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TITLE: FARMERS' KNOWLEDGE AND UTILIZATION OF CRIG RECOMMENDED TECHNOLOGIES AND PERCEPTIONS OF GOVERNMENT POLICIES TO ENHANCE COCOA PRODUCTIVITY

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ABSTRACT

This study aimed at assessing farmers' knowledge, utilization and challenges associated with CRIG recommended cocoa technologies as well as farmers' perceptions of government policies on yield enhancing policies in Ghana. A total of 322 cocoa farmers were randomly selected from 25 communities in five cocoa growing regions for interviewing using a formal questionnaire in 2017. Results indicated that there were marked variances between farmers' knowledge in terms of recommended practices and what they actually practised. While some over-indulged in the practices, others underutilized the recommendations; and both attitudes may lead to inefficiencies or abuse of chemicals. Apart from age of the cocoa farms, there was no significant relationship between productivity on one hand, and training (*P-value=0.498*), group membership (*P-value=0.841*) and educational level of farmers (*P-value=0.338*) which calls for a further research and analysis. In terms of government policies for cocoa such as free supply of hybrid seedlings and agro-inputs including fertilizer to farmers, the majority of respondents supported the continuation but, acknowledged some basic challenges. Thus, they gave some suggestions to making them more beneficial. Others, however, advocated for a replacement with a more sustaining effort such as open market policy with subsidy to cushion farmers to purchase inputs on their own. It is recommended that these farmers' perceptions and comments be given due considerations by the Ghana Cocoa Board (COCOBOD) to enhance the intended benefits of the policies put in place to increase cocoa production and productivity in Ghana.

INTRODUCTION

The importance of cocoa to Ghana's economy cannot be over emphasized. However, many technical and socio-economic factors affect cocoa production and productivity. Major causes of low cocoa productivity include diseases and pests problems (Opoku Ameyaw et al 2010), vegetation clearance (FAO,1993), illegal mining activities (EPA,1996) and also socio-economic factors. These include low level of knowledge, lack of funds to purchase needed inputs resulting in poor farm maintenance culture and utilization of recommended technologies (Asamoah et al 2015; Donkor et al 1991, Henderson et al 1990) mostly by small scale producers in Ghana.

To increase production, governments of Ghana have made huge investments in yield enhancing policies that include provision of extension services, hybrid planting materials, CODAPEC and Hi-Tech programmes.

Farmers also have responsibility to utilize these policies and to complement them to achieve the desired results. CRIG is also to continue research for technologies that farmer can adopt optimum yields.

This study aimed at assessing farmers' current knowledge, utilization, challenges associated with cocoa technologies and their perceptions on the policies indicated above. It is expected that the findings will provide feedback to deepen the impact of the policies on cocoa production and productivity in Ghana.

RESEARCH METHOD

A survey was used to collect primary data from 322 respondents located in selected districts in Ashanti, Central, Eastern, Western north and Western south cocoa growing regions between January and May 2017 using formal questionnaires. To assess respondents' knowledge of technologies, they were asked to

mention three approved chemicals each for the control of insecticides and fungicides and also mention the approved machine for spraying among others. About 77% of the respondents were males and 23% females; mean age was 50 years and educational level was very low with over 72% having basic education. Only 7.4% of them belonged to registered farmer cooperatives, but, about 98% had received training in farm maintenance practices organized by CHED extension officers. Data was analysed mainly descriptively using IBM SPSS version 22. Also, analysis of variance (ANOVA) was done to test the significance of some variables.

RESULTS AND DISCUSSIONS

Respondents' Knowledge and Utilization of recommended practices

Insecticide application

Only 34.5% had the right knowledge on the frequency of insecticide application. The rest mentioned either less or far more than the recommended, which in either case, leads to inefficiency or abuse. On utilization, only 24.2% adopted the recommended frequency of insecticide application (Table 1). This maintenance culture is not good for efficient and effective control of insect pest.

Table 1: Farmers' level of knowledge and utilization of CRIG recommendations for insecticides application on cocoa

Farmer response on application frequency per year.	Knowledge: Percentage of respondents	Utilization: Percentage of respondents
No/zero Application	1.6	3.4
1 – 2	1.6	19.3
3	32.3	34.5
4*	34.5	24.2
5 – 7	15.2	12.1
More than 7	6.8	5.9
Don't know	8.0	0.6
Total (N=322)	100	100

Source: Field data 2017 *CRIG recommendation – 4 times a year.

Fungicide application

CRIG's recommendation for efficient control of the disease is to apply recommended fungicides 5-6 times a year (Opoku-Ameyaw et al., 2010). However, only 23.9% had it right on knowledge while only 15.2% adopted the recommendation (Table 2) mainly due to challenges which included lack of machines, finance and credit to purchase more chemicals to complement governments' efforts.

Table 2: Farmers' level of knowledge and use of approved fungicide on cocoa

Farmer response on application frequency per year.	Knowledge	Utilization
	Percentage of respondents	Percentage of respondents
No/Zero Application	-	16.7
One to two times	4.7	22.4
Three times a year	23.6	28.6
Four times	22.7	13.7
Five to six times *	23.9	15.2
More than six times	10.9	3.1
Don't know	14.2	0.3
Total (N=322)	100	100

Source: Field data 2017 * CRIG recommends – 5-6* times a year.

Type of insecticide for the control of insect pests

Each respondent was asked to mention three chemicals and indicate those they used the previous year. Results indicated that Akate Master, Confidor, Actara and Akate power were mostly mentioned and used the previous year by respondents (Table 3).

Fortunately, all four were among approved insecticides on cocoa. However, some of the insecticides known (7.9%) and used (3.8%) by some were unapproved chemicals[1] for cocoa (Table 3).

Table 3: Farmers' level of knowledge and use of approved insecticides on cocoa

Insecticides mentioned by farmers	Knowledge		Utilization	
	Frequency	Percentage	Frequency	Percentage
Actara	110	34.3	22	6.8
Akate Master	289	89.8	173	53.7
Akate Power	102	31.7	51	15.8
Buffalo Super	13	4.0	9	2.8
Confidor	250	77.6	108	33.5
Kum Akate	2	0.6	-	-
Aceta Star	8	2.5	3	0.9
Others*	4	1.2	3	0.9
Others (Unapproved)#	25	7.8	10	3.1
Total	803**	249.4	379**	117.7

** Multiple response Others* (Approved) - Akate Global, Pridapod, Galil, D-lion

Agama, Akate Suro and Remonstar were also mentioned but are currently banned. Cocosett was mentioned as both as insecticide, and fundicide, but, it is rather an approved foliar fertilizer. A chemical named '*Condifor'* mentioned mimics the name of an approved insecticide called Confidor. This may definitely confuse illiterate cocoa farmers who may want to purchase the approved chemical.

Types of fungicides

In terms of knowledge and utilization the four mostly known and used were Ridomil, Champion, Kocide and Nordox which were all approved (Table 4). Unfortunately, some of these known (5.9%) and used (3.0%) were unapproved fungicides[2] as in the case of the insecticides; reiterating the need for more efforts to stop the trend.

Table 4: Farmers' level of knowledge and utilization of approved fungicide on cocoa

Fungicides	Knowledge		Utilization	
	Frequency	Percentage	Frequency	Percentage
Champion	107	33.2	51	15.8
Sidalco Defender	14	4.3	5	1.6
Fungikill	8	2.5	3	0.9
Funguran	35	10.9	16	5.0
Kocide	77	23.9	35	10.9
Metalm	1	0.3	1	0.3
Nordox	75	23.3	33	10.2
Ridomil	165	51.2	104	32.3
Others*	7	2.2	5	1.6
Others (unapproved)#	13	4.0	5	1.6
Total	502**	155.8	258**	78.6

** Multiple response * Others (Approved)-Metacid and Agrocomet

Approved machines for insecticide and fungicide applications

Majority knew and used the approved (Table 5 and 6). CRIG recommends a Mist blower for insecticide application to target the leave and canopy. About 94% knew while 91% used it.

[1] Others (Unapproved)# - Agama, Agartastar, Akate Suro, Condifor, Digro, Cocoseed, Codapot, Samico, Cocostar, Karate, Power, Remonstar, Sandox, Semitos, Plunto, Cocoa Power and Cocosett.

[2] Others: Unapproved fungicide#- Confidor, Cocosett, Cocobreed, Francostar, Metar, Remix, Metalsate. Cocosett and Confidor were also mentioned as fungicides, but, while Cocosett is a foliar fertilizer, as indicated earlier, Confidor is an insecticide. Impliedly, either respondents were confused with the names or ignorantly used the wrong chemical for the control of black pod.

Also, CRIG recommends a Knapsack for spraying fungicide to target the pods on the cocoa trees. About 87% knew while 78% used it

Table 5: Farmers' level of knowledge and utilization of type of machines for insecticide application

Type of Machine to use	Knowledge	Utilization
	Percentage	Percentage
Knapsack	2.8	4.7
Mist blower*	93.8	91.0
Mist blower & knapsack	-	0.3
Don't know	3.4	4.0
Total (N=322)	100	100

Source: Field data 2017

Table 6: Farmers' level of knowledge and utilization of type of machine for fungicide application

Type of Machine to use	Knowledge	Utilization
	Percentage	Percentage
Knapsack*	86.3	78.3
Knapsack/Mist blower	0.3	-
Mist blower	5.6	4.6
Don't know	7.8	17.1
Total (N=322)	100	100

Source: Field data 2017

Effect of training, group membership and educational level on farmer productivity

Apart from age of the cocoa farms, there was no significant relationship between productivity and training, group membership and educational level of respondents (Tables 7). This is unexpected and requires further analysis.

Table 7 Relationship between some socio-economic variables and respondents' cocoa productivity (kg ha^{-1})

Factors	Levels	Mean productivity (kg ha^{-1}) (Standard error)	Significant value
Farm age classification	0-7 (A class)	231.2 (28.7)	0.000*
	8-16 (B class)	649.0 (37.7)	
	17-30 (C class)	624.5 (38.4)	
	31^{+} (D class)	599.8 (74.7)	
Education level	No formal	478.2 (47.1)	0.338
	Basic	564.6 (27.0)	
	Secondary	590.4 (93.0)	
	Tertiary	717.1 (123.9)	
Farmers' membership of Association	Yes	563.0 (25.7)	0.841
	No	552.7 (49.6)	
Benefit from training/ Farmer Business or Field School on farm maintenance culture	Yes	553.6 (25.2)	0.498
	No	599.0 (59.6)	

Note: * Indicates significance at $p<\alpha=0.05$

Perceptions about governments' yield enhancing policies:

Cocoa Diseases and Pests Programme (CODAPEC)

CODAPEC is one of the major policies rolled out in Ghana in the early 2001 to arrest the increasing spate of diseases and pests that were militating against national cocoa production (Opoku-Ameyaw et al 2010; COCOBOD, 2017). Spraying gangs were engaged by the government through the COCOBOD to mass spray all cocoa farms at no explicit cost to the farmer.

About 42% of respondents strongly agreed while 45.3% agreed that CODAPEC is a good programme and should be continued. Total of less than 13% strongly/disagreed to the attitude question that CODAPEC is good and must be continued (Figure 1).

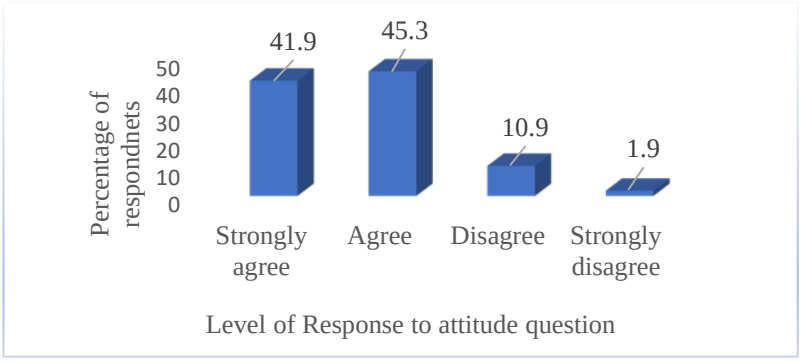

Figure 1. 'CODAPEC is a good programme and must be continued'.

Free supply of cocoa seedlings

Free supply of cocoa seedlings started in 2014. About 71.% asked for continuity while 23% indicated that there were some challenges that needed to be addressed to achieve the desired effects. Only 3.1% respondents suggested discontinuity due to unfairness and other flaws (Table 8).

Highlighted challenges included high cost of conveyance, unfair and untimely distribution as well as inadequate supply (Table 9).

Table 8: Respondents' views on free supply of cocoa seedlings by government to farmers

Views on free seedlings supply	Percentage
Good policy and must be continued	71.4
Good but with challenges	23.0
Not good and must be stopped	3.1
No comments	2.5
Total (N=322)	100.0

Source: Field data 2017

Table 9: Challenges associated with the free supply of cocoa seedlings to farmers

Challenges of the free seedlings policy	Frequency of responses	Percentage
High cost of conveyance	40	33.6
Unfair distribution/untimely supply	48	50.30
Inadequate supply	31	26.1
Total	119*	100.0

**Multiple response* *Source: Survey data 2017*

Free supply of granular fertilizer to farmers

Cocoa Hi-Tech Programme was introduced in 2003 to improve cocoa soils (Opoku-Ameyaw et al 2010). Here, 66.5% of respondents asked for continuity but 24.5% said it was good but with some challenges (Table 10) including insufficient or late supply, unfair distribution and high cost of conveyance of fertilizer (Table 11).

Table 10: Respondents views on free supply of granular fertilizer by government to farmers

Views on free granular fertilizer supply	Frequency	Percentage
Good policy and must be continued	214	66.5
Good but with challenges	79	24.5
Policy is not good and must be stopped	11	3.4
No comments	18	5.6
Total	**322**	**100.0**

Source: Field data 2017

Table 11: Challenges associated with free supply of granular fertilizer by government to farmers

Challenges	Frequency	Percentage
High cost of conveyance	17	11.9
Type of fertilizer called *Duapa* was not good, because it does not dissolve.	5	3.5
Unfair distribution	31	21.7
Insufficient supply	64	44.7
Late supply	26	18.2
Total	143	100.0

Source: Survey data 2017

Conclusion and Recommendations

More education is needed to enhance farmers' knowledge and utilization of best cocoa practices.

Majority of respondents supported the continuation of yield enhancing policies on cocoa but identified some challenges.

Apart from age of cocoa farms, there was no significant effect of farmer training, membership of associations and level of education on cocoa productivity.

It is recommended that government should continue to invest in yield enhancing strategies that would encourage farmers to rehabilitate their aged cocoa farms.

More media involvement is needed to enable farmers know approved agro-inputs for cocoa production in Ghana, especially, using local radio and television channels.

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