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AWARENESS AND CONSTRAINTS TO AGROCHEMICALS SOURCING AND ADOPTION AMONG RUBBER FARMERS IN EDO STATE

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ABSTRACT

Farmers' productivity has been recognized as a long-term path to food security in Africa. As a result, making pest management easier would enable farmers to increase the size and output of their farms. This study sought to ascertain the level of awareness and the constraints associated with agrochemicals sourcing and adoption among rubber farmers in Edo State, Nigeria. A 3-stage sampling procedure was used to select respondents. The primary data used in this study were obtained from field surveyed through the use of structured questionnaire administered to 180 respondents. Data were analyzed using frequency counts, percentages, means and standard deviation and logit regression and t-test. Results showed that Thirty- Nine (39) constraints to agrochemical users' adoption were identified by respondents. Poor extension services (mean=2.28), Inadequate government intervention (mean=2.16), inability to afford protective wears (mean=2.05) and Inadequate fund (mean =2.69). There was a significant difference in constraints to adoption among agrochemical users in rubber farms in the Edo State. Result showed that education status (wald = 3.66), farm size (wald = 4.17), farming experience (wald = 2.85) and estimated annual income (wald 5.16) were the significant determinants of access to information on rubber production as indicated by the respondents at 1 % level of significance. The study recommends that agrochemical dealers should provide accurate information on agrochemicals in order to educate farmers about the benefits of proper pesticide usage in crop production in Edo State. The government and other financial institutions should further give low-interest financing to crop farmers, which might be in the form of grants or microfinance bank loans.

KEYWORDS: *Constraints, Awareness, Rubber, Edo State, Agro-chemicals*

INTRODUCTION

Africa is one of the continents that uses the least number of agrochemicals (agrochemicals is a term used in this paper to refer to synthetic chemicals such as pesticides and fertilizers) in agriculture. This is due to a variety of causes, including the subsistence nature of farming, in which most farmers grow crops primarily for their own consumption and only sell the surplus, the inability to purchase agrochemicals

owing to a lack of financial resources, low return on investments, and so on (Tambo *et al.,* 2020). Africa is responsible for less than 5% of the world pesticide market and only 2% to 4% of pesticide consumption (Nnamani and Onekutu, 2015.). Agrochemicals provided to African countries by philanthro-capitalist organizations supporting the green revolution are not included in this statistic. Despite the reduced use of agrochemicals, farmers in Africa have a high rate of dangerous chemical use (Williamson, *et al.,* 2008). Agrochemicals are crucial for many reasons. Agrochemicals are cost-effective because they boost crop output and quality while lowering other costs such as labor and gasoline (Damalas, 2009). Furthermore, throughout the last few decades, various pesticides have been utilized to protect crops from pest damage and thereby boost agricultural productivity (Delcour *et al.*, 2015). Crop growth is limited by a variety of biotic (weed, insect, and pest infestation) and abiotic stresses (lower soil fertility), which are addressed by the use of fertilizers and pesticides (Lamichhane *et al.*, 2016). During the previous 40 years, the use of these agrochemicals has resulted in better soil fertility and insect/pest management, as well as increased crop yield (Abdul, 2018). Agricultural intensification has occurred in recent decades as a result of rising food demand caused by fast population increase. Despite their importance to agricultural output, evidence has emerged in recent years that agrochemicals can be harmful to human health and the environment when overused (Tadesse and Asferachew, 2018) Farmers are well aware that they are misusing agrochemicals to protect their crops from pests, illnesses, and weeds Issa *et al.* (2015). This might be because many crop farmers are under-informed on the possible short- and long-term hazards, as well as the safeguards that must be taken when using harmful pesticides correctly.

Rubber (*Hevea brasiliensis*) is one of the agricultural products (cash crop) that Nigeria, West Africa has been known for. The major rubber producing states in Nigeria comes from the southern part of the country, where high rainfall is experienced, although it is also been grown in Abia, Anambra, Akwa Ibom, Rivers, Ebonyi and Bayelsa, it is commercially been grown in Ondo, Edo, Ogun, Delta (Sapele) and Cross River state. The cultivation of rubber provided bulk employment for the people of the then Mid-West now known as the Edo and Delta states. However, rubber is not native to Nigeria (Ogbebor, 2013). The primary and major product of rubber-latex (the milky juice obtained from the rubber tree) is very useful as it contains about 25 to 45 percent rubber by weight and can be processed into secondary products such as crepe rubber, crumb rubber and sheet rubber for onward processing into finished goods. Apart from latex, the rubber tree produces seeds and wood which are also of economic value to the grower.

Herbicide helps to alleviate the hardship that comes with persistent weeds and labour shortages. Herbicide usage has resulted in a geometrical growth in world agricultural productivity during the previous 100 years, as additional area has been put

under cultivation (Olowogbon *et al.*, 2013). Despite all of the benefits of agrochemicals, there are certain disadvantages to their use. Carbamates and organophosphates, which are classified as WHO class I pesticides, endosulfan, which is scheduled to be phased out worldwide under the Stockholm Convention, and paraquat are among the pesticides that have been linked to confirmed incidents of poisoning. In underdeveloped nations, pesticides are frequently readily accessible on the market or smuggled in for usage or sale (Secretariat of the Rotterdam Convention, 2010). According to Vaagt (2005) and Akinyosoye (2005), the illegal sale of pesticides is a major global issue. As many as 30% of pesticides in developing countries fail to fulfil internationally accepted safety criteria Vaagt (2005). The most striking significance of this study is that, an x-ray of literature on the constraints associated with the use of agro-chemicals in Edo state indicated that very few has evaluated how recommended agrochemical practices were adopted by rubber farmers. Essentially, the data generated through this study would serve as a basis for understanding how recommended agrochemical practices are being adopted in the country. This study here will provide answers to the questions that borders on awareness and constraints to Agrochemicals sourcing and adoption among rubber farmers in Edo State. The study was aimed at identifying constraints faced by the respondents in sourcing and adopting agrochemical information.

Hypotheses

Ho: There is no significant relationship between the socio-economic characteristics of rubber farmers and access to various sources of information.

METHODOLOGY

Study Area

The study was carried out in Edo state. The state was created 27th August 1991 with latitude 6° 30°N 6° 00°E and longitude 6.500°N 6.00°E. Benin is the capital city of Edo state with the total area of 17,802km (6873 sq mi) and estimated population of 3,218,332 according to 2006 population census figure. (NPC, 2018).

Sample Collection

A multi-stage sampling procedure was used to sample farmers in the study areas as follows: A simple random sampling was used as the state is divided into three senatorial zones (Edo South, Edo North and Edo Central). Edo South consists of seven (7) local government areas, Edo North consists of six (6) local government areas and Edo Central consists of five (5) local government areas.

In Edo North, three (3) local government were selected based on the availability of rubber farmers in the local government areas namely; Owan East L.G.A, Owan West and Akoko-*Edo L.G.A. Twenty (20) rubber farmers* was sampled.

In Edo South, three (3) local government areas were selected based on the availability of rubber farmers in the local government areas namely; Ovia South-West L.G.A, Uhunmwode L.G.A and Orhionmwon L.G.A. Twenty (20) rubber farmers was

sampled. In Edo Central, three (3) local government areas were selected based on the availability of rubber farmers in the local government areas namely; Esan North-East L.G.A, Esan Central L.G.A and Esan West. Twenty (20) rubber farmers were sampled to give a total sample size of one hundred and eighty respondents (180).

Data Analysis

Data were collected with the use of structured questionnaire and analyzed using frequency counts, percentage, mean, logit regression and t-test

RESULTS AND DISCUSSION

Constraints Respondents Face in Sourcing and Adopting Agrochemical Information

Among the constraints faced in information sourcing and adoption by the rubber farmers are inadequate personnel (=2.15), inability to understand instructions labels (=2.69), inadequate first aid facilities (=2.55), inadequate skills to decontaminate after use from the body and environment (= 2.55), not comfortable with wearing of protective gears (=2.59). Others are afraid of health implications (=2.54), cannot afford the money required to buy the protective wears (=2.69), lack of confidence (= 2.17) on the labels among others. The findings show that numerous challenges are faced by the rubber farmers in information sourcing and adoption in the study area. This agrees with Nwakile *et al.* (2020); they revealed that the constraints to the effective utilization of agrochemicals in crop production include; high cost of pesticides, high cost of procuring agrochemical spraying equipment, complexity of user's manual, misguiding information from agrochemical dealers, health hazards associated with misuse, irritation from agrochemical spills, unpleasant odour of most agrochemicals, complexity of application equipment, misconception on the efficacy of agrochemicals, buying of expired agrochemicals and unavailability of instruments for measuring the quantity of agrochemical used in crop production.

Table 1: Constraints respondents face in sourcing and adopting agrochemical information

Variables	Mean	Std. Dev
Inadequate personal protective equipments and clothing of approved type	2.15*	0.11
Inability to understand instruction labels on containers of agrochemicals	2.72*	0.32
Inadequate first aid facilities and health talk	2.55*	0.44
Inadequate skills to decontaminate after use of agrochemicals from your body, work place and protective clothing	2.69*	0.23
Inadequate access to information on safe use of agrochemicals	2.56*	0.15
Not comfortable with wearing protective wears	2.59*	0.32
Do not know the side effects of not using the recommended pesticide use practice	2.57*	0.12
Do not understand weather conditions (air, wind, temperature and humidity) favourable for spraying	1.87	0.23
Do not understand the operation and servicing of spraying equipments	1.66	0.41
Afraid of health implications for the use of agrochemicals	2.54*	0.21
Cannot afford money for protective wears	2.69*	0.32
No enough time to read or follow instructions on labels	1.58	0.51
Already use to a method/ practice I believe	1.55	0.31
I can apply residual knowledge	1.17	0.43
Information from fellow farmers is enough	1.61	0.15
Use over dose to check chronic infection	1.51	0.45
Lack of confidence on label instructions	2.17*	0.31
Inadequate knowledge of the health implications	1.77	0.32
Inadequate access of measuring equipments e.g jugs, funnels and stirrers	2.66*	0.13
Inadequate government intervention	2.82*	0.21
Poor extension services	2.54*	0.19
Lack of safety measures	2.55*	0.34
Management and maintenance of equipments	2.53*	0.24
Custom	1.19	0.35
Religion	1.21	0.15

Mean > 2.0 = Serious

Constraints to Sourcing Information on Agrochemicals

Specifically, results in Table 2 show the constraints to sourcing information on agrochemicals. Evidence shows that inadequate funds, poor government policies, feedback problem, inadequate facilities and professionals that could assist in disseminating information to the grass-root, and inadequate knowledge were the serious constraints to rubber farmers sourcing information on agrochemicals in rubber plantation. These findings were in agreement with the findings of Jamala *et al.* (2013) that the major constraints to adoption of

agrochemicals are inadequate fund and low competency of farmers in the use of agrochemicals the equipment on their farm.

Table 2: Constraints to sourcing information on agrochemicals

Constraints	Mean	Std. Dev
Inadequate fund	2.69	0.18
Non-participatory methods used	1.78	0.32
Inconsistency	1.35	0.44
Improper awareness	2.78	0.56
Distance/ inaccessibility	1.67	0.15
Poor government management and policies	2.55	0.56
Feedback problem	2.71	0.43
Incomplete/ irrelevant information	1.11	0.56
Complexity of message	1.51	0.11
Language barriers and understanding	1.73	0.52
Inadequate facilities and professionals	2.53	0.16
Inadequate knowledge	2.66	0.67
Cultural differences	1.42	0.56
Cultural environment	1.56	0.56

Mean > 2.0 = Serious

Hypothesis testing

Ho: Relationship between the Socio-economic Characteristics of Rubber Farmers and Access to Various Sources of Information

Results in Table 3 show that education status (wald = 3.66), farm size (wald = 4.17), farming experience (wald = 2.85) and estimated annual income (wald 5.16) were the significant determinants of access to information on rubber production as indicated by the respondents. This means that accessibility to information is based on these identified significant variables. The odd ratio of 1.95 for education status means that being educated increases the odd of access to information sources by approximately 2 times while having a large household size will increase the odd of accessing information by almost 4 times. Also, having a high farming experience will increase the odd of accessing information on agrochemicals by 5 times while high estimated annual income will increase the odd of accessing information by almost 9 times. The implication of this finding is that farmers with higher income would be ready to task risk and they are therefore regarded as innovators according to (Olarinde *et al.,* 2020). The loglikehood of 118.481 shows the fitness of the model and the R-squared value of 0.4612 shows that 46.12 percentage variation of the response variable could be determined by the explanatory variables.

Table 3: Relationship between the socio-economic characteristics of rubber farmers and access to various sources of information

Variables	Coeff	Wald	Odd Ratio
Sex	0.91	3.64*	2.48
Age in years	0.76	1.43	2.14
Marital status	1.51	0.59	4.53
Educational qualification	0.67	3.66*	1.95
Average farm size (hectare)	0.32	4.17**	1.38
Rubber palm farming experience	1.77	2.85*	5.87
Household size	1.43	2.59*	4.18
Membership of organization	1.11	1.51	3.03
Contact with any extension agents	1.56	0.53	4.76
Estimated annual income (₦)	2.18	5.16**	8.85

2-loglikehood = 118.481; R squared = 0.4612
*significant at 0.05 level
**significant at 0.01 level

CONCLUSION

This study has demonstrated that the rubber farmers in the faced different levels of constraints to adopting agrochemical utilization was hindered by management and maintenance of equipment, lack of safety measure, Inadequate access of measuring equipment e.g. jugs, funnels and stirrers, Lack of confidence on label instructions, Afraid of health implications for the use of agrochemicals, Inadequate first aid facilities and health talk, Inadequate personal protective equipment and clothing of approved type, Do not understand weather conditions (air, wind, temperature and humidity) favourable for spraying, Not comfortable with wearing protective wears, Inadequate access to information on safe use of agrochemicals. To mitigate these hindering factors, enhancing measures have to be utilized and these factors include; access to credit at low interest rate, use of mass media in disseminating agrochemical related information, organization of workshops and seminars to educate farmers on the use of agrochemicals, farmers belonging to cooperatives to them get right information on the use of agrochemicals, among others. Adhering to these measures will assist farmers in attaining the intended benefits of agrochemicals in Edo State.

RECOMMENDATIONS

Using the media and farm visits, extension agents should provide information to crop farmers about the various types of agrochemicals available for crop production.

1. Agrochemical dealers should provide accurate information on agrochemicals in order to educate farmers about the benefits of proper pesticide usage in crop production.
2. The government and other financial institutions should give low-interest financing to crop farmers, which might be in the form of grants or microfinance bank loans.
3. By inspecting imported agrochemicals on a regular basis, the government can ensure that

agrochemical sellers are selling only original, non-expired products.

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