

EFFECTIVENESS OF COOPERATIVES ON ENHANCED KNOWLEDGE TOWARDS COCOA PRODUCTION PRACTICES IN EKITI STATE, NIGERIA

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Abstract

The study assessed the effectiveness of cooperatives on enhancement of knowledge towards improve cocoa production in Ekiti State, Nigeria. It identified the extension services provided by the cooperatives, determined the contribution of the cooperatives to farmers' knowledge. Data were collected from a random selection of 177 cocoa cooperative members in nine Local Government Areas across the agricultural development zones in the study area. Descriptive statistics and multiple regression, were employed for data analysis. Cochran tests was used to analyses the reliability of the data collected. The results revealed that the major agricultural extension activities of cooperatives in the study area were providing members with information about modern farming practices (87.27%), providing members with market information on farm product prices (74.54%), training members on storage methods (74.54%), training members on nursery management practices (73.47%). The major areas in which the cooperatives contributed to farmers' technology awareness were provision of shade at the nursery (30.24%), fencing nurseries with wire mesh (31.30%) and transplanting seedlings after 5 to 6 months (29.18%). Overall, the percentage contribution of the cooperatives to the aggregate technology awareness among respondents was low (27.3%) compared to the total technologies. Multiple regression results revealed that extension activities of cooperatives ($\beta = 0.492$), age of co-operators ($\beta = 0.159$) and frequency at cooperatives meetings ($\beta = 0.104$) were the only significant factors that enhanced cocoa production technologies. The study concluded that cocoa producers' co-operatives were little effective in their extension activities in the study area. Hence, there is the need to link cocoa producer cooperatives to institutional credit sources (to enhance their access to capital), Cocoa Research Institutes of Nigeria (CRIN) and ADP to enhanced knowledge towards cocoa production.

Keywords: Knowledge enhancement, productive cooperatives, cocoa production, Ekiti State, Nigeria.

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INTRODUCTION

Agriculture had been the main stay of the Nigeria economy before and during the colonial period, and recorded tremendous success in supporting the national economy, accounting for about 60% of foreign exchange which

rose to 74.3% in 1968. This was before the national independence (Chinweizu, 2006). But the discovery, exploration and mining of crude oil in the southern part of Nigeria which raised the profile of the country in the world oil business to the 6th largest producer and indeed eighth largest deposit of natural gas in the world (Babatunde, 2010; Soludo, 2006). The advent of crude-oil production led to the desert of agricultural industry. The world development report (World Bank, 2007) emphasises agricultural extension as an important development intervention for increasing the growth potential of the agricultural sector, in the light of rising demand and supply side pressures, and for promoting sustainable, inclusive and pro-poor agricultural and hence economic development (Adereti 2011 and Adedoyin 2002).

A major instrument available to the agricultural extension service in the attainment of its objectives is cooperative society. Cooperative societies are independent association of people who voluntarily unite to form a jointly owned and democratically controlled enterprise called cooperatives, to meet members' economic, social and cultural needs (Oluyombo, 2010, Henry and Schimmel, 2011). Farmers cooperatives are seen as a medium through which services like provision of farm input, farm implements, farm mechanization, agricultural loans, agricultural extension, members education, marketing of members farm produce and other economic activities and services are rendered to members (Akinwumi, 2006; Bhuyam, 2007). Poulton, (2006) and Clegg (2006) highlighted some of the information to include the use of appropriate technology, innovative ideas, and sound technical advice not only to increase their agricultural productivity and incomes but also to make rural life meaningful and sustainable.

Cocoa is the second major non-oil foreign exchange earner in Nigeria after leather. It is produced in fourteen (14) states of the federation namely, Ondo, Cross River, Oyo, Osun, Ekiti, Ogun, Edo, Kogi, Akwa Ibom, Delta, Abia, Kwara, Ebonyi and Rivers with an annual production rate of 225,000 metric tons (CRIN 2011). Over 98% of the product is exported and it provides means of livelihood and employment to over five million (5,000,000) people (Foramfera.com 2014). Africa is the largest producer of cocoa, with the major market being in Europe and America. Ivory Coast, Ghana and Nigeria share the largest contribution to the world cocoa market with Ivory Coast being the leading producer. Nigeria is currently the world's fourth largest producer of cocoa after Ivory Coast, Indonesia and Ghana and the third largest exporter, after Ivory Coast and Ghana (Verter, 2014; and FAO, 2015).

Past studies have argued that cooperatives are one of such private sector instruments that can support the agricultural extension service. According to Clegg (2006) and Omotesho (2008) cooperatives remain the most effective vehicles for efficient mobilization of production resources and accelerated rural development. This is because cooperatives increase awareness and adoption of agricultural technologies among farmers. Hence, this study seeks to ascertain if the cocoa producer's cooperatives have undertaken these extension advisory services to its members in the study area. Consequently, the study examine to what extent cooperatives have contributed to the farmers knowledge on improved cocoa production practices. Also, the study will ascertain the cooperatives contributions to farmers' knowledge of improved cocoa management practices. In developing the conceptual construst for this study, few studies have examined cooperative involvement in extension activities particularly in cocoa industry (see Agbarevo 2013 and Ehiwarro 2016). Therefore this study will add to the knowledge on the influence of cooperative on cocoa production.

Methodology

Study Area

The study was conducted in Ekiti State, Nigeria. Ekiti State was created on 1st October, 1996 from the old Ondo State. The state is located between longitudes $4^{\circ}45^1$ - $5^{\circ}45^1$ East of Greenwich Meridian and Latitude $7^{\circ}15^1$ - $8^{\circ}5^1$ North of Equator. Ekiti State has a land mass of 700 square kilometres, bounded in the East and South by Ondo State and bounded in the North by Kwara and Kogi States (Ekiti - Land of Honour, 2014). It has an estimated population of about 3,190,093 people (NPC 2015). The state has sixteen (16) Local Government Areas divided into three agricultural development districts namely, Ekiti North, Ekiti Central and Ekiti South. The state enjoys tropical climate with two distinct seasons. These are the rainy season (April to October) and dry season (November to March). Temperature ranges between 21°C and 28°C with high humidity. The major occupation of the people is farming with major cash crops grown being cocoa, kolanut, oil palm, coffee and cotton, and food crops grown are yams, cassava, rice, plantains, bananas, maize and beans.

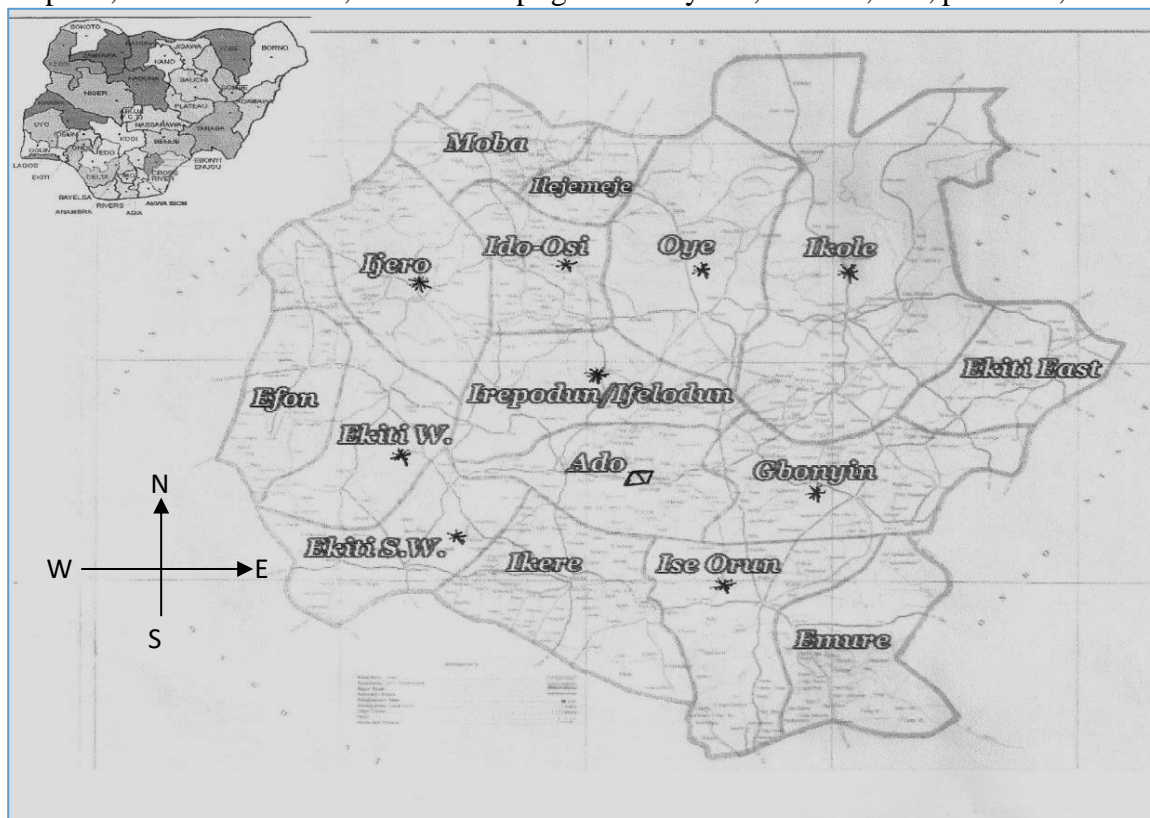


Figure 1: Map of Ekiti State showing study area

Source: Nigeria Muse, 2010

Sampling Techniques

A multi-stage sampling procedure was employed in the selection of respondents for the study, as described below and summarized in Table 1: The first stage was the purposive selection of the three (3) agricultural development zones (ADP) The second stage was the random selection of three (3) Local Governments areas

per ADP giving a total of Nine (9) Local Governments areas. Stage 3 involved proportionally sampled of 5% across the selected Local Government Areas to give a total of 87 that was used for the study.

Table 1: Sampling Procedure

SEN. DISTRICT	LGA	No. of cocoa producer cooperatives	Total no. Of co-operators	Average membership	No. Of cooperative 5%	Average membership of selected coop.	Sample 21.84%
Ekiti North	Ikole	200	4,000	20	10	200	44
	Idoosi	150	3,000	20	8	150	35
	Oye	100	2,000	20	5	100	22
	Sub-total	450	9,000	60	23	450	101
Ekiti Central	Ijero	200	4,000	20	10	200	44
	Ekiti west	230	4,600	20	12	230	52
	Irepodun/ifel odun	175	3,500	20	9	175	39
	Sub-total	605	12,100	60	31	605	135
Ekiti South	Ise	300	6,000	20	15	300	66
	Gbonyin	150	3,000	20	8	150	35
	Ekiti south west	200	5,000	20	10	200	44
	Total	650	14,000	60	33	650	145
	Grand total	1,705	35,100	180	87	1,705	381

Source: Ekiti State Ministry of Commerce and Industry

Sources of data

Data were collected from primary sources, namely from members of cocoa producer cooperatives societies drawn from the study area. Data were collected with the help of a questionnaire and interview schedule to obtain information needed to achieve the study stated objectives. Information obtained from the respondents include among others: cooperative characteristics, extension services offered by cooperatives to members. Data reliability test was performed using the Cronbach's Alpha method.

Data analysis techniques

Data were analyzed using descriptive statistics, comprising frequency tables, percentage, mean and standard deviation. Inferential statistics comprising multiple regressions, Cochran test and Friedman test were used to analyse the hypotheses of the study. Multiple regressions model was used to measure causal relationship between one or more independent variables and a continuous dependent variable (Garson, 2014). The explicit form of the multiple regression equation is shown below:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 \dots\dots, + b_nX_n + e \quad (1)$$

Where

- Y = dependent variable
- a = the coefficient of the constant term

b_1 = the coefficient of the independent variables
 X_{1-n} = the independent variables
 e = error term

This statistics were used to analyse co-operators socio-economic characteristics and extension services exposed to as determinants of their adoption of improved technologies as well as adoption behaviour. The variables in the equation are defined below as:

Y = Adoption of improved farm management/agronomic practices.
 X_1 = Sex (male = 1, female = 0)
 X_2 = Age (years)
 X_3 = Educational status (years)
 X_4 = Household size (number of people living and feeding together)
 X_5 = Farming status (dummy: Full time = 1; part time = 0)
 X_6 = Farm, size (ha)
 X_7 = Farming experience (years)
 X_8 = Income (₦)
 X_9 = Length of cooperative membership (years)
 X_{10} = Knowledge if improved farm technologies (proportion of total Technologies aware of from cooperative extension activities)

Ordinary least square (OLS) method was employed as estimation technique used for the study.

Measurement of variables in the study

The socio-economic characteristics of the respondents were measured are as follows:

- (i) Age: The respondents (cooperators) were required to indicate their actual age in years.
- (ii) Sex: The respondents (co-operators) were required to indicate whether they are male or female.
- (iii) Marital status: Respondents were categorised as
 - i. (a) Married (b) Single (c) Divorced (d) Widowed (e) Separated
- (iv) Number of children were indicated by the respondents.
- (v) Level of education: The level of education was operationalized into categories based on number of years spent in school e.g. Primary 6, Secondary School, OND, NCE, HND, and University Degree.
- (vi) Primary occupation: The respondents were requested to indicate their primary occupation based on (a) Farming (b) Trading (c) Civil Servant; (d) Livestock rearing; (e) Food vendor/processor; (f) others (specify)
- (vii) Farm size: in hectares
- (viii) Cooperative membership: Respondents were asked to indicate how long they have been a member of the cooperative society. This were measured in years.
- (ix) Frequency of meetings: Respondents were asked how often the cooperatives hold their meetings and how frequently they attend the meetings.

Results and Discussion

This section examined the socio-economic characteristics of respondents.

Age of respondents

The age distribution of respondents as presented in Table 2, shows that the majority of the cocoa cooperative farmers interviewed (33.42%) were 50-59years, followed by age range of 40-49years (25.20%), while 18.04% were 30-39years and 14.32% were 60years and above. The average age range of the respondents was 46-69years which shows that most of the co-operators are still within the active age category. Similar results regarding the younger age of members of co-operatives was reported by Ibitoye (2012) and Ehiwario (2016). They noted that even though there is no age limit in the membership of agricultural co-operatives, agricultural activities are strenuous which implied that old people may not be fit enough to be involved in tilling operations on the land hence the need for younger and active individual. Being young indicates that they possess enough energy to engage in extension activities. The aggregate result shows that only 9.02% of the respondents were less than 30 years. This signifies that young people were not so much interested in the production of cocoa in the State.

Sex of respondents

The sex spread among the respondents indicated that male constituted the majority in cocoa production. Also, 77.19% were males while 22.81% were females. The implication of this is that most of the members of the cooperative in the study area were male. Mgbakor *et al.*, (2013) and Ehiwario (2016) reported similar results regarding low female participation in cooperative activities. They observed that females are not actively involved in farmers' cooperative societies despite the fact that women are actively involved in other forms of cooperative organization. This study also agrees with the findings of Ogunlela and Mukhtar (2009), that men are mainly involve in the cultivation of cash crops in most parts of Africa, Nigeria inclusive because women only have temporary rights to land ownership in most cases and are not usually allowed to grow cash crops like cocoa and oil palm.

Marital status of respondents

Most respondents were married (80.90% while about 9.55% were single). Being married thereby suggest a sense responsibility and which also shows the importance the society attached to the marriage institution and family labour which is still very much important among the cocoa farmers. Married individuals are considered to be more financially responsible and productive. The findings corroborates the result of Akinbile *et al* (2008) and Ehiwario (2016), which noted that peoples participation in community and cooperative organization are mostly offered by married people, who participate in order to improve their economic livelihood.

Educational level of respondents.

Most co-operators (52.78%) had primary and secondary education, 13.53% had not formal education while 33.68% had post-secondary education. This is an indication that respondents' literacy level was high. With this high level of education, it is expected that the level of adoption of cocoa technologies will be high. This corroborate the studies carried out by Inedia *et al* (2016) and Ogwuche, (2016) who found that education is positively correlated with adoption of technologies. Also, Ogunfeditimi (1981) found that the level of education of small scale farmers in Oyo and Ondo States of Nigeria have positive significant relationship with adoption of improved varieties of Cassava, Maize and Cocoa. He reiterated that the more the farmers advanced in their level of education, the more they tend to understand the impotence, intricacies and need for adopting new

improved farm practices. Onemolease *et al* (2001) discovered that educational level of farmers had a positive and significant effect on farm productivity and adoption.

Household size of respondents

Household size distribution of the respondents shows 41.38% to have 1-4 members, 40.58% (5-8), 15.38% (9-12) and 2.65% to have above 12 members. The average household size for the study area was approximately six. The findings indicated that most of the respondents had people living with them, suggesting a sense of responsibility and this, hopefully, will enhance their effective utilization of cocoa innovations. This finding is in line with Nosiru (2010) and Ogwuche (2016), who found that farmers with larger household size were more productive than those with smaller household size; since they use household members as labour input in the farm enterprise. Household size imposes the necessity to engage in co-operative activities as mere family size put pressure on the household head to devise means of sustenance by engaging in productive ventures. Having large family size, as indicated in this study, may suggest availability of farm labour among the farmers which could lead to increased farm productivity, especially in the area of application of insecticides, pruning of cocoa trees, harvesting and breaking of cocoa pods, fermentation and drying processes. Having people to cater for can be a motivating factor to compel individuals to engage in cooperative extension activities in order to improve upon their productivity and income levels. The result agrees with Kareem *et al.*(2012) who reported similar household range for member of cooperative societies in Ijebu-Ode, Ogun State.

Farming experience of respondents

The result of Table 2 shows that 31.83% of the respondents had 10-19 years farming experience, 23.34% had 20-29 years farming experience, 29.71% had 1-9years farming experience, and 3.45% had 40-49years, while 1.06% had 50 or more years of farming experience. The average experience, which was about 18 years, suggests that this long experience in farming among the co-operators gives them better experience and opportunity to have firsthand knowledge of the challenges and needs associated with cocoa farming in the study area. This assertion is in line with Okwuokenye and Onemolease (2011) who noted that having long farming experience help farmers to be better positioned to know the needs and problems associated with farming activities.

Table 2: Socio-economic characteristics of respondents

		Ekiti North (n=106)		Ekiti Central (n = 127)		Ekiti South (n = 144)		Total (n = 377)		Mean
		Freq	%	Freq	%	Freq	%	Freq	%	
Age range years	<30	1	.94	26	20.47	7	4.86	34	9.02	11.09
	30-39	20	18.8	21	16.54	27	18.7	68	18.04	5.54
	40-49	26	24.5	25	19.69	44	30.5	95	25.20	3.97
	50-59	48	45.2	33	25.98	45	31.2	126	33.42	2.99
	60 & above	11	10.3	22	17.32	21	14.5	54	14.32	6.98
Sex	Female	24	22.6	29	22.83	33	22.9	86	22.81	4.38
	Male	82	77.3	98	77.17	111	77.0	291	77.19	1.30
Marital status	Married	90	84.9	96	75.59	119	82.6	305	80.90	1.24
	Single	4	3.77	21	16.54	11	7.64	36	9.55	10.47
	Widow(er)	9	8.49	7	5.51	12	8.33	28	7.43	13.46
	Separated/Divorced	3	2.83	3	2.36	2	1.39	8	2.12	47.13
Educational level	No formal education	11	10.3	18	14.17	22	15.2	51	13.53	7.39
	Primary education	14	13.2	32	25.20	27	18.7	73	19.36	5.16
	Tertiary education	59	55.6	30	23.62	38	26.3	127	33.68	2.99
	Secondary education	22	20.7	47	37.01	57	39.5	126	33.42	2.99
Household size	≤ 5	61	57.5	42	33.07	53	36.8	156	41.38	2.42
	6-10	26	24.5	61	48.03	66	45.8	153	40.58	2.46
	>10	19	17.9	23	18.90	25	17.4	68	18.03	5.54
Farming experience range (years)	≤ 10	50	47.7	34	26.77	28	19.4	112	29.71	3.37
	11-20	45	42.5	65	51.18	98	68.1	208	55.17	1.81
	>20	19	17.9	24	18.90	25	16.4	68	18.03	5.54
Farm size (ha)	<2	33	31.1	48	37.80	36	25.0	117	31.03	3.22
	2.1 - 5.9	26	24.5	62	48.82	80	55.6	168	44.56	2.24
	>6	47	65.1	17	13.39	28	19.5	92	24.40	4.10
Income range	250,000 & below	14	13.2	48	37.80	44	30.6	106	28.12	3.56
	250,001-500,000	29	27.4	38	29.92	44	30.6	111	29.44	3.40
	500,001-750,000	47	44.3	31	24.41	37	25.7	115	30.50	3.28
	750,001 - 1,000,000	14	13.2	8	6.30	13	9.03	35	9.28	10.77
	1,000,001 - 1,250,000	0	.00	1	.79	4	2.78	5	1.33	75.4
	1,250,001 - 1,500,000	0	.00	1	.79	1	.69	2	.53	188.5
	1,500,001 - 1,750,000	2	1.89	0	.00	0	.00	2	.53	188.5
	1,750,001 - 2,000,000	0	.00	0	.00	1	.69	1	.27	377
	Inherited	74	69.81	68	53.54	91	63.19	233	61.8	1.62
	Purchased	4	3.77	13	10.24	16	11.11	33	8.75	11.42

Leased/rented	9	8.49	22	17.32	13	9.03	44	11.67	8.57
Family owned	18	16.98	25	19.69	60	41.67	103	27.32	3.66
Community land	1	0.94	2	1.57	5	3.47	8	2.12	47.125

*Multiple responses hence total exceeds sample size

Source: Field Survey 2017

Farm size of respondents

The results for farm size show that 44.56% had 2.1-5.9ha, 21.75% had 6-9.99ha, and 31.03% had less than 2ha while 2.65% had 10ha and above. The average farm size was 4.04ha, and indicates that the farmers were small-scale farmers. This shows that most cocoa farmers in the study area were smallholders, and this may likely limit their output and discourage embracing new cocoa technologies. Such low scale may constitute a constraint to production expansion and serve as an incentive to seek out information on how to seek improve productivity. This result corroborates the works of Erie (1996), Omohan (1996) and Ogwuche (2016) that small farm holdings constitute more than 70% of all farming activities in Nigeria. Also, it is in line with Mgbeje (2005) and Ugwu (2009), who asserted that smallholders in African countries owned between 2-4 hectares.

Income of respondents

Annual income figures for the respondents revealed that 30.50% earned ₦500,001 - ₦750,000, 29.44% earned ₦250,001 – ₦500,000, 28.12% earned ₦250,000 and below, 9.28% earned ₦750,001 – ₦1,000,000 while only 1.33% earned ₦1,000,001 - ₦1,250,000. The average income of the co-operators was ₦453, 249.34. The income is low. These findings suggest that cocoa cooperatives farmers in the study area are still operating at the subsistence level. Income of farmers has been found to be a critical factor in agricultural production especially cocoa production. The more the farmers are well to do economically, the more their ability to purchase necessary inputs such as fertilizers, insecticides, herbicides and labour (Tesfaye *et al.*, 2001).

Respondent’s attendance at cooperative meetings.

Table 3 reveals that 84.88% of the respondents attended cooperative meetings at least once in a month, in the last 6 months 12.48% attended cooperative meeting between 7-12 times in the last six months while 2.66% of the respondents attended cooperatives meetings more than 12 times within the last six months. According to cooperatives rules and regulation, it is compulsory for a member to attend meetings regularly. Meetings are held at least once every month for members to attend. Executive meeting are usually held before the general meetings where vital issues about members’ credits and performances are discussed before the general meetings.

Table 3: Agricultural extension activities of cooperatives

Activities	Ekiti North		Ekiti Central		Ekiti South		Total	
	Freq	%	Freq	%	Freq	%	Freq	%
Providing members with information about modern farming practices	66	62.26	126	99.21	137	95.14	329	87.27
Providing members with market information on farm product prices	3	50	114	89.76	114	79.17	281	74.54
Training members on storage Methods	50	47.17	115	90.55	116	80.56	281	74.54
Training members on nursery management practices	54	50.94	105	82.68	118	81.94	277	73.47
Training members on disease/pest control measures	51	48.11	107	84.25	113	78.47	271	71.88
Training members on farm chemical (fertilizer) applications	51	48.11	101	79.53	117	81.25	269	71.35
Getting information from research institutes to solve members farming problem	49	46.23	95	74.8	117	81.25	261	69.23
Linking members to input Suppliers	48	45.28	103	81.1	110	76.39	261	69.23
Provision of improved planting materials to members	47	44.34	96	75.59	118	81.94	261	69.23
Organizing training for Members	49	46.23	96	75.59	115	79.86	260	68.97
Provision of subsidies on approved chemicals	44	41.51	104	81.89	103	71.53	251	66.58
Linking members to middlemen /marketers	45	42.45	100	78.74	104	72.22	249	66.05
Establishment of farm demonstration sites	38	35.85	73	57.48	113	78.47	224	59.42
Taking farmers (members) on Tour/excursion/agric shows.	36	33.96	83	65.35	65	45.14	184	48.81

Source: Field Survey 2017

Contribution of cooperatives to farmers' awareness of cocoa technologies.

The results of Table 4 reveal that under nursery practices, the major areas in which the respondents agreed that their cooperatives was instrumental to their knowing about the technologies were provision of shade at the nursery (30.24%), fencing the nursery with wire mesh (1m high) (31.30%), transplanting seedlings after five to six months (29.18%), locating nursery close to farm sites/water source (27.59%). For field establishment practices, the results of the table indicate that planting of improved cocoa seedlings technology (28.91%), providing shade cover for cocoa seedlings and site for new planting which should preferably be under forest cover (27.85%). Recommended spacing of 3m x 3m which can guarantee a plant population of 1,100/ha (27.06%), mulching of seedlings/young plants (28.12%) were the major practices the respondents claimed to know through the cooperatives.

Other areas in which the respondents said they have come to gain knowledge of cocoa technologies through the cooperatives include use of insecticides as control of major insects pests (23.08%), harvesting cocoa pods with sharp, clean and disinfected hooks or secateurs, fermentation of cocoa beans in heaps or forwarding boxes

(20.42%), drying of harvested cocoa beans immediately after fermentation (22.81%), storage of cocoa bean in clean jute bags (21.49%) and proper fumigation of stores where cocoa bean is stored (21.49%)

It was observed that cooperatives have contributed to the respondents' awareness of cocoa technologies in the study area. However, the general results suggested that cocoa producer cooperatives contribution to the farmers' awareness of cocoa technologies was low, since the maximum percentage was about 31%. CTA (2011), USAID (2011) and Ghiasy and Mirakzadeh (2012) maintained that cooperatives have been known to provide extension and advisory services to farmers on problems or opportunities, facilitate development of local skills and organizations, transfer new technology to farmers. Such activities help cooperative members to become aware and skilled in modern farming technologies.

Table 4: Contribution of cooperatives to farmers' awareness of cocoa technologies

	Ekiti North		Ekiti Central		Ekiti South		Total	
	Freq	%	Freq	%	Freq	%	Freq	%
Nursery practices								
Fencing the nursery with wire mesh (1M high)	16	15.09	33	25.98	69	47.92	118	31.30
Provision of shade at the nursery	11	10.38	32	25.20	71	49.31	114	30.24
Transplant seedlings after 5 to 6 months	20	18.87	33	25.98	57	39.58	110	29.18
Locating nursery close to farm sites/water source	9	8.49	35	27.56	60	41.67	104	27.59
Field establishment								
Planting of improved cocoa seedlings	19	17.92	37	29.13	53	36.81	109	28.91
Mulching of seedlings/young plants	17	16.04	38	29.92	51	35.42	106	28.12
Site selection: Site for new planting should preferably under forest cover	17	16.04	35	27.56	53	36.81	105	27.85
Provide shade cover for Cocoa seedlings	17	16.04	34	26.77	54	37.50	105	27.85
Regular weeding manually or with chemical	16	15.09	37	29.13	50	34.72	103	27.32
Recommended spacing for the new varieties is of 3M x 3M which can guarantee a plant population of 1100/ha	16	15.09	32	25.20	54	37.50	102	27.06
Fire Tracing	17	16.04	35	27.56	45	31.25	97	25.73
Regular pruning	13	12.26	35	27.56	47	32.64	95	25.20
Control of major insect pests								
Harvest ripe, healthy pods regularly to prevent pod loses to minor infection	15	14.15	37	29.13	25	17.36	77	20.42
Use of insecticides	15	14.15	35	27.56	37	25.69	87	23.08
Harvesting								
Harvesting with sharpened clean and disinfected hooks or secateurs	17	16.04	35	27.56	24	16.67	76	20.16
Fermentation								
Fermentation of Cocoa beans in heaps or forwarding boxes	17	16.04	39	30.71	21	14.58	77	20.42
Fermentation done within 5 to 7 days	16	15.09	40	31.50	20	13.89	76	20.16
Drying								
Use of solar driers	10	9.43	39	30.71	26	18.06	75	19.89
Drying of harvested Cocoa beans immediately after fermentation	12	11.32	38	29.92	36	25.00	86	22.81
Packaging and storage								

Storage of Cocoa bean in clean jute bags	16	15.09	43	33.86	22	15.28	81	21.49
Proper fumigation of stores where cocoa bean is stored	15	14.15	45	35.43	21	14.58	81	21.49
Keeping bagged cocoa beans away from smoke	16	15.09	43	33.86	19	13.19	78	20.69

Source: Field Survey, 2017

Test of difference in extension activities of cocoa producer cooperatives

Cochran test was used to analyze the hypothesis that states that, there is no significant differences in the agricultural extension activities/services provided members by the cocoa producers' cooperatives in the study area. The result is presented in Table 5. Cochran test result ($\chi^2= 295.82$; $df= 13$; $p \leq 0.050$) is significant at the 5% level which implies that there is a significant difference in the extension activities co-operators agreed that their cooperatives were involved in. Since the result is significant, the null hypothesis rejected while the alternative hypothesis is accepted. The post-hoc test reveals that the extension activities the cocoa producers cooperatives were significantly more involved in include training members on storage methods (0.745), providing members with market information of farm product prices (0.745), providing members with information about modern farming practices (0.873) and training members on nursery management practices (0.735). The least significant activities the cooperatives were involved in include taking farmers (members) on tour or excursion or agricultural shows (0.488), establishment of farm demonstration sites (0.594), linking members with middlemen/marketers (0.660), organizing training for members (0.690) and linking members to inputs suppliers (0.692).

Table 5: Differences in extension activities of cocoa cooperatives (Cochran test)

Activities	Proportion	
Taking farmers (members) on tour/excursion/Agric shows.	0.488	f
Establishment of farm demonstration sites	0.594	ef
Linking members to middlemen /marketers	0.660	e
Provision of subsidies on approved chemicals	0.666	e
Organizing training for members	0.690	de
Linking members to input suppliers	0.692	cde
Getting information from research institutes to solve members farming problem	0.692	bcd
Provision of improved planting materials to members	0.692	bcd
Training members on farm chemical (fertilizer) applications	0.714	bc
Training members on disease/pest control measures	0.719	b
Training members on nursery management practices	0.735	ab
Training members on storage methods	0.745	a
Providing members with market information on farm product prices	0.745	a
Providing members with information about modern farming practices	0.873	a

$\chi^2= 295.82$; $df = 13$; $p < 0.050$

Source: Field Survey 2017

Table 6: Multiple regression outputs.

Independent variables	Unstandardized Coefficients (b)	Standardized Coefficient (Beta)	t	Prob. Level
(Constant)	-7.696		3.46	0.001
Extension activities of Cooperatives	1.111*	0.492	9.12	0.000
Age	1.093*	0.159	2.32	0.021
Number of meetings attended	0.484*	0.104	2.20	0.029
Income	0.230	0.089	1.35	0.178
Farm size	0.171	0.074	1.14	0.255
Household size	-0.230	-0.064	1.12	0.265
Farming experience	-0.105	-0.041	0.59	0.558
Educational level	-0.132	-0.039	0.70	0.485
Length of cooperative Membership	-0.122	-0.033	0.58	0.566
Sex	-0.081	-0.018	0.39	0.698

Adjusted R square = 0.233; F = 12.42; p ≤ 0.050

**Significant at 5% (critical t = 1.96)*

Source: Field Survey 2017

Conclusion

Cocoa producer cooperatives in the study area are actually involved in some form of agricultural extension service delivery to their members. Major activities include providing members with information about modern farming practices, market information (farm product prices), training members on storage method, nursery management practices, and disease or pest control measures. The percentage contribution of the cooperatives to the co-operators' awareness of cocoa production technologies was average. This findings suggest that the cooperatives played little role in the cooperators awareness of cocoa production technologies.

The study found that the contribution of cooperatives to the farmers' awareness of cocoa technologies was influenced by the extent of extension activities the cooperatives are engaged in, the age of the farmers as well as their attendance frequency in cooperative meetings

Based on the findings, the following recommendations are made: Cocoa producers' cooperatives should be linked to institutional credit sources especially microfinance banks. This will enhance their access to capital which will make it easier to engage in agricultural extension activities. Cocoa Research Institutes of Nigeria (CRIN) as well as the ADP should make concerted efforts to reach out to cocoa farmers with extension services using the cooperatives. This will boost the contribution of these cooperatives to the farmers' awareness and knowledge of cocoa technologies.

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