

## Perceptions of Environmental Effects of Pesticides use in Vegetable Production by Farmers along River Ngadda of Maiduguri, Nigeria

Abubakar M.<sup>1</sup>, Mala M.A.<sup>2</sup>, Mumin A.<sup>2</sup>, Zainab T.<sup>2</sup>. & Fatima A.A.<sup>2</sup>

### Abstract

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Farmers along the River Ngadda of Maiduguri, Borno State, Nigeria, grow vegetable like spinach, rossel and amaranth us. Based on the use of questionnaire and interviews that were conducted in the study area on the farmers perceptions, awareness and pesticides used to the environment were investigated. A purposive sampling technique was use to collect data from the farmers. Frequency, percentage and mean were used to describe the result. The finding of the study revealed that 93.8% of the farmers applied pesticides. Majority (85.2%) of the farmers did not use protective clothes when applying pesticides. Also majority of the farmers showed high level of perceptions on the effects of pesticides on the environment. This results can be used to develop a tool to quantify the effects of pesticides use on environment by vegetable farmers along River Ngadda at Maiduguri.

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### Introduction

Most agricultural production relies on the use of chemicals to maintain high crop yield. The use of these chemicals in modern farming practices is viewed as an integral part of the success of the agricultural industry (Margni *et al.*, 2002). However, most of the pesticides applied to agricultural lands may affect non-target organism, contaminates soil and water media (Tijani, 2006). Vegetable farmers use wide range of pesticides at different levels to reduce losses from pests and diseases. Despite the contribution of pesticides to agricultural production, many pesticides and chemicals are not biodegradable, and due to their bioaccumulation can enter into food chain and detrimental to human and the ecosystem (Banjo *et al.*, 2010; Adeola, 2012). Exposure to pesticides is one of the most important occupational risks among farmers in developing countries (Atreya, 2008). In some situation, exposure to pesticides can occur from accidental spills of chemicals, leakages or faulty spraying equipment (Akingbohunge, 2009). The exposure of farmers increases in the case of not paying attention to the instructions on how to use the pesticides and particularly when they ignore basic safety guidelines on the use of personal protective equipment (Ajayi & Akinnifesi, 2008; Damalas & Ilias, 2011). Inappropriate use of pesticides has been linked with; adverse effects on non-target, organism, water contamination from mobile pesticide, injury on non-target plants from herbicide drift, crop injury due to high application rates and wrong application timing or unfavourable environmental conditions at and after pesticides application (Glover & Tetteh, 2008). Despite the fact that the dirty dozen pesticides are banned, severally restricted or unregistered in many countries and despite their having been listed as hazardous by the World Health Organization (WHO), Fegewonyomi, (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. In view of the adverse environmental effects from the unsafe pesticide use, lack of awareness of the adverse health consequences of pesticides by some farmers, it therefore becomes imperative to identify farmers pest management practices in vegetable cultivation by investigating farmers awareness and perception about effects of pesticides use on the environment.

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<sup>1</sup> Department of Basic Science and Technology, Mohamet Lawan College of Agriculture Maiduguri, Borno State, Nigeria.  
E-mail: [abbakmusa@gmail.com](mailto:abbakmusa@gmail.com), Tel: +2348033713582

<sup>2</sup> Department of Basic Science and Technology, Mohamet Lawan College of Agriculture Maiduguri, Borno State, Nigeria.

## Materials and Methods

The study was conducted along River Ngadda passes through Maiduguri Metropolis of Borno State. A questionnaire consisting of structured items was designed. Data was collected through a farm survey by face to face interviews with farmers during farm activities. A total of one hundred and thirty five questionnaires were administered (135) but one hundred and twenty eight (128) was returned valid. The site was selected based on the leafy vegetable grown, pesticides usage and ease of accessibility. Vegetables produced along River Ngadda include leafy vegetables such as spinach, rossel and amaranthus.

## Results and Discussion

The mean age of the farmers was 46.5 years, about 14.1% were in the 25 to 35 age bracket, 23.4% were between 36 to 45 years of age, 54.7% were between 46 to 55 years old, while 7.8% of the farmers were 56 and above.

**Table 1: Socioeconomic Characteristics of Farmers Status**

Characteristics	Frequency	Percentage
Age group	-	-
25 – 35	18	14.1
36 – 45	30	23.4
46 – 55	70	54.7
55 and above	10	7.8
Total	128	100
Education:		
No formal education		
Primary education	16	12.5
Secondary education	77	60.2
Adult education	04	3.1
Total	31	24.2
Sex:	128	100
Male		
Female	119	93.0
	9	7.0
Total	128	100

**Table 2: Method of Farming/Status**

Characteristics	Frequency	Percentage
Farming experience (years):		
5 -15	24	18.7
16 – 25	86	67.2
26 – 35	12	9.4
36 and above	06	4.7
Total	128	100
Farm Size (Ha):		
0.5 – 2	116	90.6
2.5 – 4	08	6.3
4 and above	4	3.1
Total	128	100
Land ownership status:		
Inheritance	99	77.3
Leasehold	19	14.9
Rent	10	7.8
Total	128	100

**Table 3: Pesticide used by Farmers in the Study Area n = 128**

Pesticides used by farmers	Frequency	Percentage
Apron plus	120	93.8
Atrazine	25	19.5
Cypermethrin	94	73.4
Sevin	103	80.5
Thiodan	25	19.5
Fusilade	76	59.4
Primextra	66	51.6

**Table 4: Pesticide Practices of Farmers n = 128**

Purpose of pesticides application	Frequency	Percentage
Weed control	62	48.4
Pest control	104	81.3
Rodent control	08	6.3
Fungi control	120	93.8

**Table 5: Farmers Perception of Pesticides Effects on the Environment n = 128**

Items	Frequency	Percentage
Destroy soil by reducing its quality	70	54.7
Harming beneficial insects	36	28.1
Decrease biodiversity	79	61.7
Contribute to air pollution	77	48.1
Pollute river and stream	89	69.5
Harmful to effect on non-target organism	103	80.5

**Table 6: Farmers Knowledge about Misuse of Pesticides n = 128**

Items	Frequency	Percentage
Using of banned agricultural pesticides	95	74
Failure of wear protective clothes	109	85.2
Storage of pesticides in family bedroom	34	26.6
Improper disposal of pesticides containers	123	96.1
Using pesticides container for domestic purposes		
Use outdoor pesticides for household door pest	52	40.6
Use of leaking equipment	79	61.7
Re-entry into the spread field	115	89.8
	49	35.3

More than half of the farmers have primary education (60.2%), 24.2% had adult education and only a scanty 3.1% had secondary education. Majority, 93% of the farmers are male, while 7% are female. Majority (67.2%) of the farmers had been farming between the period of 16 to 25 years with mean of 23.4 years. The mean farm size of the farmers was 1.6 ha and 77.3% of the farmers inherited the farmlands on which they cultivate. The pesticides commonly used by the farmers were identified as Apron plus (93.8%) followed by Sevin used by 80.5% of the farmers. Other pesticides were Cypermethrin (73.4%), Atrazine (19.5%), Fusilade (59.4%), Primextra (51.6%) and Thiodan (19.5%). This is an indication that pesticides play an important role in the control of pests and increasing crop yields (Banzo *et al.*, 2010). Sixty-two percent of the farmers used pesticides to control weeds while majority (81.3%) of the vegetable farmers used pesticides to control insects and most (93.8%) farmers used pesticides for fungi and mould control. Only 6.3% used pesticides to control rodents. This implies that farmers cultivating vegetables in the study area used pesticides at different levels. Farmers' perception of pesticides effects on the environment include, soil destruction (54.7%), harming beneficial insects (28.1%), decrease biodiversity (61.7%) and contribute to air pollution (48.1%). About 70% of the farmers were of the opinion that pesticides pollute streams and rivers while majority (80.5%) perceived that harmful side effects of pesticides on non-target animals, birds and earthworms. The study revealed that vegetable cultivating farmers in the study area were aware of various issues related to misuse of pesticides.

About 74% of the farmers were aware of using banned pesticides as misuse while 85% of them had knowledge of pesticides misuse as failure to wear protective devices. Storage of pesticides in family bedroom is another misuse indicated by 26.6% of the farmers while the majority (96.1%) regarded improper disposal of pesticides containers as a misuse. The use of pesticides containers for domestic purpose was regarded as a misuse by 40.6% of the farmers and 61.7% were aware that using outdoor pesticides for household door pests. Almost 90% of the farmers had knowledge of using leaking equipment as misuse of pesticides and only 35.3% of the farmers indicated re-entry into the sprayed field as a misuse. This high level of knowledge about pesticides hazards which the end users of pesticides have is important for the prevention of acute poisoning (Zyoud *et al.*, 2010).

### Conclusion

The use of pesticides was observed to be high and majority of the farmers use pesticides. The study shows that farmers in the study area were aware of the risks associated with use of pesticides and its effects on the environment. Hence, their favourable attitude towards the risks of pesticides usage. The trends of pesticides and herbicides use by farmers over the years is probably based on farmers knowledge and perception in relation to effectiveness of pesticides and herbicides. Hence, we recommend that farmers should be subjected to training by the Agricultural Extension Officer on how to adopt Integrated Pest Management and the benefits of taken preventive measures on the farm so that they can remain healthy.

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