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AWARENESS OF CASSAVA FARMERS ON THE USE OF AGROCHEMICALS AND THE ADVERSE EFFECTS ASSOCIATED WITH THEM IN ODIGBO LOCAL GOVERNMENT AREA OF ONDO STATE

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ABSTRACT

This study was carried out to assess the awareness of Cassava farmers on the use of Agrochemicals and the adverse effects associated with them in Odigbo local government area of Ondo State. Multistage sampling procedure was used to select 140 registered cassava farmers. Well structured questionnaires were used to obtain information on farmers' awareness on the use of agrochemicals as well as the adverse effects. Collected data were analyzed using descriptive statistics such as frequency, percentages, mean and ranking. Findings from the study revealed that majority (62.1%) of the respondents had secondary occupation other than farming, also, about 64.4% belonged to farmers' association while 35.6% did not. Most (87.9%) of the respondents claimed to have the knowledge of the effectiveness of agrochemicals over other methods of controlling insect pests, 84.1% respondents agreed that . Insect pest and diseases cause serious problems in arable crop production. About 87.1%, 78.8% and 81.1% of the respondents are aware of air and water pollution, several health problems and skin irritation they suffer due to agrochemical use respectively. Farmer to farmer information (83.3%) ranked first when assessing the respondent's source of information while information from nongovernmental organizations (NGO) (11.4%) ranked 13th. Most (90.2%) of the farmers apply agrochemicals according to the prescription, 69.7% avoids the use of banned agrochemicals. Also, 83.3% of the respondents avoid the storage of agrochemicals in family bedroom while 82.6% dispose the container properly after use.

Keywords: Agrochemical, Awareness, Knowledge, Pest and Diseases

INTRODUCTION

Over the years, reliance on agrochemicals in the Nigerian agricultural sector has been on the increase, this can easily be attributed to the need for increased and improved farm outputs to cater for the ever growing population. These agrochemicals have worked tremendously for the various purposes for which they were adopted albeit, with their own shortcomings. Agrochemicals vary according to their active ingredients and the purpose for which they are utilized, some are fertilizers, pesticides (insecticide, fungicide, herbicide and rodenticide), while other are plant regulators. Generally, they possess various unique attributes that contribute positively to agricultural production thereby increasing farm yield. However, the proper use of these chemicals is yet to be sufficiently mitigated, in fact, most users (farmers) abuse the usage, all in a bid to improve their farm yield. This naivety can be attributed to lack of adequate knowledge on the dosage of application, especially among rural farmers who are predominantly illiterates. Konradsen *et al*., (2007), opined that one-half of the human poisonings occur more in less developed countries, even though these places account for only 20% of the world's use of pesticides.

According to Okoffo *et al*. (2016), inappropriate use of pesticides to control pests and diseases has major health implications for smallholder farmers and this is now on the global scale, attracting global attention of researchers, policy-makers, and the general public (consumers). Pesticides and other foreign substances in food products and drinking water along with toxic pollutants in the air pose an immediate threat to human health, whereas other contaminants gradually build up in the environment and in the human body, causing disease long after first exposure (Gavrilescu *et al*., 2015).

Apart from inhibiting the soil nutrient (i.e destruction of beneficial soil organisms and increasing soil acidity), causing secondary pest outbreak and developing pesticides resistance pests, various health hazards associated with the improper use of agrochemicals include; abdominal pain, dizziness, headache, nausea, catarrh, vomiting as well as skin and eye problems (Akinola *et al*., 2019). Furthermore, some of the effects of agrochemicals on humans are damage to the reproductive and nervous systems and other organs, behavioral and developmental abnormalities, interference with hormone function as well as affecting the immunity system. They gather fat deposits in the body where they stay and cause a lot of damage. Most of the infants and young children drinking breast milk ingest herbicides as women who eat fruits and vegetables that have been sprayed with pesticides may pass the chemicals through their breast milk while pregnant women can pass the chemicals unto their foetus (Jurewicz and Hanke, 2008). Agrochemical residues can also 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).

Today, all over the world, consumers are becoming increasingly aware of the importance of food safety and are therefore demanding high standards in marketed and processed foods with emphasis also on agricultural practices with minimum detrimental impact on the environment (MOA, JICA, 2004). Cassava is mostly cultivated by smallholder farmers on less than 2 hectares of land and requires unsophisticated tools and equipment (Nweke, 2003). It is one of the most important staple food crops grown and consumed in the western region of Nigeria as it fits well in the diet of most households. It can play a major role in the effort to alleviate the country's food crisis. Cassava farmers like others, depend on agrochemicals to improve their farm yield. The big questions however, are; are these cassava farmers aware about the best practices in the usage of agrochemicals to get the desired result on their farms? Are the illiterate farmers who cannot interpret the instructions on the labels sufficiently educated about the risks associated with the misuse of these chemicals? Are they in compliance with the protracted regulations on the use of agrochemicals? The need to answer the aforementioned questions have necessitated this study, which specifically sought to assess the awareness of cassava farmers on the use of agrochemicals and the adverse effects associated with them in Odigbo Local Government Area of Ondo State. The objectives were to: assess the enterprise characteristics of the respondents; assess the knowledge of respondents on the use of Agrochemicals; determine the level of awareness of farmers to adverse effects of agrochemicals; identify the sources of information available to the respondent on use of agrochemicals and ascertain the compliance of farmers to regulations on the usage agrochemicals.

MATERIALS AND METHODS

Study Area

This study was carried out in Odigbo Local Government Area of Ondo State, Nigeria. Being a rainforest zone, the vegetation of the area supports the growth of notable food and cash crops such as plantain, banana, cassava, maize, yam, cocoa, oil palm and kola.

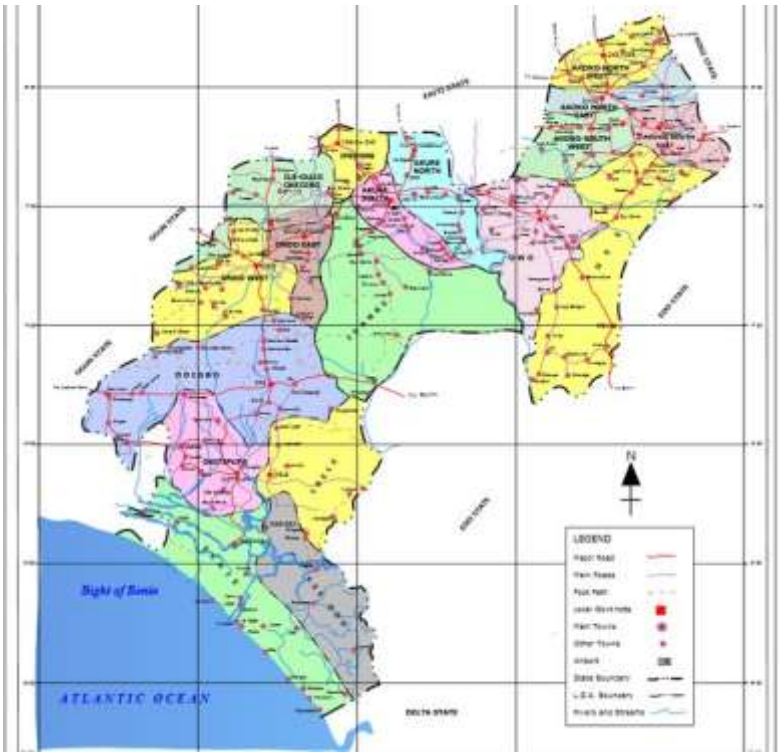

Figure 1: Map of Ondo State Showing Odigbo Local Government Area
Source: Owolabi and Aderinola (2014).

Sampling Technique

Multistage sampling procedure was employed in selecting respondents for this study. In the first stage, three wards out of the eleven wards in the local government were purposively selected due to the prevalence of agricultural activities in these areas. The second stage involved the random sampling of two communities out of each selected ward. In the final stage, the list of registered cassava farmers was obtained from their association and ten percent (10 %) cassava farmers were randomly selected and interviewed from each community, arriving at a total of 140 respondents. Only 132 questionnaires were however retrieved from the study location.

Data Collection

Primary data were employed in the study; data were obtained from respondents via the use of well structured questionnaires. A total of 140 copies were administered in the area.

Data Analysis

Relevant data obtained were subjected to both descriptive and inferential statistics.

RESULTS

Enterprise Characteristics of the Respondents

Table 1 revealed the enterprise socioeconomic characteristics of the respondents. About 62.9% of the respondents from the study were males while 37.1% were females.

Table 1: Enterprise Characteristics of the Respondents (n = 132)

Variable	Frequency	Percentage
Sex		
Male	83	62.9
Female	49	37.1
Total	**132**	**100**
Age		
21-30	17	12.9
31-40	30	22.7
41-50	50	37.9
51-60	14	10.6
>60	21	15.9
Total	**132**	**100**
Involvement in Secondary Occupation		
Yes	82	62.1
No	50	37.9
Total	**132**	**100**
Secondary Occupation Involved		
Artisan	37	28.0
Petty trading	53	40.2
Transportation	10	7.6
Others	32	24.2
Total	**132**	**100.0**
Involvement In Association		
Yes	85	64.4
No	47	35.6
Total	**132**	**100.0**
Year of Farming Experience		
Below 5years	20	15.2
6-10years	32	24.2
11-15years	18	13.6
16years and above	62	47.0
Total	**132**	**100.0**

Mean age = 45.0

Respondents' Knowledge about the use of Agrochemicals: Table 2 represents respondents' knowledge about the use of agrochemicals. Understanding the proper application of these chemicals helps them avoid the side effect associated with misuse.

Respondents' Awareness of adverse effects associated with the use of Agrochemicals Table 3 shows the respondents' awareness about the adverse effects associated with the use of agrochemicals.

Respondents Sources of Information on the use of Agrochemicals: The farmers' existing sources of information on the use of agrochemicals is represented on table 4. Out of the 13 sources of information listed in the study, the farmers got most of their information from fellow farmers.

Table 2: Respondents' Knowledge about the use of Agrochemicals

S/No.	Knowledge	Yes	I don't know	No	Mean
i.	Does pesticides education and training matter in pesticide usage?	83.3	5.3	11.4	1.280
ii.	Can a combination of different chemicals give good results after spraying?	56.8	25.0	18.2	1.614
iii.	Can the chemical sprayed on arable crops affect their products?	66.7	23.5	9.8	1.432
iv.	Is it true that chemicals work well than other methods of controlling insect pests?	87.9	11.4	0.8	1.129
v.	Do you understand the information written on the pesticide container?	68.9	9.8	21.2	1.523
vi.	Can high cost of pesticide stop it from been used on farm?	35.6	3.8	60.6	2.250
vii.	Can banning of un-recommended pesticides by EU prevent you from accessing them?	56.1	13.6	30.3	1.742
viii.	Can the use of pesticide contaminate nearby streams and rivers?	76.5	13.6	9.8	1.333
ix.	Are insect pest and diseases serious problems in arable crop production?	84.1	6.1	9.8	1.258
x.	Are the recommended pesticides available for use in your area?	79.5	8.3	12.1	1.326
xi.	Is it compulsory to bury empty pesticide containers in the ground after use?	41.7	25.8	32.6	1.909

Table 3: Respondents' Awareness of adverse effects associated with the use of Agrochemicals

S/No.	Awareness	Yes	No	Mean
i.	Are you aware of health problems that are attributed to the use of agrochemicals?	78.8	21.2	1.212
ii.	Are you aware that skin irritation is attributable to the use of agrochemicals?	81.1	18.9	1.189
iii.	Are you aware that the use of agrochemicals can cause stomach irritation? e.g. nausea	49.2	50.8	1.507
iv.	Are you aware that the use of agrochemicals leads to eye redness and other illness like cough, chest pain, etc?	52.3	47.7	1.477
v.	Are you aware that farmers' exposure to pesticides can cause dizziness, reduce coordination and ability to think?	49.2	50.8	1.508
vi.	Are you aware that agrochemicals destroy soil by reducing its quality?	78.0	22.0	1.220
vii.	Are you aware that agrochemicals harm beneficial insects? e.g. bees	86.4	13.6	1.136
viii.	Are you aware that the use of agrochemicals decreases biodiversity?	71.2	28.8	1.288
ix.	Are you aware that it pollutes air, streams, rivers & wells?	87.1	12.9	1.288
x.	Are you aware that the use of agrochemicals is harmful to non-target organisms (birds, and earthworms).	87.1	12.9	1.288

Table 4: Respondents Sources of Information on the use of Agrochemicals

S/No.	Sources of Information	Response			
		Yes	No	Mean	Rank
i.	Fellow Farmers	83.3	16.7	1.167	1st
ii.	Radio	68.9	31.1	1.311	2nd
iii.	Television	50.0	50.0	1.500	3rd
iv.	Agricultural extension officers	46.2	53.8	1.538	4th
v.	Farmers' association	29.5	70.5	1.705	5th
vi.	Agrochemical stock list	23.5	76.5	1.765	6th
vii.	Posters	19.7	80.3	1.803	7th
viii.	Fliers	18.2	81.8	1.818	8th
ix.	Internet	15.2	84.8	1.849	9th
x.	Research institutes	14.4	85.6	1.856	10th
xi.	Newspaper	13.6	86.4	1.864	11th
xii.	Mobile phone	13.6	86.4	1.864	11th
xiii.	NGOs	11.4	88.6	1.886	13th

Respondents' compliance to regulations on the usage of agrochemicals

Presented on table 5 is the level of compliance of respondents to regulations on the usage of agrochemicals. . Result shows that majority (90.2%) of the farmers apply agrochemicals according to the prescription

Table 5: Respondents' compliance to regulations on the usage of agrochemicals

S/N	Compliance utilization specification	Yes	No	Mean
i.	Do you apply agrochemicals according to the prescription?	90.2	9.8	1.099
ii.	Do you avoid the use of banned agrochemicals e.g. Basudin, Unden, Gramazone, Gammalin 20, Copper sulphateetc?	69.7	30.3	1.303
iii.	Do you use the currently approved agrochemicals like Dursban 48EC, Acatara 25WG, Champ WG, Kocide 101, Touchdown Round up, etc?	92.4	7.6	1.076
iv.	Do you wear protective clothes/equipment during application?	62.1	37.9	1.379
v.	Do you use material safety data sheet before chemical mixing and application?	44.7	55.3	1.553
vi.	Do you avoid storage of agrochemicals in family bedroom?	83.3	16.7	1.167
vii.	Do you dispose of agrochemical containers properly?	82.6	17.4	1.174
viii.	Do you sure that agrochemical containers are not used for domestic purposes?	90.2	9.8	1.099
ix.	Do you avoid the use of leaking equipments?	87.1	12.9	1.129
x.	Do you ensure that agrochemicals are not use for household indoor pests?	84.1	15.9	1.234
xi.	Do you keep away from sprayed fields and crops before expiration?	56.1	43.9	1.440
xii.	Do you avoid spraying of weeds during the hottest part of the day when herbicide drift or volatilization can damage other garden plants, including your neighbors?	62.1	37.9	1.379

DISCUSSION

Result from this study showed that 62.1% of respondents were involved in secondary occupation while 37.9% were not involved in any other occupation apart from farming. This implies that majority of the cassava farmers in the study area were not solely dependent on farming but ventured into other occupations. This is in line with a study by Ado (2007) in Eastern Nigeria which found that small number of households remains undiversified as they combine activities within farming, commerce, skilled non-farm and low skilled non-farm sectors. The table also indicates that 28.0% of the respondents were artisan, 40.2% were into petty trading, 7.6% were into transportation business while 24.2% practices some other forms of occupation to augment their cassava farming business. This implies that petty trading is more practiced among the respondents as it answers some basic needs of the people in the community. Table 1 further reveals that about 64.4% of the respondents belong to association while 35.6% of the respondents did not belong to any association. This could enhance their access to information as regards agrochemical usage and benefits. Being a member of association enables

the farmers to have access to agricultural information, credit and other inputs as well as enhanced ability to adopt innovations. This is in agreement with Oladele and Afolayan (2005) who indicated that high levels of social participation and linkages can give rise to high level of innovation dissemination, mass adoption and increased productivity due to group dynamism. Table lastly indicates that 15.2% of the respondents' year of farming experience was below 5years, 24.2% were between 6-10years, 13.6% were between 11-15years while 47.0% had 16years and above. Farming experience of farmers is reported to increase their tendency of adopting improved techniques such as the use of agro-chemicals according to Adeola (2012).

Majority (87.9%) of the respondents asserted that chemicals work well than other methods of controlling insect pests. This implies that biological and cultural methods may be effective against moderate populations but they concluded that during epidemics, only preventative methods including the use of insecticides are effective. This agrees with Masson *et al.*,(2003) which reported that combining insecticides with mating disruption could enhance the effectiveness of insecticides and reduce the need for eight to ten applications per year down to two. Insect pest and diseases cause serious problems in arable crop production as claimed by 84.1% of the respondents. This implies that the continue cultivation of cassava as a profitable agribusiness enterprise is being threatened by a number of problems which include those of pests and diseases. Singh and Allen (1980), identified various kinds of pests and diseases that have led to a considerable decrease in the output of these crops. Effective control of these pests and diseases require the use of chemical pesticides which level of use has been found to depend on its price, risk, credit availability and cropping pattern (Sukume, 1999). About 83.3% of the respondents attest that education and training matter in pesticide usage. This agrees with Ngowi (2003) who revealed that since farmers were not receiving agricultural extension services hence have attempted various means especially in pesticides use when dealing with pest problems but were constrained by the lack of appropriate knowledge. With a big proportion of farmers taking no precaution, there is real danger of harm to beneficial insects especially that the study had revealed use of agrochemicals which have been reported to be toxic to various aquatic organisms and contaminate nearby streams and rivers (Tomlin, 1994).

Most of the farmers on table 3 acknowledged to have experienced air and water pollution (87.1%), several health problems (78.8%) and skin irritation (81.1%) due to agrochemical use. These results are consistent to findings of Lawal *et al*., (2005) among farmers in Ogun state, Nigeria where similar problems were attributed to the use of agrochemicals by 95% of the farmers. As the farmers in the study area apply fertilizers without prior soil analysis to determine soil characteristics and nutrient status, there is increased risk of soil destruction (78.0%) thus affecting plant nutrient uptake and microbial balance, contamination of surface and groundwater resources, and loss of biodiversity (71.2%). This finding is supported by Shetty *et al*., (2010). From the foregoing, it is evident that majority of the farmers from this study are aware of the adverse effects associated with the use of Agrochemicals.

The result on table 4 reveals that out of the listed sources of information, 83.3% and 68.9% of the respondents obtained information on agrochemicals usage from other farmers and radio, as ranked 1st and 2nd respectively. Also, 88.6% and 86.4% of the respondents attest that NGOs and Newspapers were not available for agrochemical information as ranked 13th and 12th respectively. This suggests that there is no guarantee on the quality of information received among the respondents in the study area, since there is no assurance that other farmers have had training or demonstrated competence on agrochemical use and therefore can pass wrong information to chemical buyers. The reliance on these informal information sources could be attributed to inadequate agricultural extension service. The findings from this study compares closely with those done elsewhere on farmers sources of information. Ngowi (2003), revealed that farmers were not receiving agricultural extension service hence have attempted various means especially in pesticides use when dealing with pest problems but were constrained by the lack of appropriate knowledge.

Table 5 represents the respondents' compliance to regulations on the usage of agrochemicals. As claimed by respondents, 69.7 % avoids the use of banned agrochemicals (and use the currently approved agrochemicals (92.4%). Also, 83.3% of

the respondents avoid the storage of agrochemicals in family bedroom, 82.6% dispose the container properly and 90.2% ensured that the containers were not used for domestic purpose. About 87.1% of the respondents avoid the use of leaking equipment. This implies that the respondents in the study area were complying with regulations on the usage of agrochemicals and are current with its trend. As a consequence, farmers are liable to be selective in their choice and purchase of certain agrochemicals. This according to Asogwa and Dongo (2009) is responsible for the reduced availability of certain agrochemicals in Nigerian market since the marketers are afraid that farmers may not easily accept the newly approved agrochemicals, which may affect patronage. This result agrees with Wetterson (1988), Tijani (2006) and (NPAS, 2012), that also reported positive compliance to regulations on the usage of agrochemicals.

CONCLUSION

Evident from the study is the importance of agrochemicals in agricultural production. Also, the very many health and environmental risks associated with their misuse came to fore. It is therefore quintessential to scale up the costs and benefits associated with the usage of agrochemicals, this will assist policy makers formulate policies that ensures proper dissemination of information to agrochemical users about the most effective way of utilizing them bearing the most minimum risk. Furthermore, the government can intervene by enrolling rural farmers in adult education, this will help them informed decisions on which, when and how to apply these agrochemicals at the appropriate times, with recommended dosage(s) and at the same time maintaining their safety.

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