TRAINING NEEDS OF RURAL FARMERS ON BEST PRACTICES IN THE USE OF AGROCHEMICALS IN AGUATA AGRICULTURAL ZONE OF ANAMBRA STATE

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Abstract

This study was designed to find out the training needs of rural farmers on best practices in the use of agrochemicals. Three research questions were posed to guide the study in line with the purposes of the study. The study was carried out in Aguata agricultural zone of Anambra State. The study adopted a descriptive survey research design. The population for the study was 870 made up of 20 extension officers and 850 registered farmers in the zone. Simple random sampling was used to select 430 registered farmers and all the extension officers were used because of the manageable size making a total of 450. The instrument for data collection was structured questionnaire rated on a four (4) point response scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The instrument was subjected to face validation by three experts and the internal consistency of the instrument was established using cronbach Alpha method and this yielded a reliability coefficient of 0.77. Data collected was analyzed using mean and standard deviation. The study revealed that the rural farmers are not aware of some of the health risks associated with improper use of agrochemicals like cancer, allergy, reproductive problem, asthma, neurological disorders among others. Also revealed in the study was that a lot of factors militate against farmers' awareness on health risks associated with improper use of agrochemicals. It was further revealed that farmers require training in the following areas: Before application of agrochemical, during application and after application. Based on the findings some of the recommendations made include that: the state government through the Ministry of Agriculture should occasionally organize seminars for the farmers using indigenous language, the Ministry of Agriculture should be organizing training for the rural farmers from time to time and the extension officers in the rural areas should assist in the training of the rural farmers since they are closer to them.

Key Words: Agrochemicals, Health risks and Best practices

Introduction

Agriculture has long been a dominant sector of the economy in Nigeria in terms of output, employment and export earnings. According to United States Department of Agriculture (2007), agriculture accounts for over 70% of the non-oil export, employs about 70% of the country's labour force and provides over 80% of the food needs of the nation.

In Nigeria before the discovery of oil, Nigeria depended so much on agriculture for food, employment and foreign exchange. With the rise in the importance of petroleum in the Nigerian economy, emphasis shifted from agriculture to petroleum. Young people including school leavers migrated to urban areas in search of white collar jobs. This left agriculture in the hands of peasant farmers (old men and women). For instance Food and Agricultural Organization (1995) noted that men have left the bulk of agriculture work to women and leaving to the cities for more lucrative jobs. These rural farmers tried to protect their crops against weeds, pests and diseases. They used different methods which according to Food and Agricultural Materials Inspection Centre (FAMIC) (2008) breeding varieties resistant to pest and diseases, cultural control of diseases and pest by ploughing and removing crop debris after harvest, weed control using vinyl sheeting and spreading straw, physical pest control such as soil disinfection using solar heating and biotic control using natural enemies. All these methods are energy and time consuming with

less than 50% good result especially in the area of pest and disease control and yield.

The introduction and adoption of agrochemicals by farmers was a welcome development. The use of agrochemicals has some economic advantages which include: increased yield, effective control of pests and diseases, saves time and labour and requires less effort.

Agrochemicals are used worldwide today to improve and protect crops and livestock. Fertilizers are applied to obtain good yields from crops that are protected from insects and diseases by the timely use of pesticides. Farm animals are similarly protected from parasites and diseases by veterinary treatment such as vaccination, oral dosing or immersion dipping (International Labour Organization, 2010).

Agrochemicals are chemicals used to improve the quality and quantity of agricultural products. They are used within the agricultural farming industries. They include pesticides, herbicides, insecticides, fungicides, nematicides, hormones, growth agents and fertilizers.

Agrochemicals are used for different farming operations and purposes and are therefore classified as such. The Food and Agricultural Materials Inspection Centre (FAMIC) (2008) classification include: Insecticides - Agents for controlling harmful insect pests that damage field crops; Fungicides - Agents for controlling diseases that damage field crops (caused by fungi); Insect fungicides - Agents that simultaneously control harmful insect pest and diseases that damage field crops; Herbicides - Agents for controlling weeds; Rodenticides - Agents for controlling rats and other rodents; Attractants - Agents that attract mainly harmful insect pest by odor or other means; Repellant - Agents for having repellant action on harmful mammals and birds that damage field crops; Spreaders - Agents that are mixed with other agricultural chemicals to enhance the adherence of these chemicals.

There are other types of agrochemicals that are not included in this classification but very important and are used by farmers. They include fertilizers, growth hormones, plant growth regulators, germination inhibitors and different types of agrochemicals used on farm animals by both workers and veterinary personnel (Izunobi, 2002).

Immaterial of the fact that agrochemicals are looked upon as vehicle for improved agricultural production yet they can cause ill-effects when in contact with human body (Tapas Institute of Scientific Research and development, 2006). International programme on chemical safety (IPCS) (2001) pointed out that most agrochemicals have adverse effect if they enter the body. The IPCS further stated that many agricultural workers die and many are poisoned or injured each year by such substances entering the body. Also Havahart (2002) stated that studies have found that agrochemicals like pesticides pose serious health challenges like cancer, nervous system diseases, reproductive problems in people exposed to them through home and farm exposure. The author further pointed out that similar research has linked exposure to pesticides to increased presence of neurological disorders, Parkinson's disease, childhood leukemia, lymphoma, asthma among others.

Wrong application of agro-chemicals affects crops adversely. For example, overdose of agrochemical on crops cause necrosis of the foliage, scorches, yellowing and distortions of

the leaves. Sometimes the chemical residues enter the crops and consumed by humans, this is also hazardous to consumers. Agrochemicals enter the body through different routes which according to IPCS (2001) include: Inhalation, Skin Absorption and Ingestion.

The use of agrochemicals to promote/boost agricultural productivity, control weeds and preserve agricultural produce has become part of the farming culture in almost all parts of the country and among rural farmers. Unfortunately there are concerns about the indiscriminate use and abuse of these chemicals. Mabe, Talabi and Abdeam (2017) lamented about the indiscriminate use of these agrochemicals with non-adherence to safety precautions by farmers. The authors pointed out that the use of protective equipment, remains a thing of choice to the farmers, other precautionary measures like avoiding of eating, drinking and smoking during agrochemical application is still not adhered to by farmers. The authors further stated that instead of farmers properly disposing of empty containers of agrochemicals, they use them for fetching water, keep cooked food in them, store seed stock for next season usage among others. These are sources of concern and calls for adequate training of rural farmers on how best agrochemicals can be handled and used.

Statement of the Problem

The use of agrochemicals has become an integral part of farmers' agricultural activities. They are used on all types of crops to control pests and diseases control storage pest and increased yield. These agrochemicals are faced with misuse, abuse and overuse. This is as a result of the fact that most farmers in rural areas are illiterates, lack requisite training, protection equipment and safety information. Mabe, Talibi and Abdean (2017) stated that many do not have adequate knowledge and information on the health hazards associated with handling and use of pesticides/agrochemicals. The authors further opined that the ability to apply the right quantity is dependent on awareness of the health implications and physiological effect on crop output and quality of produce.

In view of the above, the hazards associated with the use of agrochemicals need to be identified and farmers properly trained and educated on how best to handle and use these agrochemicals.

Purpose of the Study

The purpose of the study was to find out the training needs of rural farmers on best practices in the use of agrochemicals. Specifically, the study sought to:

1) Identify the health risks associated with improper use of agrochemicals by rural farmers in Aguata agricultural zone.
2) Identify the factors affecting rural farmers' awareness of health risks associated with improper use of agrochemicals.
3) Determine the training needs of rural farmers on best practices in the use of agrochemicals in Aguata agricultural zone.

Research Questions

The following research questions were formulated to guided the study:

1) What are the health risks associated with improper use of agrochemicals among rural farmers in Aguata Agricultural Zone?
2) What are the factors affecting rural farmers' awareness of health risks associated with improper use of agrochemicals?

3) What are the training needs of rural farmers on best practices in the use of agrochemicals in Aguata agricultural zone?

Methodology

This study adopted a descriptive survey research design. Descriptive survey research design according to Eboh (2007) uses sample of an investigation to explain what is in existent or non-existent on the present status of phenomenon being investigated. The design was considered appropriate for this study because it intends to find out the awareness of the farmers on best practices in the use of agrochemicals.

This study was carried out in Aguata agricultural zone of Anambra State. The zone is made up of five (5) local government areas namely: Aguata, Nnewi North, Nnewi South, Orumba North and Orumba South Local Government Areas.

The population for the study was made up of two (2) groups of respondents, 20 extension officers in the zone and 850 registered farmers in the zone, giving a total of 870. While all the extension officers (20) were adopted as part of the sample, simple random sampling was used to select four hundred and thirty (430) registered farmers. These gave a total of four hundred and fifty (450) and this constituted the sample for the study.

The instrument for data collection was structured questionnaire, rated on a four (4) point response scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The Instrument has four (4) sections A-D. Section A was on background information of the respondents, section B on health risks associated with improper use of agrochemicals with 15 items, section C on factors affecting farmers awareness of health risks associated with improper use of agrochemicals with 7 items while section D on training needs of rural farmers on best practices in the use of agrochemicals with 19 items. Section D was only for the extension officers. The instrument contains a total of 41 items.

The instrument was subjected to face validation by three experts. Two from Michael Okpara University of Agriculture Umudike, Abia State, (One from Crop Science Department and the other from Agricultural Extension Department) and one from Anambra Development Programme (ADP) Awka, Anambra State. Their suggestions and comments were used to fine-tune the final draft of the instrument. Initially, the total number of items was 49 but reduced to 41 after validation.

The reliability of the instrument for this study was established using Cronbach Alpha formula. A reliability co-efficient value for the whole instrument was 0.77.

Personal contact approach was adopted in collecting data from the respondents. The researcher with the help of Zonal Extension Officer (ZEO) distributed the instrument to the extension officers. The instrument was also administered to the farmers during their monthly meetings. The method ensured 100% return rate of the instrument.

Data collected were analyzed using descriptive statistic (mean and standard deviation). The mean from each item was interpreted in relation to real limit of numbers. Therefore items with mean ratings 3.50-4.00 were regarded as strongly agree, 2.50-3.49 were described as agree, mean ratings between 1.50-2.49 were described as disagree while mean rating between 0.50-1.49 were regarded as strongly disagree.

Results

Research Questions 1

What are the health risks associated with improper use of agrochemicals in Aguata Agricultural Zone of Anambra State?

The data for answering research question 1 is presented in table I.

Table 1: Mean ratings of respondents on health risks associated with improper use of agrochemicals

S/N	ITEMS	**N = 20**	**N_2= 430**	**X_1SD_1**	**X_2SD_2**	**REMARKS**
1.	Headache	3.67	0.51	3.52	0.64	Strongly agree
2.	Catarrh	3.51	0.73	3.50	0.56	Strongly agree
3.	Cough	3.88	0.64	3.60	0.72	Strongly agree
4.	Fever	3.58	0.56	3.52	0.64	Strongly agree
5.	Dizziness	3.60	0.99	3.51	0.56	Strongly agree
6.	Dermatitis	3.31	0.72	3.32	0.75	Agree
7.	Conjunctivitis	3.72	0.74	3.52	0.79	Strongly agree
8.	Cancer	3.60	0.64	1.05	0.61	EO = Agree F = Disagree
9.	Allergy	3.00	0.85	1.08	0.68	EO = Agree F = Disagree
10.	Abdominal pain	3.00	0.75	1.05	0.73	EO = Agree F = Disagree
11.	Nervous system disease	3.12	0.61	1.02	0.56	EO = Agree F = Disagree
12.	Reproductive problems	2.78	0.79	1.50	0.53	EO = Agree F = Disagree
13.	Neurological disorders	2.50	0.66	1.18	0.70	EO = Agree F = Disagree
14.	Parkinson's disease	2.57	0.68	1.51	0.87	EO = Agree F = Disagree
15.	Asthma	3.77	0.60	2.00	0.75	EO = Agree F = Disagree
16.	Childhood leukemia	2.80	1.58	0.71	0.73	EO = Agree F = Disagree

N_1= Number of Extension officers, N_2 = Number of farmers,

x_1= Mean ratings of extension officers and $\bar{x}_2$ = Mean ratings of farmers, SD_1 = Standard deviation of extension officers, SD_2 = Standard Deviation of farmers

EO = Extension Officers and F = Farmers.

Table I above revealed that items 1-7 with mean ratings ranging from 3.31 to 3.88 for extension officers and 3.32 to 3.60 for farmers fall under response category agree and strongly agree for both farmers and extension officers. This shows that both the extension officers and farmers are aware of such health risks as listed in items 1-7 as being associated with improper use of agrochemicals. There are variations in the level of agreement between the extension officers and farmers on items 8-15. While the extension officers agree on the associated health risks therein, the farmers disagree with these items. This shows that the farmers are unaware of these health risks associated with improper use of agrochemicals.

Research Questions 2

What are the factors affecting rural farmers' awareness on health risks associated with improper use of agrochemicals?

The data for answering research question 2 is presented in table 2.

Table 2: Mean ratings of respondents on factors affecting rural farmers awareness on health risks associated with improper use of agrochemicals

S/N	Items	N = 20	N_2= 430	X_1SD_1	X_2SD_2	Remarks
1.	Ignorance about the health risks Associated with improper use of agrochemicals	3.50	0.69	3.81	0.71	Strongly agree
2.	Ignorance as a result of sales Advertisements	3.51	0.65	3.72	0.82	Strongly agree
3.	Illiteracy among the rural farmers	3.66	0.78	3.85	0.94	Strongly agree
4.	Propaganda by the importers and suppliers to sell more toxic agro-chemicals as more effective products	3.50	0.69	3.51	0.78	Strongly agree
5.	High cost of protective equipment Compared with farmers income	3.51	0.60	3.57	0.77	Strongly agree
6.	Lack of training of the farmers on Proper use of agrochemicals	3.71	0.74	3.65	0.83	Strongly agree
7.	Lack of orientation through mass media and other organizations for the protection of farmers, general public and environment, on the adverse effect of agrochemicals	3.77	0.86	4.00	0.68	Strongly agree

N_1 = Number of Extension Officers, N_2 = Number of Farmers, $\bar{x}$ = Mean ratings of extension officers and x_2 = Mean ratings of farmers. SD_1=Standard deviation of Extension Officers, SD_2 = Standard deviation of farmers EO = Extension officers and F = Farmers.

Table II revealed that items 1-7 had mean ratings that fall above the response category strongly agree for both the extension officers and the farmers. This shows that the respondent accepted all the items as factors affecting the farmers' awareness on health risks associated with improper use of agrochemical.

Research Questions 3

What are the training needs of rural farmers on best practices in the use of agrochemicals?

The data for answering research question 3 is presented in table 3.

Table 3: Mean ratings of respondents on the training needs of rural farmers on best practices in the use of agrochemicals.

S/N	Items	N = 20	XD	Remarks
A	**Before application of Agrochemicals**			
1.	Read and understand the instruction and other information on container label	3.78	0.73	Strongly agree
2.	Check application equipment to ensure that it is in good condition i.e. with leaking or spilling	3.77	0.61	Strongly agree
3.	Check all protective equipment/wears to ensure that they are in good condition	3.50	0.90	Strongly agree
4.	Check whether the weather conditions are conducive for the application excessive wind speed period should be avoided	3.50	0.80	Strongly agree
5.	Tell people around the area if they might be affected to move away	3.61	0.72	Strongly agree
6.	Arrange for safe disposal of empty containers and surplus chemicals after use	3.71	0.93	Strongly agree
B	**During Application of Agrochemical**			
7.	Wear appropriate protective clothing during application – (apron, eye goggle, boots, face shield, hand gloves) etc	4.00	0.80	Strongly agree
8.	Mix only the correct quantity of agrochemicals for a task, avoid overdose.	3.90	0.66	Strongly agree

9.	Handle contain Strongly agreeers carefully to avoid spillage during pouring into an applicator	3.75	0.75	Strongly agree
10.	If two or more agrochemicals are to be mixed, ensure that they are compatible and without risk of a chemical reaction	3.75	0.68	Strongly agree
11.	Ensure that agrochemicals are used for the purpose for which they are meant	3.55	0.77	Strongly agree
12.	Do not eat, drink or smoke during application	4.00	0.81	Strongly agree
13.	Incase of any blockage of the nozzle, do not use your mouth to blow it off	4.00	0.83	Strongly agree
14.	Incase of spillage, keep every one away until it is properly cleaned and disposed safely	3.91	0.78	Strongly agree
C	**After Application of Agrochemicals**			
15.	Wash hands, face and entire body, if hand Gloves were used, wash them before removal	3.92	0.67	Strongly agree
16.	Store unused chemicals safely and dispose Empty containers properly	3.81	0.79	Strongly agree
17.	Wash and dry all the application equipment Thoroughly and store in a cool dry place	3.70	0.81	Strongly agree
18.	Wash all the protective equipment/clothingThoroughly and store in a cool dry place	4.00	0.72	Strongly agree
19.	Bathe thoroughly again after completing Operations	3.65	0.68	Strongly agree

N = Number of extension officers, $\bar{x}$ = mean ratings of extension officers and SD = Standard deviation of extension officers

Table 3 above revealed that all the 19 items had mean ratings ranging from 3.50 to 4.00. These fall under the response category of strongly agree. The result on this table showed that the respondents accepted all the items as the training needs of rural farmers on best practices in the use of agrochemicals.

Discussion of Results

On health risks associated with improper use of agrochemicals, the study revealed a lot of health risks which include headache, catarrh, fever, cough, cancer, conjunctivitis, asthma, Parkinson's disease among others. These findings are in line with International Programme on Chemical Safety (2001) who stated that many agricultural workers die, and many poisoned or injured each year by such substances entering the body. Also in consonance with the findings is Havahart (2007) who stated that agrochemicals like pesticides pose serious health challenges like cancer, nervous system diseases, reproductive problem, Parkinson's disease, asthma among others in people. Unfortunately, the findings revealed that the farmers are not aware of most of these health risks as can be seen in their mean ratings.

On factors affecting rural farmers' awareness on health risks associated with improper use of agrochemicals, the study revealed a lot of factors which include illiteracy, ignorance, lack of training, lack of orientation through mass media and other organizations for protection of farmers, general public and environment on the adverse effect of agrochemicals. These findings are in consonance with Mabe, Talib and Abdean (2017) who stated that despite the fact that manufacturers of agrochemicals used several methods such as graph, labels, and pictures to raise the awareness of the users about the health risks associated with the use of their products yet the achievable targets have not been reached. This means that there are

certain socio economic and demographic factors that influence the farmers' awareness of health implications of agrochemical use.

On the training needs of rural farmers on best practices in the use of agrochemicals, the study revealed that all the items were accepted by the respondents as the training needs of farmers on proper use of agrochemicals. These findings are in agreement with Ilo (2010) who averred that certain precautions should be taken when using agrochemicals, that is, before application, during application and after application.

Conclusion

The use of agrochemicals to boost agricultural production has become part of agricultural activities among rural farmers. Some of these agrochemicals could be hazardous to the health of the workers if not properly used. Most rural farmers due to ignorance abuse the use of these chemicals. They do not adhere to the safety precautions or practices that would guarantee safety of their health, the public and the environment.

Some developed countries have strict regulations with regard to the production, sale and use of these chemicals. But in developing countries especially to the rural farmers, the economic benefits of these chemicals outweigh the risks involved. This is ignorance and too dangerous. This precarious situation can only be addressed and minimized by education and training of the rural farmers on best practices in the use of these agrochemicals.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. The state government through the Ministry of Agriculture should be organizing seminars and workshops for the farmers in the rural areas on health risks associated with indiscriminate use of agrochemicals as well as adopting best practices using indigenous language.
2. The mass media (radio television, newspapers and social media) should help in creating awareness on health risks and safety precautions required on the use of agrochemicals.
3. Farmers' education is important. Therefore, the government (federal, state and local governments) should continue to encourage adult education programmes especially for rural farmers to enable them read and understand agrochemical labels, pictures, graphs and so on.
4. The extension officers in the rural areas should assist in the training of the rural farmers since they are closest to them.

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