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Analysis of agrochemical Usage among cocoa farmers in the innovation platform of the Humidtropics programme in Southwestern Nigeria

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Abstract

This paper documents the analysis of agrochemical use among cocoa farmers in the innovation platform of the humid tropics programme. Specifically, explores the socioeconomic characteristics of respondents by gender, examines the perception of farmers towards agrochemical by gender, examine the rate of agrochemicals, type of agrochemical use and impact of agrochemicals by gender, and determines the factors influencing agrochemicals use in cocoa production. A multistage sampling procedure was used to obtain data from 200 respondents, consisting of 159 male farmers and 41 female farmers. Data were collected with the use of a survey questionnaire which contained questions relating to the socioeconomic characteristics of respondents by gender, agrochemical use, perception, cost of input and constraints to agrochemical use. Data were analysed with the use of descriptive statistics and probit regression model. Results revealed that majority of the farmers in the action site were married with average age of Akindele 59.4(±13.22), Lagebu 52.44(±11.97), Osunwoyin 58.06(±15.88), Iwara 47.47(±15.71) and farming experience of Akindele 25.4(±13.95), Lagebu 27.42(±13.4), Osunwoyin 33.28(±17.82) and Iwara 25.3(±12.6). Their average household size was Akindele 7.84(±5.42), Lagebu 7.56(±3.10), Osunwoyin 8.06(±3.84), Iwara 6.61(±3.3) and they were mainly of primary school level. Majority of the respondents agreed that usage of agrochemicals are time saving, labour saving and cheaper. Therefore, majority of the respondents use agrochemicals. However, some of the farmers discontinued the use of agrochemicals without replacement because of financial constraint and cost of herbicides. Education, source of information, cost of agrochemicals, and household size are significant factors that influenced agrochemical use. These factors need to be taken into consideration in any policy aimed at promoting the use of agrochemicals in the Nigeria action site. In accordance with the findings, it was recommended that intensive enlightenment programmes on the use of agrochemicals and its advantage by efficient extension services should be encouraged as well as providing input support services in the form of credit to help the farmers to take advantage of the programme.

Keywords: Agrochemical, Cocoa farmers, Innovation platform, Humidtropic programme

Introduction

Cocoa (*Theobroma cacao*) is one of the prominent cash crops cultivated in Nigeria. Before the discovery of crude oil, cocoa played an important role in the economic development in Nigeria. Cocoa still continues in this role till date. It provides employment opportunities for Nigerians, source of income to the farmers, constitutes raw materials to most industries, source of revenue to cocoa producing states as well as foreign exchange to the government (CRIN, 2000, Alamu, 2013). However, Nigeria's cocoa production

has been experiencing declining growth after 1971 season up till today thereby relegating its position to 4th among the world cocoa producers (Folayan et al., 2006). Reasons identified for the declining production includes ageing of cocoa trees, disease and pest infection, high cost of inputs, shortage of labour, technical issues relating to input availability and adequacy amongst others (Aikpokpodion *et al.*, 2005; Oyedele, 2007).

Inputs such as chemicals, fertilizers, cutlass, knapsacks, seeds, capacity building were found to be a major constraint in crop production. Most of the agricultural inputs use by farmers remain largely obsoletes, fake, expensive, non-accessible and non-available at the right time. This indicates a situation of information gap between the suppliers, research institutions and the prospective users of these inputs. There is the need for proper identification of good quality, stable and cheap source of these agricultural inputs and facilitate their availability and accessibility to the farmers by creating a market link between the farmers and the service producers. Therefore, enhancing the productivity of cocoa based farming system in Nigeria demands that the input supply system be addressed.

In light of this, humid tropics project was initiated under a collaborative effort of International Institute for Tropical Agriculture (IITA) and Obafemi Awolowo University Ile-Ife with the aim of disseminating recommended technologies, agrochemicals inclusive, to farmers in cocoa based farming system for adoption to improve crop productivity within the system. Forum for Agricultural Research in Africa (FARA) supported the intervention of provision of agrochemical stores for easy access in all the innovation platform sites of humid tropics in southwestern Nigeria which have been reported to be effective in increase in productivity and quality of produce in the cocoa based farming system (CRIN, 2000).

Despite this efforts, however, agrochemical useage in the innovation platforms has remained somewhat controversial. This could be ascribed to some set of factors such as socio-economic characteristics of the farmers, input availability, cost of input, gender differential among others. Evidence (Bonabana-Wabbi, 2002) shows that there are variations in the degree of use of improved technologies by male and female farmers, even if the technologies are available to them at the same time. This could be attributed to the fact that women have limited access to productive resources such as land and credit (Doss, 2015; Cadzow, 2016). Thus, the focus on the analysis of agrochemical use in the innovation platforms of humid tropics programmes. Specifically, explores the socioeconomic characteristics of respondents by gender, examines the perception of farmers towards agrochemical by gender, examine the rate of agrochemicals use, types of agrochemical use and impact of agrochemicals by gender, and determines the factors influencing agrochemicals use in cocoa production.

Methodology

Study area

Southwestern Nigeria was purposively selected based on cocoa growing zone of Nigeria and constitutes the study area of humid tropics project. The area lies between Longitude $2^{0}31^{1}$and $6^{0}00^{1}$East and Latitude $6^{0}21^{1}$and $8^{0}37^{1}$N (Agboola, 1979) (Figure 1). The locations are Akindele in Ido local government and Lagbedu in Ogo-oluwa local government located in Oyo State, while Iwara in Atakumosa East local government and Osunwoyin in Ayedire local government were located in Osun State. The region is characterized tropical humid climate with major bimodal rainfall distribution pattern with peaks in July and September. The favourable climate of the area encouraged about 70 percent of the inhabitants to engage in cocoa farming. They generally grow both cash and food crops. The climate is ideal for the cultivation of food crops like maize, yam, cassava, millet, rice, plantain which are generally done in combination as mix or intercropping.

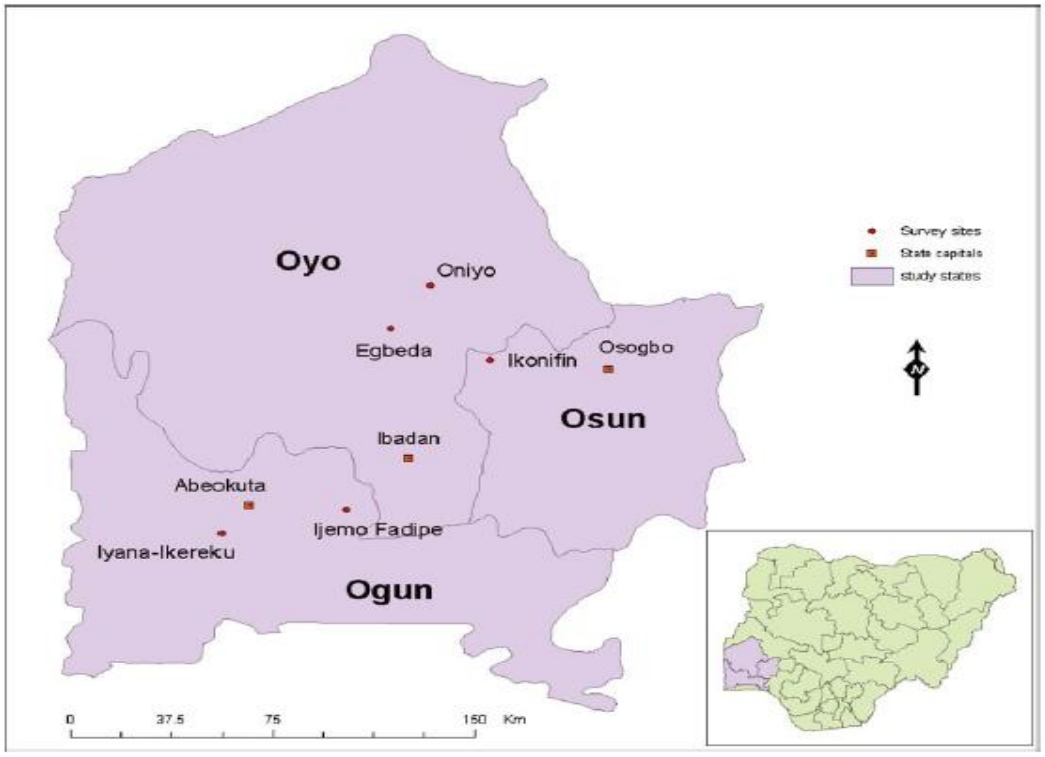

Figure 1. Studied states in the South Western area of Nigeria.

Source: www.nairaland.com

Sampling Technique and Data Collection Method

A multistage sampling procedure was used to obtain data for the study which involved a cross–sectional survey in the Nigeria project Action Site which comprises four (4) project field sites: Akindele village in Ido Local Government Area and Lagbedu village in Ogo-Oluwa Local Government Area both of Oyo State; Osunwoyin village in Ayedire Local Government Area and Iwara village in Atakumosa East Local Government Area both of Osun State. The villages were purposively selected as they the identified field sites of the Humidtropics in the Nigeria Action Site. The third stage was random selection of fifty cocoa farmers from the enlisted members of the innovation platform located in each of the field site to give a total of 200 respondents, consisting of 159 male farmers and 41 female farmers. Data were collected on farmers' socio-economic characteristics such as age, education, gender, household and farm size, agrochemicals use, efficiency and constraints to agrochemical use, amongst others.

Analytical techniques

Data collected were analyzed with the use of Descriptive statistics and Probit regression model. Descriptive statistic was used to explore the socioeconomic characteristics of respondents, examine the perception of farmers towards agrochemicals use by the respondents, and identify the types of chemical and the level of use. Probit regression was used to determine the factors influencing the agrochemical use. Probit is a binary choice model that can only assume two values of 1 or zero and tries to explain the probability of farmer's decision to use a technology based on some factors (Akudugu *et al*., 2012). This decision is a function of a set of socio-economic factors that may likely affect the probability that farmers will use agrochemical or not. The estimated Probit model is specified as follows:

$$Y_i = \beta_0 + \beta_1 AGEHHED + \beta_2 FFEDU + \beta_3 GENR + \beta_4 EXPER + \beta_5 HHSIZE + \beta_6 COTCHEM + \beta_7 SOI + \beta_8 FAMSIZ + \beta_9 INCM\ e_i$$

Where,

Y_i is the dependent variable, the probability of agrochemical use (Dummy: use, 1; Non-use, 0)

The independent variables are:

AGEHHED is age of the farmers (years), FFEDU is years of formal education, GENR is gender of household head (1= male, 0= female), EXEPR is years of farming experience, HHSIZE is farm household size (#), COTCHEM is cost of chemicals (₦) SOI is source of information (1= formal, 0= informal), FAMSIZ is the farm size (hectares), INCM is the farm income (₦) and e_i is random error term.

Results and Discussion

Socio-economic characteristics of respondents

This section presents the results of socio-economic characteristics of the respondents in the field sites. The socio-economic characteristics include age, gender, marital status, farming experiences among other variables. The socio-economic characteristics of respondents in the field sites are shown in Tables 1.

The average age trend was similar for each of the four field sites. On the average, the respondents aged 47 to 60 years across the four field sites: Akindele 59.4(±13.22), Lagebu 52.44(±11.97), Osunwoyin 58.06(±15.88), Iwara 47.47(±15.71). A gender analysis of the age structure showed that farmers in Akindele recorded the highest average age for the field sites with males accounting for 59.7(±13.42) and females 57.5(±12.81). This was followed by Osunwoyin 58.9(±16.81), Lagbedu 53.2(±12.9) and Iwara 47.36(±16.58). This could indicate that the farmers in innovation platform are relatively old.

The average household size across the action site was Akindele 7.84(±5.42), Lagebu 7.56(±3.10), Osunwoyin 8.06(±3.84), Iwara 6.61(±3.3) with varying average of male and female farmers. This collaborate with the findings of Ekong (2010) who estimated the average household size in rural areas of Nigeria to be 6. This implies that these households could provide relevant labour support for the labour intensive farming system and related activities which characterize agricultural production in developing countries. Also, large household size suggests increased consumption pressure with the need to search for better land improvement techniques to enhance crop productivity.

The average years of farming experience across the action site was Akindele 25.4(±13.95), Lagebu 27.42(±13.4), Osunwoyin 33.28(±17.82), Iwara 25.3(±12.6) with varying average of male and female farmers. This implies that majority of the respondents were highly experienced in farming activities and this could indicate positive implication on agricultural production.

Majority of the respondents were married. Across the field sites, farmers in Akindele recorded the highest (96%) with 100% and 75% male and female representation respectively; farmers in Osunwoyin (88%) followed with 87.7% male and 81.8% female (76%); 86% in Lagbedu with male farmers accounting for 94.1% and females 68.8%; and Iwara (86%), with 86.4% male and 83.3% females.

Majority of the respondents had no formal education. Across the field sites, farmers in Akindele recorded the highest (46%) with 40.5% and 75% male and female representation respectively; farmers in Osunwoyin (30%) followed with 30.8% male and female (27.3%); 20% in Iwara with male farmers accounting for 22.9% and females 0%; and the smallest Lagbedu (12%), with 8.8% male and 18.8% female farmers.

Farmers' perception towards agrochemicals use

Respondents' perception varied with different percentages of male and female farmers in the field site as shown in Table 2. A breakdown by field site indicates that 76.5% of the respondents agreed that herbicide is cheaper than manual weeding in Akindele. In Lagbedu, 98%, Osunwoyin, 82%, while 68% in Iwara field site. Majority (76.5%) of the respondents agreed that herbicide is time saving than manual weeding with 74% males and 87.5% female farmers in Akindele. In Lagbedu, 98% with 97.1% male and 100% female farmers. Osunwoyin, 82%, with 89% male and 81% female while 68% in Iwara field site with 70% male and 83% female. Larger percentage (76.5%) of the respondents agreed that herbicide is labor saving than manual weeding with 74% males and 87% female farmers in Akindele. In Lagbedu, 98% with 97.1% male and 100% female farmers. Osunwoyin, 90%, with 92% male and 81% female while 70% in Iwara field site with 75% male and 83% female. An analysis of respondents' herbicide preference by field site indicates that 76.5% of the respondents preferred herbicide to manual weeding with 74% males and 87% female farmers in Akindele. In Lagbedu, 98% with 97.1% male and 100% female farmers. Osunwoyin, 86%, with 87% male and 81% female while 72% in Iwara field site with 70% male and 83% female farmers.

Table 1: Socio-economic characteristics of farmers in 4 IPs of cocoa-based farming systems in Oyo and Osun States of Nigeria

Variables	Akindele			Lagebdu			Osunwoyin			Iwara		
	All (n=50)	Male (n = 42)	Female (n =8)	All (n =50)	Male (n = 34)	Female (n =16)	All (n =50)	Male (n =39)	Female (n =11)	All (n =50)	Male (n =44)	Female (n =6)
Age (years)	59.4 (13.2)	59.8 (13.4)	57.5 (12.8)	52.4 (11.9)	53.2 (12.9)	50.6 (9.8)	58.1 (15.9)	58.9 (16.8)	55.1 (12.2)	47.44 (15.7)	47.4 (16.6)	47.9 (7.33)
Household size	7.84 (5.42)	8.36 (5.76)	5.12 (1.35)	7.56 (3.10)	8.03 (3.2)	6.62 (2.72)	8.06 (3.84)	8.34 (4.10)	7.09 (2.70)	6.61 (3.3)	6.51 (3.48)	7.33 (2.16)
Married	96	100	75	86	94.1	68.8	88	87.7	81.8	86	86.4	83.3
Farming experience	25.4 (13.95)	26.54 (14.57)	19.37 (8.21)	27.42 (13.4)	30.17 (12.68)	21.56 (13.64)	33.28 (17.82)	34.82 (18.14)	28.36 (16.55)	25.3 (12.6)	25.61 (13.36)	23.0 (4.47)
Educational level												
Primary	32	38.1	0	34	29.4	43.8	36	33.3	45.5	36	36.4	33.3
Secondary	16	14.3	0	34	32.4	37.5	30	30.8	27.3	38	34.1	66.7
Tertiary	6	7.1	25	20	29.4	0	4	5.1	0	6	6.8	
No formal education	46.	40.5	75	12	8.8	18.8	30	30.8	27.3	20	22.7	0

Table 2: Farmers' perception towards agrochemical use in 4 IPs of cocoa-based farming systems in Oyo and Osun States of Nigeria.

Variables	Akindele			Lagebdu			Osunwoyin			Iwara		
	All (n=50)	Male (n=42)	Female (n =8)	All (n=50)	Male (n=34)	Female (n =16)	All (n=50)	Male (=39)	Female (n =11)	All (n=50)	Male (n =44)	Female (n =6)
Cheaper	76.5	74.4	87.5	98	97.1	100	82	82.1	81.8	66	65.9	66.7
Time saving	76.5	74.4	87.5	98	97.1	100	88	89.7	81.8	72	70.5	83.3
Labour saving	76.5	74.4	87.5	98	97.1	100	90	92.3	81.8	76	75	83.3
Preference	76.5	74.4	87.5	98	97.1	100	86	87.2	81.8	72	70.5	83.3

Rate and types of agrochemicals use

Respondents' rate of agrochemicals use varied in the action site as shown 3. In the field sites, the highest number of farmers that currently use agrochemicals was in Lagbedu (96%) with males accounting for 97% and females, 93%. This was followed by Osunwoyin (78%), Akindele (72.5%) and the smallest (56%) in Iwara with different percentages of male and female farmers. This could indicate that majority of the farmers in the study areas applied herbicides. This could be ascribed to availability of chemical and cost and time efficiency of chemical application.

Respondents' years of chemical application experience varied with different percentages of male and female farmers in the action site. A breakdown by field site indicates that 15.7% of the respondents have 1 to 3 years, 9.8% had 4 to 6 years, 9.8% had 7 to 9 years, and majority (41.2%) had above 10 years in Akindele. In Lagbedu, 4% of the respondents have 1 to 3 years, 20% had 4 to 6 years, 6% had 7 to 9 years, and majority (66%) had above 10 years. In Osunwoyin, 10% of the respondents have 1 to 3 years, 16% had 4 to 6 years, 22% had 7 to 9 years, and majority (42%) had above 10 years. Also, 16% of the respondents have 1 to 3 years, 20% had 4 to 6 years, 10% had 7 to 9 years, and majority (30%) had above 10 years in Osunwoyin field site. This shows that the respondents have many years of chemical application experience. This could aid its continuous use of agrochemicals.

Respondents' type of chemical varied with different percentages of male and female farmers in the action site. A breakdown by field site indicates that 17.5% of the respondents have pre-plant (non-selective), 2% had pre-emergence (soil applied), 2% had post-emergence (selective), 2 % had post- emergence(non-selective), 43.1% had pre-plant and post-emergence and none had pre-plant, pre-emergence, selective and non- selective post- emergence in Akindele. In Lagbedu, 32% of the respondents have pre-plant (non-selective), 2% had pre-emergence (soil applied), 2% had post-emergence (selective), 2 % had post- emergence(non-selective), 26% had pre-plant and post-emergence and 34% had pre-plant, pre-emergence, selective and non- selective post- emergence. In Osunwoyin, 14% of the respondents have pre-plant (non-selective), 4% had pre-emergence (soil applied), 18% had post-emergence (selective), 6 % had post- emergence(non-selective), 22% had pre-plant and post-emergence and 24% had pre-plant, pre-emergence, selective and non-selective post- emergence. Also, 14% of the respondents have pre-plant (non-selective), 2% had pre-emergence (soil applied), none had post-emergence (selective), none had post- emergence(non-selective), 26% had pre-plant and post-emergence and 34% had pre-plant, pre-emergence, selective and non-selective post- emergence in Osunwoyin field site. This shows that majority of the respondents applied pre-plant and pre-emergence herbicides. This could be traced to low cost of those chemicals.

Impact and efficiency of agrochemicals use

Respondents' impact of chemical usage varied in the action site. Across the field sites, farmers in Lagbedu recorded the highest positive impact of agrochemical use (84%) with 85% and 81% male and female representation respectively; farmers in Osunwoyin (82%) followed with 87% male and 63% female; Akindele (74.5%), with 72% male and 87% female; and the smallest (68%) in Iwara with male farmers accounting for 65% and females 83.%. This shows that herbicides have positive impact in the study areas. This could be sequel to many years of experience the farmers have in agrochemical application, therefore have high technical knowledge on its application.

In the field sites, the highest number of farmers that reported the chemicals to be efficient was in Lagbedu (94%) with males accounting for 94% and females, 93%. This was followed by Osunwoyin (76%) and Akindele (76%) and the smallest (72%) in Iwara with different percentages of male and female farmers. This shows that chemical application is efficient in weeding than manual weeding. This could be attributed to the several years of experience the farmers have. This implies that they are highly skilled in chemical application based on their several years of experience in chemical application.

Factors limiting agrochemical use

Majority of the respondents identified cost of herbicide as factor limiting herbicide usage. Across the field sites, farmers in Lagbedu recorded the highest (66%) with 58% and 81% male and female representation respectively; farmers in Osunwoyin (54%) followed with 56% male and 45% female (76%); 46% in Iwara with male farmers accounting for 40% and females 0 %; and the smallest Akindele (43%), with 37% male and 75% females.

Table 3: Agrochemical use, years of application and types of agrochemicals in 4 IPs of cocoa-based farming systems in Oyo and Osun States of Nigeria.

Variables	Akindele			Lagebdu			Osunwoyin			Iwara		
	All (n=50)	Male (n= 42)	Female (n=8)	All (n=50)	Male (n=34)	Female (n=16)	All (n=50)	Male (n=39)	Female (n=11)	All (n=50)	Male (n=44)	Female (n=6)
Agrochemical use	72.5	69.8	87.5	96	97.1	93.8	78	76.1	81.8	56.	54.5	66.7
Years of usage												
1-3	15.7	14	25	4	5.9	0	10	7.7	18.2	16	18.2	16.7
4-6	9.8	9.3	12.5	20	23.5	12.5	16	17.9	9.1	20	20.5	33.3
7-9	9.8	4.7	37.5	6	5.9	6.2	22	20.5	27.3	10	6.8	33.3
Above 10	41.2	46.5	12.5	66	61.8	75	42	46.2	27.3	30	29.5	83.3
Herbicide types												
Pre plant (non-selective)	27.5	30.2	12.5	32.0	32.4	31.2	14	5.1	45.5	14	11.4	33.3
Pre-emergence (soil applied)	2	0	12.5	2	2.9	0	4	5.1	0	2	2.3	0
Post-emergence (selective)	2	2.3	0	2	2.9	0	18	23.1	0	0	0	0
Pre-plant and post emergence	43.1	39.5	62.5	26	23.5	31.2	22	17.9	36.4	26	25.0	33.3
Pre-plant, pre-emergence, selective and non-selective post emergence	0	0	0	34	32.4	37.5	24	30.8	0	34	36	16.7

Table 4: Impact and efficiency of agrochemicals use in 4 IPs of cocoa-based farming systems in Oyo and Osun States of Nigeria.

Variables	Akindele			Lagebdu			Osunwoyin			Iwara		
	All (n=50)	Male (n=42)	Female (n =8)	All (n=50)	Male (n=34)	Female (n =16)	All (n=50)	Male (=39)	Female (n =11)	All (n=50)	Male (n =44)	Female (n =6)
Impact of chemicals	74.5	72.1	87.5	84	85.3	81.2	82	87.2	63.6	68	65.9	66.7
Efficiency of chemicals	76	74.4	87.5	94	94.1	93.8	76	76.9	72.7	72	70.5	83.3

Table 5: Factors limiting agrochemical usage in Nigeria action site in 4 IPs of cocoa-based farming systems in Oyo and Osun States of Nigeria.

Variable	Akindele			Lagebdu			Osunwoyin			Iwara		
Factors limiting agrochemical usage	All (n=50)	Male (n = 42)	Female (n =8)	All (n =50)	Male (n = 34)	Female (n =16)	All (n =50)	Male (n=39)	Female (n =11)	All (n =50)	Male (n =44)	Female (n =6)
Cost of herbicide	43.1	37.2	75	66	58.4	81.2	54	56.4	45.5	46	40.9	0
Knowledge	7.8	9.3	0	4	0	12.5	8	10.3	9.1	8.2	9.1	0
Skill	2	2.3	0	0	0	0	0	0	0	2	2.3	0
Availability	0	0	0	0	0	0	4	2.6	9.1	0	0	0
Awareness	0	0	0	0	0	0	4	0	9.1	0	0	0
Health hazard	3.9	4.7	0	6	5.9	6.2	6	5.1	9.1	4	4.5	0
Finance	19.6	20.9	12.5	22	32.4	0	4	15	0	16	18.2	0

Table 6: Factors influencing agrochemical use

Variables	Farmers
Gender	0.619(1.25)
Age	0.011(0.65)
Education	-0.320(-1.93)*
Household size	-0.019(-3.37)***
Farming experience	0.002(0.17)
Cost of chemicals	-0.019(-5.76)***
Source of information	1.145(2.44)**
Farm size	-0.0142(-1.10)
Income	0.063(0.81)
Constant	0.941(3.02)***

Factors influencing agrochemical use

Factors influencing agrochemical use were presented in Table 6. Log likelihood function and chi-square were -29.471 and 96.69. The entire model was significant at one percent. This implies that the model is best fit. Out of the 7 explanatory variables included in the model, 4 were found to significantly influence agrochemical use. The variables were education ($p<0.1$), household size ($p<0.01$), cost of chemicals ($p<0.01$), and source of information ($p<0.05$). The coefficient of household size had a negative sign. This implies that an increase in household member by a person decreases agrochemical use by 0.019 units. This can be attributed to the fact that households with large families have access to more family labour to help with farm activities. Similarly, the coefficient of education had a negative sign. This implies that increase in education status of the farmer decrease agrochemical use by 0.320 units. This could be associated with the ineffective extension service delivery system. Also, the coefficient of cost of chemicals had a negative sign. This implies that increase in cost of chemicals decrease agrochemical use by 0.002 units. On other hand, the coefficient of source of information had a positive sign. This suggests that formal sources of information such as extension services, research institutes etc. increases agrochemical use by 1.145 units.

Conclusion

The study investigated analysis of agrochemical use in cocoa-based farming system in cocoa-based farming systems of Southwestern Nigeria. The study was conducted in Osun and Oyo States of Nigeria. A multistage sampling procedure was used to obtain information from 200 respondents. Descriptive statistics revealed that the respondents aged 47 to 60 years across the four field sites, household above 6 persons and several years of experience. Majority of the respondents agreed that chemicals are time saving, labour saving and cheaper. Therefore, majority of the respondents uses chemicals. However, some of the farmers discontinued the use of agrochemicals without replacement because of financial constraint and cost of herbicides. The study employed a probit model to determine factors affecting agrochemical use in cocoa-based farming systems of Southwestern Nigeria. Probit estimates revealed that education ($p<0.1$), household ($p<0.01$), cost of chemicals ($p<0.01$), and source of information ($p<0.05$), were the critical determinants of agrochemical use. In accordance to the findings of the study, we therefore recommend that intensive enlightenment programmes on the use of agrochemicals and its advantages by effective and efficient extension services should be encouraged as well as providing input support services in the form of credit to help the farmers to take advantage of the programme.

References

Agboola, S.A. (1979). An Agricultural Atlas of Nigeria, Oxford University Press, Nigeria Pp.248

Aikpokpodion, P.O., Badaru, K., Kolesnikova-Allen, M., Ingelbrecht, I., Adetimirin, V.O. and Eskes, A. (2005). Farmer-researcher participatory on-farm selection of improved cocoa varieties: the Nigerian experience. In:Bekele Frances L. (ed.), End Michelle (ed.) & Eskes Albertus (ed.). *Proceedings of the International workshop on cocoa breeding for improved production systems: 19th-21th October 2003, Accra, Ghana. Reading: INGENIC, p. 183-188. International Workshop on Cocoa Breeding for Improved Production Systems. 4,2003-10-19/2003-10-21, Accra, Ghana.*

Alamu, S.A. (2013). Analysis of Seedling Subsidy Policy and Cocoa Production in South-West Nigeria. *Journal of Educational and Social Research Vol. 3 (4) 59-68.*

Bonabana- Wabbi, J. (2002). Assessing factors affecting adoption of agricultural technologies: the case of integrated pest management (IPM) in kumi District, Eastern Uganda. Unpublished M.Sc thesis submitted to the faculty of the Virginia Polytechnic Institute and State University, Uganda.

Cadzow, H. (2016) Empowering Freetown's women farmers. Doctoral dissertation, University of Otago, New Zealand.

CRIN, 2000: Cocoa Research Institutes of Nigeria, Annual Report, 2000.

Doss, C. R. (2015) Women and agricultural productivity: what does the evidence tell us? *Yale University Economic growth centre discussion paper* (1051).

Folayan, J. A., Daramola, G. A. and Oguntade, A. E., (2006) Structure and performance evaluation of cocoa marketing institutions in South-Western Nigeria: An economic analysis. *Journal of Food, Agriculture and Environment.* 4 (2): 123-128

Oyedele, J.O. (2007). Enhancing the Sustainability of Cocoa Growing in Nigeria. A Paper Presented at the Cocoa Roundtable on a Sustainable World Cocoa Economy, Accra, Ghana, 3-6 October.

RAAIS (2014). Rapid appraisal of agricultural innovation systems of Nigeria action sites

Rogers, E. M. (2003). Diffusion of innovations (5th ed.). In.I. Sahi (Ed.), Detailed review of Rogers' diffusion of innovation theory and educational technology-related studies based on Rogers' theory. *The Turkish online journal of Educational technology*. TOJET 5(2). New York: Free Press

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