

Analysis of Agricultural Development Programme (ADP) Promoted Agrochemical use Among Women Farmers In Abia State

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Abstract: This study analyzed ADP-promoted agrochemicals applications among women farmers in Abia State through the examination of socio-economic characteristics of the respondents, their awareness of ADP-promoted agrochemicals and the extent of application of these chemicals. A multistage sampling procedure was used in selecting 180 women farmers for the study. Data for the study were collected using a structured questionnaire and analyzed using frequencies and mean scores and the hypothesis was tested using simple linear regression. From the result, the average age of the respondents was 50 years, 36% had secondary education and their mean annual income was N100,455.60. Furthermore, 70% of the respondents were aware of the chemicals for the control of insect pests, 71% were aware of the chemicals for weed control when crops have emerged, 53.4% were aware of chemicals for the control of weeds before planting while 68.9% were aware of the right fertilizer to use for their crop. The result also shows a low extent of utilization of the agrochemicals (x 1.94). Marital status, tenure system, farm size, level of education and extent of utilization of agrochemicals showed a significant relationship at a 5% level of probability. The study concluded that while awareness of the agrochemicals was high, the level of utilization was low. The study therefore recommends that extension agents should provide advisory services to women farmers on where to obtain the needed agrochemicals that are affordable. Also, ADP, The state government and other stakeholders should provide subsidized inputs to women farmers.

especially in the COVID-19 era to boost food security and enhance healthy living.

Keywords: Agrochemicals, ADP and COVID-19 era

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1.0 Introduction

Agrochemicals are used worldwide to improve or protect crops and livestock. Fertilizers are applied to obtain good yields from crops that are protected from insects and disease by the

timely use of pesticides. Henry (2003) stated that crop losses due to pests' invasion and soil infertility are serious threats in both developed and developing countries. Agrochemicals (pesticides, herbicides and fertilizers) are frequently used to combat the issues of pest and disease attacks as well as poor crop yields. Women play major, but largely unrecognized roles in agriculture, in most countries of the world. The World Bank (2013) reported that women make up to 60-80% of the agricultural labour force in Nigeria, depending on the region, and that they produce two-thirds of the food crops. Hence, the roles that women play and their positions in meeting the challenges of agricultural production and development are quite dominant and prominent. Modern agriculture requires appropriate technologies, such as high-yielding varieties, application of appropriate fertilizers and management practices to increase farm productivity and food supply. The use of these agrochemicals would play significant roles in farming activities and output of women farmers, especially in the Covid-19 era due to the increased costs of the distribution and supply of agricultural inputs. Mohammed (2012) stated that agrochemical use among farmers has not been significant, as to increase agricultural output, the problem is more compounded in the case of women because of the gender bias issues in agricultural policy-making and implementations. Similarly, empirical studies have shown that financial and resource constraints as well as socioeconomic characteristics such as lower levels of education, income, farm size and access to extension services can prevent women from adopting improved farm practices (Tall *et al.*, 2014; Twyman *et al.*, 2014). Concerning improved technology, poor farmers in sub-Saharan Africa, especially women, lack access to or cannot purchase farm technologies (Carr and Hartl, 2010; Perez *et al.*, 2015) and are less likely to receive information on and adopt improved agricultural technologies such as

agrochemicals in comparison to men (Tall *et al.*, 2014).

However, it is apparently not clear if this is the real situation among women farmers in Abia State, hence the study.

The success of ADP has been reviewed in several research quarters and the program has certainly achieved some goals in food production (especially in rural areas) through the application of some agrochemicals (Obiadi *et al.*, 2020). However, the handling of agrochemicals requires some technical expatriates, which are hardly available to rural women. In Abia state, some studies have been reported on the use of agrochemicals by female farmers in different locations within Nigeria. For example, Kalu (2021) adopted a structured questionnaire to generate data that were analysed through descriptive and inferential statistics. They observed that accessibility to agrochemicals is accepted by women but the application is a challenge and calls for more education. The implication is that periodic surveys, orientation and reports are necessary for the success of involving women in the application of agrochemicals. Therefore, in continuation of such exercise, the present study is conducted to assess the level of progress in this regard and to evaluate factors that can encourage or discourage women in the applications of agrochemicals.

The specific objectives of the study were to: describe the socio-economic characteristics of the farmers; ascertain farmers' awareness of agrochemicals and ascertain the extent of use of agrochemicals by farmers. The study hypothesized that there is no significant relationship between selected socioeconomic characteristics of women farmers and their extent of use of agrochemicals.

2.0 Materials and Methods

The study was carried out in Abia State, Nigeria which lies between latitudes 4°45' and 6°00' North and longitudes 7°00' and 8°09' East. The State is located east of Imo State and shares boundaries with Anambra, Enugu and



Ebonyi States to the North-West, North-East respectively. To the East and South-East, it is bounded by Cross River and Akwa Ibom States and by Rivers State to the South. The area is characterized by bimodal rainfall of 2,175mm and a relative humidity of 72% (Kalu 2021). It occupies a landmass of 5,833.77square kilometers. Abia State comprises of Seventeen (17) Local Government Areas and is divided into three agricultural zones namely Aba, Ohafia and Umuahia. The creation of Abia state in 1991 with Umuahia as her capital made it fast growing in social, political and economic activities due to its rich soil.

The major occupation of the rural people is farming. The major crops cultivated include rice, cassava, yam, cocoyam, maize, melon, etc. Tree crops grown include rubber, cocoa, oil palm, cashew, and raffia. Livestock such as goats, poultry, sheep, etc., are also reared. The population of this study will constitute all women crop farmers in the state.

A multistage sampling procedure was used to draw the sample for the study. In the first stage, the three agricultural zones were purposively selected, in the second stage, two (2) blocks were selected from each of the three agricultural zones, giving rise to six (6) blocks. In the third stage, three cells were selected from each block making it a total of eighteen (18) cells. In the fourth stage, ten (10) women farmers were selected from each cell, this gave rise to 180 respondents which constituted the sample size of the study. Data collected through structured questionnaires were analyzed with descriptive statistics, such as mean, while simple linear regression was used to test the hypothesis.

2.1 Awareness and extent of applications of agrochemicals

This awareness of agrochemicals was measured using frequency and percentages. Also, the extent of applications of agrochemicals was measured on a 3 point

rating scale of Never use = 1, rarely use = 2, always use = 3.

Ho1: There is no significant relationship between respondents' age, marital status, tenure system, farm size, level of education, farming experience, membership of social organization and their extent of use of agrochemicals. This was tested using simple linear regression analysis. The model is given by equation 1

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + e_i \quad (1)$$

where Y is the extent of the agrochemical, X1, X2, X3, X4, X5 and X7 are the age, marital status, tenure system, farm size, level of education (in years) and farming of education (in years) while X7 is the membership of social organization (in years).

e_i = error term

3.0 Results and Discussion

2.1 Socioeconomic Characteristics of the Women Farmers

The result in Table 1 showed that the average age of the respondents was 50 years while the modal class of 46 – 55 years had 38.9% of the farmers. The majority of women farmers in Abia State were between 36 –and 55. The use of agrochemicals requires a level of skill that only younger farmers can handle, although there may be a need to engage paid labour by older farmers. However, some studies (Matanmi *et al*, 2015, Ekwe and Osuagwu, 2016) have observed that consequences of age, the use of agrochemicals among farmers. As revealed in Table 4.1, most of the women farmers (96.7%) were married. The large proportion of married women in the area is not unconnected to the belief in the area that marriage is essential in facilitating agricultural production. The result showed that a larger proportion of the respondents had Secondary School education (36.1%) while the least proportion were those who had HND/B.Sc certificates. The highest level of educated respondents shows that there are opportunities



for formal education. Distribution of respondents based on their socio-economic characteristics.

Table 1: the socio-economic characteristics of the respondents

VARIABLES	ABA (N = 60)	UMUAHIA (N = 60)	OHAFA (N = 60)	ABIA STATE (N = 180)
	%	%	%	%
AGE (YEARS)				
≤35	10.0	1.7	16.7	9.4
36-45	23.3	16.7	30.0	23.4
46-55	41.7	53.4	21.6	38.9
56-65	25.0	18.3	23.4	22.2
≥66	0	10.0	3.3	6.1
Mean	48.55	53.98	48.68	50.40
Marital Status				
Single	0	50	10.0	3.3
Married	100	50	90.0	96.7
Level of Education				
No formal education	3.3	20.0	21.7	15.0
Primary	31.7	25.0	13.3	22.2
Secondary	40.0	33.3	35.0	36.1
OND/NCE	13.3	10.0	15.0	13.9
HND/B.Sc	11.7	11.7	15.0	12.8
Annual Farm Income				
≤20,000	18.3	15.0	6.7	13.3
21,000-40,000	21.7	6.7	10.0	12.8
41,000-60,000	6.7	15.0	11.7	11.1
61,000 – 80,000	25	8.3	15.0	16.1
81,000 – 100,000	6.7	23.3	10.0	13.4
≥101,000	28.3	31.7	46.6	33.3
Mean	73,266.67	88,850.00	139,250	100,455.6
Extension Contact				
Never	41.7	26.7	81.7	55.3
Not regular	51.7	58.3	18.3	38.6
Regularly	6.7	15.0	0.0	6.0
Cooperative Membership				
Yes	58.3	48.3	45.0	44.7
No	41.7	51.7	55.0	55.3
Tenure System				
Rent/Lease	40.0	51.7	43.3	45.0
Communal	15.0	11.7	30.0	18.9
Inheritance	15.0	5.0	20.0	22.2



Outright Purchase	30.0	31.6	6.7	13.9
Farm Size (plots)				
≤ 3	20.0	0	26.7	15.6
4 – 6	66.7	23.3	30	40
≥7	13.3	76.7	43.3	44.4
Mean	4.3	8.4	8.1	6.9
Household Size				
≤4	16.7	33.3	23.3	24.4
5 – 7	55	56.7	30.0	47.3
≥8	28.3	10.0	46.7	28.3
Mean	6.4	5.3	7.35	6.4
Farming Experience				
≤10	10.0	15.0	38.3	21.1
11 – 15	43.3	35	30	36.1
16 – 20	15.0	18.3	6.6	13.4
≥21	31.7	31.7	25.1	29.4
Mean	18.4	18.7	15.7	17.6
Types of Agricultural Activities				
Crop farming	56.7	78.3	66.7	65.6
Crop/Animal	18.3	6.7	10.0	10.6
Forest resources	3.3	10.0	6.7	3.3
Food Processing	21.7	6.7	15.0	13.3
Crop/Fish/Animal	3.3	5.0	23.3	9.4
Poultry farming	18.3	10.0	18.3	6.1
Crop/Fish only	6.7	3.3	23.3	10.6
Access to Credit				
Yes	3.3	13.3	36.7	15.3
No	96.7	86.7	63.3	84.7

Source: Field survey 2021

This result disagrees with Eifediyi *et al.* (2014) who in a study in Edo state observed that most agrochemical users are secondary school drop-outs. The mean annual income of the women farmers (in naira) was ₦100,455.60 and the majority (55.3%) of them never had contact with extension while 38.6% said they had

irregular visits by extension workers. Only 6.0% reported having regular extension contact. The level of extension activities in any area has direct implications for agricultural production in terms of taking up some innovations to boost agricultural production. Therefore, it was necessary to study the level of



extension contact to ascertain how extension has fared vis a vis the use of agrochemicals.

3.2 Awareness of the various agrochemicals by the respondents

The percentage awareness of the various agrochemicals by the respondents is presented in Table 2. The result revealed that the female farmers' awareness of the various components

of agrochemical use was high. Generally, 70% were aware of the chemicals for the control of insect pests, 71.1% were aware of the chemicals for the control of weeds, 53.4% were aware of chemicals for the control of weeds before planting, 67.6% were aware of the chemicals for the control of weeds after planting while 68.9% were aware of the right fertilizer to use for their crops

Table 2: Respondent awareness on the existence of some agrochemicals

Variable	Aba (N=60)		Jmuahia (N=60)		Ohafia (N=60)		Abia (N=180)	
	Aw	Una	Aw	Una	Aw	Una	Aw	Una
Chemicals for the control of insect pest	93.3	6.7	70.0	30.0	46.7	53.3	70.0	30.0
Chemicals for control of weeds	96.7	3.3	70.0	30.0	46.7	53.3	71.1	28.9
Chemicals to control weeds before planting	90.0	10.0	41.7	58.3	40.7	59.3	53.4	46.6
Chemicals to control weeds after planting	90.0	10.0	60.0	40.0	44.7	55.3	67.6	32.4
The right fertilizer for your crops e.g. yam,maize	100.0	0.0	60.0	40.0	46.7	53.3	68.9	31.1

Source: Field survey 2018; Aw =aware, Una = unaware Figures are in percentages (%)

3.3 The extent of use of ADP promoted agrochemicals among women farmers in Abia State

The results as presented in Table 3 indicate that the respondents had a low extent of utilization (x = 1.94) of the ADP-promoted agrochemicals in the State. The result showed that only NPK 20:10:10 (x = 2.89), Attack (x= 2.96), Termicide (x = 2.73) and Snipper (x = 2.8) were highly utilized by the respondents out of the twenty-nine (29) agrochemicals promoted by the ADP. This can be attributed to the traditional beliefs that agrochemicals are

poisonous to health and fertilized foods rot easily. This is quite worrisome because while the population is rising and creating the need for more food, many diseases, pests and other inhibitors of crop growth contribute to reducing crop production. The introduction of these agrochemicals is, therefore, an important farm innovation which when used by farmers can significantly improve crop production, especially in the Covid-19 era. There is a need for the Agricultural Development Programme (ADP) to encourage farmers on the use of agrochemicals by sensitizing them to the



inherent benefits associated with the use of improved practices in food production. This finding aligns with those of Issa *et al* (2015).

Table 3: Mean distribution of respondents based on extent of use of agrochemicals

Extent of use	Σx	x	Remark
Herbicides			
Fierce	351	1.95	Low
Sencor plus	394	2.19	Low
Merlin Total	288	1.60	Low
Move on	270	1.5	Low
Gardoprin plus Gold	286	1.59	Low
Fusilade	289	1.61	Low
Cobra	259	1.44	Low
Maister power	275	1.53	Low
Select max	286	1.59	Low
Round up	324	1.80	Low
Fertilizers			
NPK 20: 10:10	520	2.89	High
NPK 15: 15: 15	347	1.93	Low
12: 12: 17-2	340	1.89	Low
Single super phosphate	266	1.48	Low
Muritate of potash	225	1.25	Low
Urea – (Contain Nitrogen)	259	1.44	Low
Insecticide			
Phostoxin	367	2.04	Low
Wormforce	315	1.75	Low
Vetox 85	405	2.25	Low
Apronplus	274	1.52	Low
Fernasan D	310	1.72	Low
Furadan 3G, 5G, 10G	374	2.08	Low
Counter dust	313	1.74	Low
Decis	405	2.25	Low
Attack	412	2.96	High
DD Force	433	2.41	Low
Termiticide	491	2.73	High
Snipper	504	2.8	High
Profexsupe	428	2.38	Low
Grand Mean	1.94		Low

Source: Field survey, (2021), Decision: > 2.5 high extents ≤ 2.5 low extents.

3.4 Hypothesis

There is no significant relationship between respondents' age, marital status, tenure system, farm size, level of education, farming experience, membership in social

organizations and their extent of use of agrochemicals.

The result as presented in Table 4.10 showed marital status, Tenure system, Farm size and Level of education were all significant at 10%,



5%, 1%, and 5% respectively. The intercept was also significant at 1% with a chi-square of 392.36 significant at 1% which shows the fitness of the model at $P < 0.05$. However, all the other variables had a positive relationship with the use of agrochemicals apart from farm size, implying that an increase in the farm size or plots available for cultivation will result in a decrease in the use of agrochemicals among the farmers. This implies that age, marital status, tenure system, level of education, farming experience and membership in social organization were the major socio-economic determinants of agrochemical use among women farmers in the study area.

We reject the null hypothesis and accept the alternate that there is a significant relationship between the selected socioeconomic characteristics such as marital status, tenure system, farm size and level of education with the level of use of agrochemicals among the

women farmers in Abia State. Other studies are in agreement with these findings. For example, while Ekwe and Osuagwu (2016) observed that age, marital status, education level, farming experience farm size and annual income are major determinants of the perception of farmers of the use of agrochemicals in Abia State, Matanmiet *al* (2015) identified farmer’s age, gender, marital status, farming experience and size of farmland had an effect on agrochemicals usage in Oyo State. This result has serious implications for the government, extension agencies and other stakeholders in the agricultural sector who need to take into consideration the peculiar socio-economic characteristics of women farmers in the design and implementation of extension programmes as well as the delivery of extension recommendations such as agrochemicals to farmers.

Table 4: Estimate of the relationship between selected socioeconomic characteristics of the respondents and the use of agrochemicals

Parameter	Estimate	Std. Error	Z
Intercept	-2.188	.199	-10.981***
Age	.000	.003	.036
Marital status	.156	.145	1.076*
Tenure system	.039	.022	1.723**
Farm size	-.023	.007	-3.094***
Level of Education	.012	.018	.679**
Farming experience	.000	.003	-.168
Membership of Social Organization	.037	.052	.706

4.0 Conclusion

The study concluded that age, marital status, tenure system, level of education, farming experience and membership in social organizations were the major socio-economic determinants of agrochemical use among women farmers in the study area. The study therefore recommends that extension agents

should take up the role of providing advisory services to farmers on where to obtain the needed agrochemicals, especially at cheap and affordable prices. Secondly, the ADP should encourage resource-poor farmers to adopt the use of agrochemicals through sensitization of the benefits of adopting the technologies to efficiently increase their production, especially



in the Covid-19 era. The Abia State ADP, state government and other stakeholders should also be actively involved in providing subsidized inputs to women farmers, especially in the Covid-19 era due to the increased costs of the distribution and supply of agricultural inputs.

One of the major limitations of this study is the lack of assessment of the environmental impact of agrochemicals concerning rural women. Consequently, it is recommended that future studies should be expanded to assess rural women on the environmental consequences of agrochemicals and how they can be protected against harmful impacts.

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Compliance with Ethical Standards Declarations

The authors declare that they have no conflict of interest.

Data availability

All data used in this study will be readily available to the public.

Consent for publication

Not Applicable



Availability of data and materials

The publisher has the right to make the data Public.

Competing interests

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All the authors partake in all aspects of the work.

