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Effect of use of agrochemical among arable crop farmers in osun state

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Abstract
Most farmers in developing world are not aware of the environmental impacts of using agrochemicals on their environment, human being and wildlife. Effect of use of Agrochemical among arable crop farmers in Osun State were therefore examined. A multi-stage sampling procedure was used through questionnaire and interviews to collect information from 150 arable crop farmers. Data were analyzed using descriptive statistics of frequency counts, percentage and means, Chi-square and Pearson Product Moment Correlation (PPMC) at 0.05% level of significance. Results of analysis revealed that majority of the respondents fell within the age range of 50years to 59 years and most respondents (88.7%) were males. Over 30.7% had secondary and below as their educational qualification with most (70.0%) married, with fairly large household size of 6-10 persons. fertilizers were most frequently used by the respondent in the study area. The result shows that there were significant relationship between Age of the respondents (X^2= 86.020, $p<0.05$), sex (X^2=23.070, $p<0.05$), marital status (X^2= 53.766, $p<0.05$), income (X^2= 37.811,$p<0.05$), experience (X^2= 37.156,$p<0.05$) and Area of land (X^2= 55.196,$p<0.05$) and the effect of agrochemical usage. Also, there is no significant relationship between Education (X^2= 10.459, $p>0.05$) and the effect of agrochemical usage. This means that education does not have any effect on the effect of agrochemical usage. The level of usage of agrochemical is high which has many effects on arable crops such as: Environmental pollution, contamination of ground water, crop injuries and skin irritation. It therefore recommended that Farmers should maintain proper usage of agrochemicals to reduce the hazardous effects of the chemicals and also Government through extension agents should enlighten farmers on the misuse of agrochemical in order to have general acceptability of the farm products at large.

Keywords: effect**,** arable crop, farmers, agrochemical use

Introduction

The major source of environmental contamination by pesticides is the deposits resulting from application of these chemicals to control agricultural pests. Effect the environment by point-source pollution and nonpoint-source pollution. The former is the contamination that comes from a specific and identifiable place; including pesticide spills, wash water from cleanup sites, leaks from storage sites, and improper disposal of pesticides and their containers. The latter is the contamination that comes from a wide area, including the drift of pesticides through the air, pesticide run off into waterways, pesticide movement into ground water (Toth and Buhler, 2009) [7]. Environmentally-sensitive areas to the pesticides are; where ground water is near surface, near the habitats of endangered species and other wildlife; near honey bees and near food crops and ornamental plants ((Toth and Buhler, 2009) [7]. Sensitive plants and animals as well as the water quality of water bodies in field margins can be affected either directly or indirectly (Cessna *et al*., 2005) [2]. The degradation of pesticide is influenced by many factors including application factors, pesticide properties weather conditions and microorganisms (Zhi-Yong Zhang *et al*, 2006) [8]. Some pesticides also escape into the atmosphere through volatilization process and some can travel long distances before they wash back down to earth in rainfall or settle out through dry deposition. On the other hand, when high fertilizer rates are applied which are not in line with the codes of good agricultural practice, nutrient losses, e.g. by surface runoff, take place which pollute land-based and aquatic ecosystems. An oversupply with inorganic nitrogen and phosphorus compounds causes an increased nitrification, oxygen demand, intensification of the primary production of plankton including tides—, excessive growths of macro-algae and other water plants as well as formation of the toxic un- ionized ammonia (Helkom, 1995). Agrochemical residues can enter streams through run-off and pose dangers to fish, birds, wild animals and plants in the aquatic habitat. Excessive use of fertilizers, for example, can lead to the contamination of groundwater with nitrate, rendering it unfit for consumption by humans or livestock (Singh *et al*., 2004) [5]. In addition, the run-off of agricultural fertilizer into streams, lakes, and other surface waters can cause an increased productivity of those aquatic ecosystems causing eutrophication. The ecological effects of eutrophication can include an extensive mortality of fish and other aquatic animals, along with excessive growth of nuisance algae, and an off-taste of drinking water (Freedman, 2005).

Specific objectives

The specific objectives of this study includes to:

1. Identify socio-economic characteristics of the arable crop farmers in Osun state.
2. Identify the sources of agrochemical they use.
3. Examine the effect of using agrochemicals.

Hypothesis of the study

The hypothesis stated in the null form is tested:

Ho_1: There is no significant relationship between selected arable crop farmer's socio-economic characteristics and the effect of agrochemicals among the farmers.

Materials and Methods

The study was carried out in Osun State. The state covers approximately 14,875 square kilometers in land area (NPC, 2006). Agriculture is the major source of income for the larger number of the people of the State (about 256,000 Farming Families). The state lies in the equatorial rainforest belt and the rainfall around this area varies from 155mm to 1800mm per annum. The forest zone with high humidity favours the cultivation of tree crops such as Cocoa, Kola, Mango, Citrus and oil palm as well as arable crops like maize, cassava, Yam and Rice.

Sampling Procedure and Sample size

A Multi-stage sampling procedure was used to select respondents for the study. Purposive sampling Technique was used to select blocks from ADP zone that are predominantly noted for arable crop farmers that always use agrochemicals for farming in the study area: (Iwo, Ayedire, Ola-Oluwa blocks). Systematic sampling techniques was used to select 10 respondents in each village of the blocks and this gives a total of one hundred and seventy six (150) respondents for the study.

Analysis of data

Data Collected were subjected to descriptive and inferential Statistical analysis using Statistical Package for the Social Sciences (SPSS). Descriptive statistical tools used included frequency counts, mean and percentage while inferential statistical used is Chi-square.

Results and Discussion

Socio-economic characteristics of respondents

Table 1: The Socio-economic characteristics of the respondents

Variables	Frequency	Percentage (%)
Age		
20-39 years	33	22.0
40 – 59	101	67.3
60 and above	16	10.0
Sex		
Male	133	88.7
Female	17	11.3
Marital status		
Single	20	13.3
Married	105	70.0
Divorced	10	6.7
Widowed	15	10.0
Level of education		
No formal education	27	18.0
Adult education	21	14.0
Arabic education	9	6.0
Primary education	25	16.7
Secondary education	46	30.7
Tertiary education	22	14.7
Household size		
1-5	54	36.0
6-10	90	60.0
Above 10	6	4.0
Religion		
Christianity	84	56.0
Islam	59	39.3
Traditional	7	4.7
Income		
Less than 100,000	1	0.7
101,000- 200,000	29	19.3
201,000- 300,000	18	12.0
301,000- 400,000	23	15.3
401,000- 500,000	28	18.7
Above 500,000	51	34.0
Experience		
1-10 years	45	30.0
11-20 years	11	7.3
21-30 years	80	53.3
31-40 years	8	5.3

Above 41 years	6	4.0
Area of land (hectares)		
1-4	26	17.3
4-6	22	14.7
6-8	67	44.7
8-10	15	10.0
Above 10	6	4.0
Total	150	100

Result of analysis in table 1 shows that majority (40.0%) of the respondent fell within the age range of 50-59 years This means that most of the farmers in the study area are middle aged which may be due to less involvement of youths in farming activities. The result also reveals that 88.7% of the respondents are male and 11.3% were female. This means that males are into farming than females in the study area. This is in line with Sokoya *et al*., (2012) [6]. Who stated that agriculture is generally regarded in Africa as an occupation for Men.

The result also revealed that 70.0% of the respondents were married. This is corresponding with Akinbile (2007) [1]. who stated that marriage confers responsibility, which send a signal that they are matured and versatile even responsible. The results further revealed that the level of education of the respondents in the study area with majority (30.7%) had secondary education. This implies that the farmer has ability to require knowledge when information is made available. This is in line with Oladele (2005) [4]. who found out that exposure of farmers to education will increased the farmer's ability to adopt change.

The result further shows that majority of the respondents had number of household range of 6-10 persons with majority of the respondents were Christians 56.0% and Islam 39.3% while 4.7% were Traditionalist. The result also shows that income earned per annum of the respondents, majority earned above 500,000 (34.0%), followed by 100,000-200,000 with 19.3%, 401,000-500,000 with 18.7%, 301,000-400,000 with 15.3% and 201,000-300,000 with 12.0% while less than 100,000 have 0.7%

The result also indicate that, majority (53.3%) of the respondents had farming experience ranges from 21-30years with the Area of land (44.7%) had 6-8 hectare. The implication of this was based on the criteria set by Fayinde *et al* as cited by Ogunjimi and Farinde (2012) [3]. that all farmers who operate on land less than 10 hectares are small-scale farmers.

Table 2: Frequency of the use Agrochemicals

Agrochemicals	Not used a season	Once in a season	Twice in a season	Thrice in thrice	More than
Herbicides	6(4.0)	10(6.7)	8(5.3)	125(83.3)	1(0.7)
Fungicides	8(5.3)	11(7.3)	4(2.7)	2(1.3)	125(83.3)
Fertilizers	0(0.0)	15(10.0)	127(84.7)	7(4.7)	1(0.7)
Insecticides	11(7.3)	15(10.0)	9(6.0)	4(2.7)	111(74.0)
Rodenticides	61(40.7)	79(52.7)	6(4.0)	2(1.3)	2(1.3)

Percentage (%) in parenthesis

Table 2 above shows that 40.7% of respondents are not using Rodenticides, 52.7% used Rodenticides once in a season, and 84.7% were using Fertilizers twice in a season and 83.3% used Herbicides more than thrice in a season. This implies that fertilizers were most frequently used by the farmers.

Table 3: Categorization of respondents based on their level of agrochemicals usage

Variable	Frequency	Percentage (%)
High	115	66.7
Low	35	33.3
Total	150	100.0

Above mean value=High, below mean value=Low (Mean=12)

The table 3 revealed the result of analysis based on the categorization that 66.7% of the respondents were high on the use of agrochemicals while 33.3% of the respondents on the use of agrochemicals were low in the study area. This implies that majority of the respondent use agrochemical in their farm activities in the study area.

Table 4: chi-square analysis showing the relationship between socio economic characteristics of respondents and effect of agrochemical use

Variable	x^2 – value	p – value	Decision
Age	86.020	0.000	S
Sex	23.070	0.000	S
Marital status	53.766	0.000	S
Education	10.459	0.401	NS
Religion	14.893	0.005	S
Income	37.811	0.0000	S
Years of experience	37.156		
Area of land	55.196		

Table 4 shows that there were significant relationship between Age of the respondents (X^2= 86.020, $p<0.05$), sex (X^2=23.070,$p<0.05$), marital status (X^2= 53.766,$p<0.05$), income (X^2= 37.811,$p<0.05$), experience (X^2= 37.156,$p<0.05$) and Area of land (X^2= 55.196,$p<0.05$) and the effect of agrochemical usage. Therefore, null hypothesis is rejected and the alternative hypothesis is accepted. On the other hand, there is no significant relationship between Education (X^2= 10.459, $p>0.05$) and the effect of agrochemical usage. This means that education does not have any effect on the effect of agrochemical usage. Therefore, null hypothesis is accepted and the alternative hypothesis is rejected.

Conclusion and Recommendations

This study revealed that most of the respondents are males and they are in their active age, married with majority had secondary education and 6-10 persons per household in the study area. The level of usage of agrochemical is high which has many effects on arable crops such as: Environmental pollution, contamination of ground water, crop injuries and skin irritation. It therefore recommended that Farmers should maintain proper usage of agrochemicals to reduce the hazardous effects of the chemicals

and also Government through extension agents should enlighten farmers on the misuse of agrochemical in order to have general acceptability of the farm products at large.

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