 11 years and above. This indicated that a high proportion of respondents 46

percent had 6-10 years of farming experience. The years of farming experience in agricultural production helps in determining decision in allocation of scarce resources wisely. The more farmers cultivate a particular crop the more experienced they would be on the crop. Result on the income level same table 1 revealed that 21 percent of the respondents earned ₦100,000 and below, 41 percent of the respondents earned ₦101,000 - ₦400,000, 13 percent respondents earned ₦401,000 - ₦800,000, 1 percent respondents earned an income of ₦801,000 -₦1,000,000 while, 24 percent respondents earned ₦1,000,000 and above. This indicated that the majority of the respondents 41 percent earned ₦101, 000 - ₦400, 000 incomes. Level of income among farmers was generally found to be synonymous with the level of investment, the higher the income, the higher the investment. Results on the farm size revealed that 22 percent of the respondents had less than 1 hectare, 26 percent of the respondents had 1.1 - 2 hectares, 22 percent of the respondents had 2.1 - 3 hectares and 30 percent respondents had 3.1 hectares and above. The results showed that a high proportion of (30 percent) had 3.1 hectares and above. Results on land acquisition revealed that 62 percent of respondents acquired their lands through inheritance, 18 percent of the respondents by rent/hired, 8 percent through gift, and 12 percent purchased their lands .This indicated that the majority (62 percent) of the respondents inherited their farm lands.

From Table 2 it is revealed that 95 per cent of the respondents are aware of insecticides and 5 percent of the respondents are not aware of them. More so, 36 percent of the respondents used insecticides to spray their house, 55 percent used insecticides to spray their farms (crops), while 9 percent used insecticide to spray their environment. This indicated that the majority (55 percent) of the respondents used insecticides in their farms to control insect pests. Results in same table 2 also showed that 48 percent sourced their information about insecticides from

friends, 15 percent from media, and 17 percent from school, while 20 percent got theirs from Extension Agents and public campaigns. Results from the same table revealed that 96 percent of the respondents used insecticides before and 4 percent respondents have not used any insecticides. More so, results revealed that 75 percent respondents used insecticides to control insect pests, 18 percent used insecticides to control diseases, while 7 percent used them on plant flowers. Results on the type of insecticides used in the same table revealed that 71 percent respondents used systemic insecticides, while 29 percent of them used contact type. Results on the equipment used for insecticides application showed that most of the respondents 93 percent used a sprayer to spray insecticides. Results on the effectiveness of insecticides in insect control revealed that the majority of the respondents (77 percent) responded that insecticides are very effective, 17 percent said that they are effective, 3 percent reported moderately effective and 3 percent opined that they are effective.

Results from tables 3 revealed that the majority 91 percent of the respondents are aware about insecticide hazard and health implication, while 9 percent were not aware. Results on the source of information revealed that 52 percent of respondents sourced their information about insecticides from friends. 12 percent respondents got information from Extension Agents and 25 percent respondents from school, while 11 percent got their information from media. This indicated that the majority (52 percent) got their information from friends and relatives. Result on the types of hazard from the same table revealed that 70 percent of respondents are aware of health hazards caused by insecticides, 16 percent are aware of soil hazard, 12 percent are aware of environmental hazard, and 2 percent are aware of biodiversity. This indicated that the majority (70 percent) of them are aware of health hazards and implication of insecticides to man and the environment. The result on perception on the negative effect of insecticide revealed that 40

percent strongly agreed, 21 percent agreed, 18 percent slightly agreed, 8 percent undecided and 13 percent did not agree. This shows that a high proportion of respondents (40 percent) strongly agreed on perception of the negative effect of insecticides.

Table 1: Socio-Economic Characteristics of the Respondents

Variable	Frequency	Percentage	Mean	Standard Deviation

Table 4 revealed that 89 percent of the respondents are aware of safety and precaution measures of handling insecticides, while 11 percent are not aware of the safety and precaution measure of handling insecticides during and after spraying. Results on the other hand revealed that 49 percent of respondents get information about insecticides from friends, 25 percent from Extension Agents, 19 percent from school, 5 percent from media and 7 percent get their information from others. This indicated that a high proportion (49 percent) obtained their information from friends. Results from the same table further revealed that 82 percent opined that wearing protective clothes is a perceived safety and precautionary measures, 10 percent agreed with the use of recommended insecticides, 2 percent opined disposal of insecticides containers after used, 3 percent are of the view that avoiding use of leaking sprayers is very necessary, while 3 percent of the respondents are of the view that use of appropriate time of application is equally important. This indicated that the majority (82 percent) of respondents agreed that the use of protective clothes during spray is a safety measure.

Gender				
Male	69	69		
Female	31	31		
Total	**100**	**100**		
Age (years)				
20 and below	2	2		
21-40	53	53		
41- 60	30	30		
61 and Above	15	15		
Total	**100**	**100**	**42.96**	**16.961**
Household size				
1 - 5	50	50		
6 - 10	29	29		
11 and Above	21	21		
Total	**100**	**100**	**7.13**	**6.587**
Educational level				
Adult education	27	27		
Primary education	8	8		
Secondary	29	29		
Tertiary education	36	36		
Total	**100**	**100**		
Experience				
1 – 5	45	45		
6 – 10	39	39		
11and above	16	16		
Total	**100**	**100**	**17.84**	**13.356**
Annual income (₦)				
<100, 000	21	21		
101,000-400,000	41	41		
401,000- 800,000	13	13		
801,000-1,000 000	1	1		
>1, 000, 0000	24	24		
Total	**100**	**100**	**1379260.0**	**1901433.4**
Farm Size (ha)				
< 1ha	22	22		
1.1 – 2ha	26	26		
2.1 3ha	22	22		
3.1 and above	30	30		
Total	**100**	**100**	**2.90**	**1.761**
Land acquisition				
Rent/Hired	62	62		
Gift	18	18		
Purchased	8	8		
Leased	12	12		
Total	**100**	**100**		

Source: Field Survey Data, 2021

Table 2: Distribution of respondents according to insecticide awareness

Variables	Frequency	Percentage
Awareness about insecticide		
Yes	95	95
No	5	5
Purpose of insecticide usage		
Household use	36	36
Farm use	55	55
Environmental usage	9	9
Source of Information about insecticide		
Friends	48	48
Media	15	15
School	17	17
Extension Agent	20	20
Involvement in insecticide usage		
Yes	96	96
No	4	4
Usage of insecticide		
Insect control	75	75
Disease control	18	18
Induce flowering	7	7
Types of insecticide used		
System	71	71
Contact	29	29
Equipment used for insecticide application		
Sprayer	93	93
Dusters	7	7
Effectiveness of insecticide on insect control		
Very effective	77	77
Effective	17	17
Moderately effective	3	3
Low effective	3	3

Source: Field Survey Data, 2021

Table 3: Distribution of respondents according to information about insecticides hazard

Variables	Frequency	Percentage
Awareness about insecticide hazard		
Yes	91	91
No	9	9
Source of Information about insecticide		
Friends/Relatives	52	52
Extension agent	12	12
School	25	25
Media	11	11
Types of hazard		
Health	70	70
Soil	16	16
Environmental	12	12
Biodiversity	2	2
Negative effects of insecticides		
Health	65	65
Soil	29	29
Environmental	2	2
Biodiversity	2	2
Perception on the negative effect of insecticide		
Strongly agreed	40	40
Agreed	21	21
Slightly agreed	18	18
Undecided	8	8
Not agreed	13	13

Source: Field Survey Data, 2021

Table 4 Distribution of Respondents according to safety and precaution measure

Variables	Frequency	Percentage
Awareness on Safety and Precaution Measure		
Yes	89	89
No	11	11
Source of Information on Safety and Precaution Measure		
Friends/Relatives	49	49
Extension Agent	25	25

School	19	19
Media	7	7
Perceived Safety and Precautionary Measures		
Wearing protective cloth	82	82
Using Recommended insecticide	10	10
Disposal of containers	2	2
Avoid using leaking sprayer	3	3
Using appropriate time of application	3	3

Source: Field Survey Data, 2021

4. DISCUSSIONS

In the study it was discovered that the majority of the respondents 69 percent were men, and 53 percent of them are within the age range of 41-60 years, 50 percent of them also had family size between 1-5 persons. High proportion of 36 percent had one form of formal education or the other, 46 percent of the respondents had 6-10 years of farming experience. Most respondents about 30 percent had 3.1 hectare of land and above, and majority 62 percent of the respondents source their farm land through inheritance as reported by Olakunle, (2016) that in Nigeria the agricultural sector is the major supplier of food, raw materials and largely depends on exchange and 70 percent of its population largely depends on this sector for survival.

In the study it was also discovered that 95 percent of the respondents 95 percent are aware of the insecticides, most of them used insecticides to spray their farm crops, others used insecticide in one way or another, and a good number of them used insecticides to control insect pests. They used a sprayer to spray the insecticides and 75 percent agreed that insecticides are very effective. This was in conjunction with Damale, (2001) who reported that insecticides can be considered as an economic, labour saving and effective tool of pest management. This was with Boxall, (2001) and Ooerke, (2004) who reported that insecticides reduce crop losses by preventing pest attacks and improving crop yield production.

Result revealed that many respondents 91 percent is aware about insecticides hazard. Majority of them 70 percent are aware of health implications caused by insecticides and perception on the negative effect of insecticides revealed that a high proportion of respondents 40 percent strongly agreed on the negative effect of insecticides. This reported was in agreement with Ecobichon, (2001), Ibitayo, (2006), Soars, (2009) and Asogwa and Dongo, (2009) who reported that insecticides pose serious concerns on health hazard as result of farmer's exposure in mixing and applying insecticides and also degrade the environment. Stoal, *et al.* (2001) and Alewu, (2014) also said that insecticides kill beneficial insect species such as natural enemies of pests and pollinators.

Most of the respondents 89 percent are aware of safety and precautionary measures in handling insecticides and many of them agreed that use of protective clothes during application (spraying) help in reducing insecticides hazard. This was in agreement with Yassin *et al.* (2006) who said that end users of insecticides have poor knowledge of risks associated with them. Most of them don't know correct application method and the precautions, this was similar to Dalys, (2003), Pemental, (2005) and Borny, (2007), Brandle, (2013) findings who reported that farmers don't know whether insecticides are safe to use or not and don't have good educational knowledge.

5. Conclusion

This study examined perception of insecticides usage and health hazard in some communities in Danko/Wasagu Local Government Area. The specific objective was to describe socio-economic characteristics, determine the awareness of the insecticides usage, determine the problems of insecticide, and to determine present and safety of insecticide application in the study area. Data collected were analyzed using descriptive statistics. From the findings of this

study, it can be concluded that, the majority of the farmers are aware of insecticides usage and their health hazard, some of the respondents agreed that there is negative effect in the used of insecticides. Suggested safety and precautionary measures in the use of insecticide is use of protective clothes during spraying operation.

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