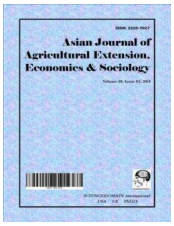

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Assessment of Training Needs in Agro-chemical Use among Farmers in Bali Local Government Area of Taraba State, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author SDT designed the study, performed the statistical analysis, wrote the protocol and first draft of the manuscript. Authors AAN, HUM and MBB managed the analyses of the study. Author AAW managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Agro-chemicals though beneficial to farmers, could be harmful to the users and the environment. To safely explore the benefits of agrochemicals use it was imperative to assess the level of training needs on save use of agro-chemicals among farmers in Bali Local Government Area, Taraba state. The specific objective were to: describe the socioeconomic characteristics of the respondent, ascertain respondents training needs in safe use of agrochemicals, identified respondents source of

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information on safe use of agrochemicals and identify the constraints encountered by the respondents in the use of agrochemicals. One hundred fifty six (156) questionnaires were administered to the respondents selected through multi- stage random sampling and snowball. Mean, percentages and logit regression were used to analyse the data. The surveys revealed 58.33% of the respondents were within the mean 25 years. Majority of the respondents (76.92%) were males, and 80.13% were married, with 67.52 of them having acquired one form of formal education or the other. The mean household size, farm size and years of farming experience were 6people, 3hectares and 11years respectively. Most of respondents' (74.36) source of fund through personal savings, greater percentage of them (47.44%) inherited their farm lands. Also majority of the respondents were aware of the safety measures on the use of agro-chemicals 100% of the respondents were in training needs in the safe use of agro-chemicals. Furthermore, 75.64% have their source of information through neighbors. A positive significant relationship existed between training needs and age (r = 0.0495), marital status (r = 0.6279) household size (r = 0.0153), education (r = 0.0267), family size (r = 0.0183) and farming experience (r = 0.0121). It is recommended that farmers need to be subjected to training in the safe and profitable use of agro-chemicals in Bali Local government area of Taraba state.

Keywords: Agro-chemicals; training; needs; Bali; Taraba.

1. INTRODUCTION

Agriculture is the main stay of the Nigerian economy. Over 70% of Nigerian population is engaged in agricultural production and agricultural related activities. Agriculture is classified as one of the most hazardous sectors both in industrialized and developing countries with an estimated number of 170,000 agricultural workers being killed yearly [1]. This implies that agricultural workers are twice at risk of dying on the job when compared with workers in other sectors. For quit sometimes now there has been public concern about the crop protection and pest control chemicals, deliberately developed to be toxic to harm some living organisms which is the reason for their commercial utilization [2]. Accidental ingestion of agro-chemicals by humans and animals might produce adverse effect because they are very poisonous. Thus, there are a lot of health risks to the farmers and others handling and spraying agro-chemicals. Agrochemicals are used world-wide to improve or protect crops and livestock. Fertilizers are applied to obtain good yield from crops that are protected from insects and disease by the timely use of pesticides.

Hence, the importance of farmers training needs on safe use of agro-chemicals cannot be over emphasized. According to Michel [3], training is a process of systematic development of the knowledge, skills and attitudes required by an individual to perform adequately a given task or job. According to Edwin [4], training can act for increasing knowledge and skills of an employee for doing a particular job. The term 'training' indicates the process involved in improving the aptitudes, skills and abilities of the employees to perform specific jobs. Training helps in updating old talents and developing new ones. 'Successful candidates placed on the jobs need the training to perform their duties effectively'. From the study of Isyaku [5], the process of training and development is a continuous one. It is an avenue to acquire more and new knowledge and develop further the skills and techniques to function effectively. Chi et al. [6], unfolds that (2008) a training program is dependent on the following parameters for its success (i) perceived value of leaning program (ii) attitude to teacher (iii) response to learning conditions (iv) desire to learn: the degree to which trainees really want to learn and do well.

Exposure to pesticides and other agrochemicals constitutes one of the main occupational risks, which could lead to illness or death. The situation is particularly evident in developing countries and the farms or plantations in some of the countries in transition or even in some industrialized countries. The incidence of occupational hazards in agriculture is poorly recorded and documented. Official data tend to under-report occupational accidents [7].

Intensification of agriculture around the world has led to an increase in the use of agrochemicals by farmers. Agrochemicals are important agricultural inputs to protect crops from diseases, pests, and weeds. The use of agrochemicals contribute not only to help growth of crops and animals but also to improve farm working efficiency and stable supply of

tasty agricultural produce. Farmers still find it difficult to practice safety measures of agrochemicals use and application in spite of government effort in recruitment and training of extension agents to train and educate farmers in modern agricultural practices. Although a lot of research work has been done in some states by other researchers on this research topic, little or nothing has been done in Taraba state. This is a research gap; that has prompted the researcher to undertake this research work. Agro-chemicals though beneficial to farmers, they could be harmful to the users and the environment. To safely explore the benefits of agrochemicals use it was imperative to assess the level of training needs on save use of Agro-chemicals among farmers in Bali Local Government Area, Taraba State. The objective of the study is to:

i. Describe the socio-economic characteristics of the Farmers.
ii. Ascertain farmers awareness of safe use of agrochemicals.
iii. Identify farmers training needs in safe use of agrochemicals.
iv. Identify farmers' source of information on safe use of agrochemicals.
v. Identify the constraints encountered by the farmers' in the use of agrochemicals.

2. METHODOLOGY

2.1 The Study Area

The study was carried out in Bali Local Government Area (LGA) of Taraba State, Nigeria. Bali LGA is bounded to the North by Ardo-Kola LGA, Gashaka LGA to the East, Donga LGA to the Southern and Gasol LGA to the West. The area lies within longitude 9°36''E and Latitude 6°30''N

The Local Government has a total projected population of 271,616 people (NPC, 3% projection). The inhabitants of this area are predominantly Ichen, Jibu, Chamba, Tiv, Kuteb, Wurkum, Fulani, Jenjo and Mambilla. Hausa is widely spoken by indigenes of Bali irrespective of ethnic grouping. Other ethnic groups (Igbo, Yoruba and Ogoja) are also found in the Local Government Area.

The primary occupation of the people of this area is farming. The farmers grow a wide variety of crops and livestock. The main crops grown in the area are maize, rice, yam, cassava, groundnut etc. A large number of the farmers are fishermen, while few are civil servants. Bali Local Government Area has two seasons, i.e. the wet (Rainy) and dry (Harmattan) season. The rainy season starts in March or April till November. The average annual rainfall is 94mm while the average annual temperature is moderate being 24.5°C.

2.2 Sources of Data and Sampling Procedure

Primary data was used for the study. The primary data was obtained through the structured questionnaire and interview sessions of farmers. The questionnaire sought information on socio-economic characteristics, awareness of health hazards and safety measures, training needs, farmer's source of information as well as constraints encountered by Farmers on safe use of agro-chemicals.

Selection of Farmers for the study was done using multi-stage sampling procedure and snowball techniques. Bali LGA consists of four Taraba Agricultural Development Program (ADP) blocks namely Kangana, Bali, Garba Chede and Dakka were purposively selected due to their prominence in the use of agro-chemicals.

Stage 1 : All the four blocks, Kangana, Bali, Garba Chede and Dakka was covered for the research.
Stage 2 : The four blocks consist of 30 cells, four cells were selected from each of the blocks using simple random sampling technique.
Stage 3 : Snowball Sampling Techniques was used to administer 156 structured questionnaires in the 16 selected cells.

2.3 Data Analysis

Descriptive statistics such as frequency, percentage and Pearson Correlation Analysis are the analytical tools that were used. The rating scale was used to analyze objectives II, III, IV and V, while Multiple Logit Regression was used to find out the relationship between socio-economic characteristics of the Farmers and training needs on safe handling and use of agro-chemicals.

Multiple logit regression formula is given as:

$$\frac{P = \exp\left(b_0 + b_1X_1 + b_2X_2 \ldots\ldots\ldots\ldots b_pX_p\right.}{1 + esp(b_0 + b_1X_1 + b_2X_2 \ldots\ldots\ldots\ldots b_pX_p}$$

Where:

P = Training Need on safe use of Agro-Chemical
$X_1 – X_n$ = Independent variables
X_1 = Age (in years)
X_2 = Sex (male=1, female=0)
X_3 = Marital Status (Dummy: married = 1, single= 0)
X_4 = Household size (number of people in the household)
X_5 = Educational level (number of years in formal schooling)
X_6 = Farm size (hectares)
X_7 = Source Fund
X_8 = Farming experience (number of years in cowpea production)
X_9 = Source of Farm Land
$b_1–b_8$ = Regression coefficients
U = Error term

3. RESULTS AND DISCUSSION

3.1 Socio-economic Characteristics of Farmers

3.1.1 Age distribution of the farmers

The age distribution of the Farmers is presented in Table1 revealed that 1.92% of the Farmers were less than 20 years old, 21.15% were in the age group of between 20-29 years, 31.41% were between the age of 30-39 years, 26.92% were in the age group of between 40-49 years respectively, while 18.59% were in the age group of 50 years and above. The mean age of the farmers was 35 years. The finding reveals that most of the Farmers practiced safe handling and use of agro-chemicals was in their active and productive age group. The age of a farmer affects the type of agricultural activities he may engage in. This agreed with the findings of Kola (2004) that most of the farmers between 31-50 years of age are in their active age, which enables them to perform actively in strenuous farm activities, and they constitute 82.30% the farming population. This is also in agreement with the findings of Tijani et al. [8] that in family labour, younger farmers spend much time on the farm, and they mostly embark on more strenuous farm operations than elder farmers and children. However, Deressa et al., (2010) stated that age of the Farmers represents experience in farming, the older the farmer, the more experience he/she is in farming.

3.1.2 Distribution of the farmers' by sex

The result in Table 1 further revealed that majority (76.92%) of the Farmers was male. This implies that males are more involved in crop production than the female in the study area. According to the prevailing culture, men are to cater for the household needs and may be assisted by other members of the households in Bali L.G.A. This corroborates Olayemi [9] findings that crop productions were mostly carried out by men. The findings are also in tandem with Olaleye [10] who revealed that, females were usually involved in farming as helpers or suppliers of labour in light farm operations such as planting, weeding, harvesting, processing and marketing and not in muscular labour demanding activities like threshing, farm clearing and digging among other activities.

3.1.3 Farmers' marital status

Table 1, shows the marital status of the Farmers. Majorities (80.13%) of the Farmers were married, 17.98% were single, 1.28% were widowed while 0.64% were divorced. This implies that, most of the Farmers were married because family labour could be available in the study area. Also, married individuals are more concerned with funding for food than the singles or divorced individuals who may tend to consider their personal well being alone. This finding corroborates Ndaghu et al. [11] who reported that, large proportions of farmers in Mubi L.G.A of Adamawa state are married. Similarly, Ofuoku [12] revealed that, married farmers had responsibilities that must be reflected in their farming activities.

3.1.4 Farmers' household size

Table1 further more describes the household size of the Farmers. It revealed that 80.13% of the Farmers have a household size of 1-10, 19.23% of them have 11-20 people while only a few (0.64%) have more than 20 people in their household. This implies that farmers in the study area have large household size. The mean household size of 5-16 people. Household size is assumed to represent the labour input of the farm; large household size is mostly inclined to divert part of its labour force into non-farming activities. This corroborates Gbetibouo [13] who found that household size enhances farmer's adaptive capacity.

Table 1. Socio-economic characteristics of farmers

Variables	Frequency	Percentage (%)
Age		
>20	3	1.92
20 – 29	33	21.15
30 – 39	49	31.41
40 – 49	42	26.92
50 and above	29	18.59
Sex		
Male	120	76.92
Female	36	23.08
Marital status		
Single	28	17.95
Married	125	80.13
Widowed	2	1.28
Divorced	1	0.64
Household size		
1 – 10	125	80.13
11 – 20	30	19.23
21 and above	1	0.64
Educational level		
Non-formal Education	37	23.71
Primary education	24	15.39
Secondary Education	58	37.18
Others (specify)	37	23.72
Farm size (ha)		
> 1	2	1.28
1-2	72	46.15
3-4	55	35.26
5 and above	27	17.31
Source of fund		
Personal savings	116	74.36
Money lenders	29	18.59
Friends/Relatives	6	3.85
bank	5	3.21
Farming experience (Yrs)		
1-20	133	85.26
21-30	18	11.54
31-40	4	2.56
41 and above	1	0.64
Source of Farmland		
Inherited	74	47.44
Rented	56	35.90
Leased	2	1.28
Purchased	24	15.39
Do extension agents visit you?		
Yes	42	26.92
No	114	73.08
If Yes, do they train you on agro-chemical use?		
Yes	40	25.64
No	116	74.36
Total	**156**	**100**

Source: Field survey, 2016

3.1.5 Farmers educational attainment

Findings on the educational status of the Farmers show that majority (37.18%) of the Farmers acquired secondary education, 23.72% had attained tertiary educational level while 23.71% had a non-formal education. This result revealed that more than half of the Farmers acquire formal education. Farmer's efficiency in using information on new production technique increases with education and thus productivity. This is in line with Tijani et al. [8] findings that majority (37.5%) of Farmers practicing chemical control method were literate, having attempted one form of education or the other. The implication of this result is that a higher proportion of educated farmers will make adoption of innovation or technologies easier in the study area.

3.1.6 Farmers farm size

Farm size analysis of the Farmers shows that majority (46.15%) practicing safe agro-chemical use had farm size between 1-2ha, 1.28% had less than 1ha, 35.26% and 17.31% had 3-4 and 5 ha above respectively. According to Iheanacho et al. [14] small-scale farmers are those farmers that cultivate the land of 0.1ha to 5ha. From the result of the finding, the majority of the Farmers can, therefore, be categorized as small-scale farmers. This corroborates Ofuaku [12] who asserted that farmers in the central Agricultural zone of Delta state whose mean farm size was 3.5 hectares were small-medium holders farmers, who still depend on the use of energy-sapping crude implements.

3.1.7 Farmers source of fund

It was found during the course of the study that 74.36% which constitute the majority of the Farmers had their source of the fund from personal savings, 18.59% had their source of the fund from money lenders and 3.85% had their source of the fund from friends and relatives which are informal sources. The formal and institutionalized source from banks was 3.21%. The absence of Agricultural Bank in the area could be responsible for a poor percentage patronage of farmers that obtain their funds from lending institutions. Also, lack of awareness of the farmers on the present Government Anchor Borrowers Program could also be responsible.

3.1.8 Farmers farming experience

The finding reveals that majority (85.26%) of the Farmers had farming experience between 1-20years and 11.54% had farming experience between 21-30years while 2.56% and 0.64% had farming experience between 31-40years and 41year and above respectively. This implies that the majority of the Farmers have long years of experience in farming. The farming experience of farmers to a large extent affects their managerial know-how and decision making. Besides, it influences the farmers understanding of climatic and weather conditions as well as socio-economic policies and factors affecting farming (Iheanacho, 2000).

3.1.9 Farmers source of farmland

Analysis of the findings shows that 47.44% of the Farmers inherited their source of farmland. This could be as a result of the importance of culture and tradition attached to farmlands. The findings further show that 35.90% and 1.28% obtained their farmland through rented and leased while 15.39% acquire their farmland through purchase.

3.2 Distribution of Farmers Based on Awareness on Safe Use of Agro-Chemicals

Data in Table 2 show that 80.13% of the Farmers buy Agro-Chemicals from the reputable source while only 19.87% do not buy from a reputable source. This could be due to the presence of Agro-Chemical company distribution agents in the study area. The study also revealed that 83.33% of the Farmers read instructions on the label before use. This high percentage of the Farmers that read the instruction on the label before use could be attributed to the high percentage of (Primary, Secondary and Tertiary education) combined 76.29% of the Farmers in the study area. Similarly, 82.69% of the Farmers were aware of not spraying during the windy period while 70.51% of the Farmers knew about wearing protective clothing before spraying. This implies that a sudden change in wind direction increases the chances of droplet deposition on the body of the operator which poses a serious health hazard.

The Table 2, further revealed that 68.59% of the Farmers wear nose shield to avoid inhalation of agro-chemicals. Also, 61.54% are aware of wearing rubber gloves and boots. This is a healthy situation because it reduced the accidental effect of skin peel.

Only 83.33% of the Farmers do not drink, eat or smoke while spraying while 76.92% avoid skin contact with agro-chemicals. This implies that farmers are sensitive about the side effect of agro-chemicals to their body.

Table 2 also showed that 77.56% are aware of not ingesting or inhaling agro-chemicals during spray while 86.54% cover their food and water during spraying to avoid contamination. Also 73.77%, of the Farmers are aware of not pouring unused agro-chemicals into drinking, irrigation or running water. This implies that improper disposal of unused agro-chemicals will cause a hazard to the environment and public health. This is in agreement with the findings of Whitehead, 2000 that Eutrophication will occur and cause damage to fishes, the food chain will be affected, and herbicide mixture can also enter the environment through drift, runoff water and pollute the water ways.

Table 2 further revealed that 53.21% of the Farmers are aware of puncturing used agro-chemicals containers and burying in the soil while 92.95% of the Farmers are aware of bathing with soap and water immediately after spraying agro-chemicals. This implies that bathing after the agro-chemicals application is a way of reducing agro-chemical contamination on the users.

The Table also shows that majority (91.03%) of the Farmers are aware of separately washing clothes used for spraying from other cloths while 82.70% of the Farmers are aware of keeping agro-chemicals under lock and key and away from children. This awareness could be as a result of high percentage of educational attainment of the Farmers in one way or another.

Table 2 further revealed that 76.92% of the Farmers are aware of not using empty containers of agro-chemicals to serve food and drink while 69.87& of the Farmers are aware of not using the agro-chemical container for ablution. This implies that Farmers' awareness will reduce the incident of agro-chemical ingestion and disease outbreak. Rell and Calvin (2011) stated that one of the main entry routes of herbicides into the body is through ingestion from the mouth. The findings revealed that there is the high level of awareness of all the variable of safety measures listed above in the Local Government Area (LGA) of the study.

Table 2. Distribution of farmers based on awareness on the safe use of agro-chemicals

Variables	Frequency		Percentage	
	Yes	No	Yes	No
Buying Agro-Chemicals from Reputable Source	125	31	80.13	19.87
Reading of Instruction on Label before use	130	26	83.33	16.67
Not spraying during a windy period	129	27	82.69	17.31
Wearing Protective Clothing before Spraying	110	46	70.51	29.49
Wearing of Nose shield to avoid Inhalation	107	49	68.59	31.41
Wearing Rubber Gloves and Boots	96	60	61.54	38.46
Not Drinking, Eating or smoking while Spraying	130	26	83.33	16.67
Avoid Skin Contact with Agro-Chemicals	120	36	76.92	23.08
Not ingesting or Inhaling Agro-Chemical during spraying	121	35	77.56	22.44
Covering Food and Water during Spraying to avoid Contamination	135	21	86.54	13.46
Not pouring unused Agro-Chemicals into Drinking, Irrigation of Running water	114	42	73.77	26.92
Puncturing used Agro-Chemical Container and Burying in the Soil	83	73	53.21	46.80
Bathing with soap & Water immediately after spraying agro-Chemicals	145	11	92.95	7.05
Separately washing cloths used for spraying from other cloths	142	14	91.03	8.97
Keeping Agro-Chemicals under Lock and Key and away from Children	129	27	82.70	17.31
Not using an empty container of Agro-Chemicals to serve food	120	36	76.92	23.08
Not using Agro-chemical container for Ablution	109	47	69.87	30.13
Total	**156**		**100%**	

Source: Field survey, 2016

3.3 Farmers Training Needs

Table 3 revealed that 100% of the Farmers are in high need of training in the use of agro-chemicals. This acclamation had a great positive implication for the health and well-being of the farmers.

3.3.1 Farmers' training on handling agro-chemicals

Table 3 further showed that majority (57.05%) of the Farmers reported high training needs and 39.10% reported average training need. In handling agro-chemicals. This may lead to the reduction in agro-chemicals ingestion, inhalation and intoxication. This corroboration with Yadav et al.[15] that majority of extension workers rated medium to high training needs in most of the nominated areas.

3.3.2 Farmers training on application of agrochemicals

Table 3 also reveals that 56.41% of the Farmers reported high training needs open agro-chemicals application, while 41.67% had average need of training. This implies that training farmers on the application of agro-chemicals will minimize agro-chemical drift, air pollution as well as hazards to human and wildlife species.

3.3.3 Farmers training on storage of agro-chemicals

Table 3 further more reveals that 50% of the Farmers have average need of training on storage of agro-chemicals while 40.39% have high training need. This implies that training on proper storage under lock and key will reduce children accident on agro-chemical ingestion and inhalation.

3.3.4 Farmers training on disposal agro-chemical container

Table 3 revealed that 47.44% of the Farmers were in average training need on disposal of the agro-chemical container while 42.95% had a high need. The implication is that if empty containers of agro-chemicals are not properly disposed of, it leads to environmental pollution and public health. This is in tandem with Whitehead (2000) findings that improper disposal of herbicide containers are sources of herbicide contamination affecting the users and other who do not use herbicides.

3.3.5Farmers training on mixing/dilution of agro-chemicals

Table 3 also shows that majority 55.13% of the Farmers are in high need of training on mixing and dilution of agro-chemicals, while 42.95% are in average need. The implication is that training

of the Farmers by extension agents of how to mix and dilute agro-chemicals will reduce plant damage and wastage of agro-chemicals.

3.3.6 Farmers training on the selection of agro-chemicals

Table 3 further reveals that majority 48.72% of the Farmers are in high need of training on the selection of agro-chemicals while 46.80% are in average need.

3.3.7 Farmers training on application time/timing of agro-chemicals

Table 3, also shows that majority 58.97% of the Farmers are in high need of training on application time/timing of agro-chemicals application and 37.08% are in average need. The implication is that when farmers are trained on time/timing of application of agro-chemicals, increase on crop, production is bound.

3.3.8 Farmers training on safe use of agro-chemicals

Table 3 further reveals that majority 58.33% of the Farmers are in high need of training on safe use of agro-chemicals while 39.74% are on average need. In the study, most of the Farmers scored average to high training needs, this was probably due to poor exposure to a source of information, and this has had a negative impact on the safe use of agro-chemicals in the area.

3.4 Distribution of Farmers Based on Source of Information on Agro-chemical Use

3.4.1 Extension agents as source of information

Table 4 shows that most of the Farmers (33.33%) had extension agents as their source of information. This implies that, Farmers fully access information from extension agents though they were limited to cover the area.

3.4.2 Radio as source of information

Table 4 further revealed that 46.15% of the Farmers got their information through radio while 38.46% moderately used radios. This implies that radio information is fully utilized as a source of information on safe use of agro-chemicals among the Farmers.

3.4.3 Television as source of information

Table 4 shows that 66.67% of the Farmers have low use of television as a source of information on safe use of agro-chemicals. Television as a source of information was seldom used by the Farmers. This may be due to the erratic power supply, and most of the rural dwellers had no television in their houses not connected to electric power supply.

3.4.4 Friends/relatives as source of information

Table 4 further revealed that 73.08% got their information from friends and relatives through conversations. The implication of the findings is that the majority of the Farmers have more interactions with non-professionals (friends/relatives) than the extension agents who are supposed to be a reliable and better source of awareness on the safe use of agro-chemicals.

3.4.5 Co-operative society as source of information

Table 4 shows that majority (51.92%) have moderate use of co-operative as a source of information while 33.97% have high use of information on safe use of agro-chemicals. Fellow farmers in co-operative societies are becoming the major sources of information among most farmers in developing countries as most of the Farmers used information obtained from the fellow farmers. The result is in agreement with the findings of Anthult [16] who earlier has found that, there is a rise in farmers preferring other farmers as the first-hand information source on agricultural production.

3.4.6 Neighbours as source of Information

Table 4 also showed that majority (75.64%) got high use of information from neighbours. The implication of this result is that farmers may not get adequate technical information from neighbours on safe use of agro-chemicals, most of the information they may get are indigenous.

3.4.7 Newspapers as source of information

Table 4 further revealed that majority (65.39%) of the Farmers has low use of newspapers as their source of information on safe use of agro-chemicals.

The use of newspapers is common among urban dwellers, as rural farmers may not patronize

Table 3. Distribution of farmers based on training

Variables	Do not use		Average need		High need	
	Freq.	%	Freq.	%	Freq.	%
Do you need training in the safe use of agro-chemicals	0	0	0	0	0	0
Handling of agro-chemicals	6	3.85	61	39.10	89	57.05
Application of agro-chemicals	3	1.92	65	41.67	88	56.41
Storage of agro-chemicals	15	9.62	78	50.00	63	40.39
Disposal of agro-chemical Containers	15	9.62	74	47.44	67	42.95
Mixing/dilution of agro-chemicals	3	1.92	67	42.95	86	55.13
Selection of agro-chemicals	7	4.49	73	46.80	76	48.72
Application time/timing of agro-chemicals	6	3.85	58	37.08	92	58.97
Safe use of agro-chemicals	3	1.92	62	39.74	91	58.32
Others (Specify)	0	0	0	0	0	0

Source: Field survey, 2016

information from newspapers due to its cost, accessibility and low literacy level. The implication of this is that, most of the relevant information on safe use of agro-chemicals found in newspapers may not reach rural farmers.

3.4.8 Instructional labels on container s as source of information

Table 4 also reveals that 39.74% highly use instructional labels on containers as a source of information on safe use of agro-chemicals. This implies that the high use of the instructional labels on the container may be as a result of educational attainment of the Farmers in the study area.

3.5 Constraints Encountered in Safe Use of Agro-chemicals

3.5.1 Farmers don't know how to use agro-chemicals

Table 5 shows that majority (44.87%) of the Farmers have a very severe case of how to use agro-chemicals while 42.95% have a severe problem of how to use agro-chemicals. This implies that farmers had no adequate training from extension agents on how to use agro-chemicals.

3.5.2 Identifying reputable dealers by the farmers

Table 5 revealed that 46.15% had a severe problem of identifying reputable source while 39.10% had the very severe problem of identifying reputable dealers of agro-chemicals. This implies that Farmer's lack of knowledge of identifying reputable dealers on safe use of agro-chemicals which could have negative effects on human and environment.

3.5.3 Farmers protective clothes and rubber, gloves/boots are heavy to wear

Table 5 shows that majority of the Farmers (45.51%) have severe problems of wearing protective clothes and 32.69% of the Farmers have very severe cases of wearing protective clothes and rubber gloves/boots as they are too heavy to wear.

3.5.3 The character on instruction labels too small to read

Table 5 also reveals that 46.80% have severe problems of character on instructional labels too small to read while 37.82% have very severe problems of character on the instructional label too small to read. This implies that considerable awareness campaign by extension agents and policy makers in the extension system is needed to promote the practice of some safety measures in agro-chemicals use.

3.5.4 Farmers do not take safety measures serious

Table 5 reveals that majority (46.15%) of the Farmers has the very severe problem of not taken safety measures serious. This implies that the health condition of the Farmers is under serious risk of health hazards. This is in agreement with Akobundu [17] that a farmer runs a greater risk of pesticide exposure to the body when using Knapsacks sprayers than their counterparts in developing countries using motorized sprayers.

Table 4. Distribution of farmers based on source of information on agro-chemical use

Variables	Low use		Moderate use		High use	
	Freq.	%	Freq.	%	Freq.	%
Extension agents	26	16.67	78	50.00	52	33.33
Radio	24	15.39	60	38.46	72	46.15
Television	104	66.67	36	23.08	16	10.26
Friends/relatives	6	3.90	36	23.08	114	73.08
Cooperative societies	22	14.10	81	51.92	53	33.97
Neighbours	7	4.49	31	19.87	118	75.64
Newspapers	102	65.39	45	28.85	9	5.77
Instructional labels on containers	16	10.26	78	50.00	62	39.74

Source: Field survey, 2016.

Table 5. Distribution of farmers based on constraints encountered on safe use of agro-chemicals

Variables	Not severe		Severe		Very severe	
	Freq.	%	Freq.	%	Freq.	%
Farmer doesn't know how to use agro-chemicals	19	12.18	67	42.95	70	44.87
Identifying reputable dealers	23	14.74	72	46.15	61	39.10
Protective cloths and rubber gloves/boots are heavy to wear	34	21.80	71	45.51	51	32.69
The character on Instruction Labels too small to read	24	15.39	73	46.80	59	37.82
Did not take safety measures very serious	25	16.67	59	37.82	72	46.15
Extension Agents are not knowledgeable about how to use agro-chemicals	67	43.00	60	38.46	29	18.59

Source: Field survey, 2016.

3.5.5 Extension agents are not knowledgeable about how to use agro-chemicals

Table 5 further reveals that majority (43.00%) of the Farmers constraints on extension agents are not knowledgeable about how to use agro-chemicals is not sever while 38.46% of extension agents are not knowledgeable about how to use agro-chemicals is severe. This implies that knowledgeable extension agents could train Farmers on safe use of agro-chemicals in the study area.

3.6 Logistic Analysis of Factors that influence the Training Needs on Safe Use of Agrochemicals

Table 6 showed that the age of respondents is positively related to the training needs on the safe use of agrochemicals. The regression coefficient of Age (0.0495) was positive and statistically significant at 1% level. This implies that age is one of factor that influences the training needs on safe use of agrochemicals. This result is in line with appriori expectation which indicates that young people may acquired the skills in using the agrochemicals faster than older one. The result in the table further shows that, Sex 0.8661, marital status 0.6279, household size 0.0153, Educational level 0.0267, farmily size 0.0183, source of land 0.0204 and farming experience 0.0121 and source of farm land 0.4253 had positive regression coefficients and were statistically significant at 1% level. These results implies that household size (x_4), educational level (x_5), farm size (x_6), source of fund (x_7) and farming experience (x_8) are the major determinants on the training needs on safe use of agro chemicals in the study area.

Furthermore, this result conformed to the findings of Salau et al.; (2010) who reported in their study of assessing adoption level of diffused light storage technology among irish potato farmers in Jos South Local Government Area of Plateau State. The logistic regression result showed that farmer's age, education, income and farm size are significant determinants of adoption. Similarly, Isibor and Ugwumba (2014) applied logistic regression model in their study on adoption of oil palm production technologies in Ihiala Local Government of Anambra State, Nigeria. The found out that farm size, educational level and annual farm income were positively significant.

Table 6. Logistic regression estimates for factors that influence training needs on safe use of agro-chemicals

Variables	Logit regression coefficient
Constant (c)	-0.4902
X_1 (Age)	0.0495*
X_2 (Sex)	0.8661
X_3 (Marital Status)	0.6279
X_4 (Household Size)	0.0153*
X_5 (Educational Level)	0.0267*
X_6 (Family Size)	0.0183*
X_7 (Source of Land)	0.0204*
X_8 (Farming Experience)	0.0121*
X_9 (Source of Farm Land)	0.4253

Source: Field survey, 2016.
[xx]Significant at the 5% level

4. CONCLUSION

This survey has revealed that the farmers are still deficient in the knowledge of proper use of agro-chemicals. Most of the Farmers were in need of training ranging from average to high need in the eight (8) areas of training needs of this study. This gap calls for training of farmers on agro-chemical usage under the collaborative efforts of the Taraba Agricultural Development Programme (TADP), Non-Governmental Organizations (NGOs) and stakeholders in extension system to enable farmers gain the full benefits of the use of agro-chemicals which include among others; effective weed control, reduced cost of production, increased yield and profit. The study shows that majority of the Farmers practicing use of agro-chemicals were in their active and productive age and had reasonable farming experience in the study area. The finding of the study also reveals that farmers practicing agro-chemical use had small household size, attend one form of education or the other. The study also re-affirmed the claim that socio-economic factors such as age, farm size and gender influence the intensity of use of agro-chemicals by farmers in the study area. However, lack of Extension agents to guide farmers, poor knowledge on how to use agro-chemicals, inability to read and lack of training on safe use of agro-chemicals were some of the problems encountered by some of the farmers in the study area.

5. RECOMMENDATIONS

i. Extension Agents in the State should be properly trained and provided with all the necessary technological packages required to teach and guide farmers on the safe use of agro-chemicals. The government should employ more extension agents to meet up the demand.

ii. Farmers should be encouraged to actively participate in the adult education extension program to acquire knowledge on how to read and write.

iii. Extension awareness campaign should be carried out on the safety measures of agro-chemicals and for farmers to take the safety measure very serious.

iv. List of reputable agro-chemical dealers in the state should be compiled by extension agents and made known to the farmers for patronage.

v. Lighter protective clothing and rubber boots should be designed by manufacturers for farmers' convenience while the character of instruction labels on the containers of agro-chemicals should be boldly written for ease of reading.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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