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Full Length Research Paper

Socioeconomic impact of SARO agro allied organic cocoa programme on beneficiary cocoa farmers in Nigeria

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Organic cocoa farming involves cultivation of cocoa with rational use of allowable inputs (fungicides and bio-insecticides). SARO Agro Allied Nigeria and her foreign partner ADM/Schokinag started the organic cocoa project (OCP) in 2006/2007 cocoa season in four of their major operating states in Nigeria (Ondo, Osun, Ekiti and Cross River). This study was designed to evaluate the income profile, biological and socioeconomic impact of OCP on the pilot farmers who were purposively selected for the study. Data were analyzed using frequency, percentages, mean and T-test statistics. Significant difference was recorded in 5 socioeconomic variables between 2007 and 2010, while a positive relationship was established between organic cocoa production, yield and farmers income profile. Three major sources of income (yield increase, savings from pesticide use reduction and premium) were identified from the 471 respondents. The cocoa yield increased from 0.5 mt/ha in 2007 to 0.73 mt/ha in 2010, there was 40% reduction in fungicide use which translated to N13.2 m savings for the 471 farmers, revenue from yield increase was N112.7 m, while revenue from premium for organic cocoa production was N24.7 m. Total revenue as a result of organic cocoa production per farmer was thus N319,745.22. Moreover, land under organic production by the pilot farmers was 1687 ha which the same remained over the study period. The study concluded that the OCP impacted positively in increased yield, input cost reduction, environmental and health improvement and increased revenue.

Key words: Organic cocoa, yield, premium, fungicides, bio-insecticides, International Federation of Organic Agriculture Movements (IFOAM).

INTRODUCTION

Production of cocoa in Nigeria has been an unstable agricultural and economical venture; it was at a time the main stay of Nigeria economy before the discovery of crude oil, when its production was neglected and farms became moribund. Renewed efforts on the part of government and private individuals have resuscitated the cocoa industry in Nigeria to its now fledging status where it has regained its major economic base for Nigeria. Revenue from cocoa exports is the country's second biggest foreign exchange earner, after crude oil (World Bank, 2010). Over 620,000 ha of land is under cocoa cultivation, with national production put at a little above 245,000 MT of cocoa beans in 2010/2011 cocoa season. Low farm productivity and poor cocoa bean quality as well as poor quality of farmers and farm hands working condition has adversely affected increased output and quality of Nigeria's cocoa. Small scale farmer that produces the bulk of cocoa lacks the knowledge and skills that can lead to improve productivity and quality of output. The current market conditions do not allow farmers to increase their income even if they offer better products or improve their production process. In the same vein, increased output through increased land area

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remains largely difficult and not sustainable. Therefore, attempts to increase output/income must focus on increased productivity per land area, quality of produce and quality of operator's life (Faturoti, 2010).

Organic agriculture is a health and environment conscious farming system which avoids the use of synthetic compounds and seeks to minimize pollution of air, water and soil. It also preserves the health and productivity of operators and consumers. Organic cocoa farming involves cultivation of cocoa with rational use of allowable inputs (fungicides and bio-insecticides). It is a regulated way of farming that mimics nature [International Federation of Organic Agriculture Movements (IFOAM, 2002)].

Organic agricultural methods are internationally regulated and legally enforced by many nations, based in large part on the standards set by IFOAM (2002), an international umbrella organization for organic farming established in 1972 (Paull, 2010). IFOAM defines the overarching goal of organic farming as: "Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit shared environment and promote fair relationships and a good quality of life for all involved (Organic Monitor, 2009)

Standards regulates production methods and in some cases final output for organic agriculture. Standards may be voluntary or legislated. As early as the 1970s, private associations certified organic producers. In the 1980s, governments began to produce organic production guidelines. In the 1990s, a trend toward legislated standards began, most notably with the 1991 EU-Eco-regulation developed for European Union (EU), (Control Union World Group, 1991), which set standards for 12 countries, and a 1993 UK program. The EU's program was followed by a Japanese program in 2001, and in 2002 the U.S. created the National Organic Program (USDA, 2008). IFOAM (2005) created the Principles of Organic Agriculture, an international guideline for certification criteria. Typically, the agencies accredit certification groups rather than individual farms.

SARO Agro Allied, a major cocoa exporting company started operations in Nigeria in 1996, with her operations more intensified in four states of the country, namely Ekiti, Ondo, Osun and Cross River states. The company's cocoa procurement strategy is origination and innovativeness, as such it has deep rooted interactions with buying agents located in villages, but with fringe interactions with farmers; prior to introduction of organic cocoa project (OCP) her cocoa export was majorly to Germany through the then Schokinag Schokolade.

In 2006, because of the increased demand for organic cocoa and increasing attention and demand for food with known origin and known inputs (organically grown cocoa) from Schokinag's customers in Europe and America, SARO Agro Allied was approached for a venture in organic cocoa which was in tandem with the vision of SARO to innovatively add value beyond sourcing of cocoa and exporting cocoa. The OCP was therefore started in the 2006/2007 cocoa season in four states of Nigeria namely, Ondo, Osun, Ekiti and Cross River. Farmers were organized into groups for ease of project delivery, internal control system was appointed and trained to oversee conformities to the organic codes as it was a novel project. At inception, there were apprehensions on farmers understanding and compliance to the organic codes as well as the outcome of the project on the yield, income and sustainability of the project.

This study, therefore, assessed the impact of the organic cocoa production in Nigeria. Specifically, the study:

1) Describe the personal characteristics of the small holder farmers, who were involved in the organic cocoa program,
2) Ascertain the impact of the organic cocoa production program on respondents farmers yield,
3) Ascertain the income profile of small holder farmers, who are involved in the organic cocoa program,
4) Examine sustainability of the OCP

Hypotheses:

1) There is no significant increase in respondents' status and income profile in 2007 and 2010
2) There is no significant impact of the organic cocoa program on the respondents
3) There is no significant difference in agro-economic yield in 2007 and 2010.

METHODOLOGY

Study area

The study area was the four SARO Agro Allied OCP pilot states in Nigeria (Ekiti, Ondo, Osun and Cross River). The four states accounts for 70% of Nigeria total cocoa production and 68% of available land mass for cocoa cultivation (Omolaja et al., 2011).

Population and sample

The population of the study was taken from the pilot organic cocoa farmers in the four pilot states (Ekiti, Ondo, Osun and Cross River). The project started with 501 farmers in 2006/2007 cocoa season which were reduced to 471 with the removal of non-compliant farmers after the first round of organic inspection certification in 2007. Purposive sampling of 471 compliant farmers was done, thus, a total of 471 respondents were included in the study (Table 1). Data were collected from the respondents through the use of questionnaire and interview schedule.

Data analysis

Data collected were subjected to statistical analysis using the

Table 1. Composition of population and sample.

Location	No. of farmers in 2006/2007	No. of violators	No. of farmers sampled
Ikom	74	10	64
Erinjo	44	3	41
Idanre	110	6	104
Ekiti	93	3	90
Ondo	70	4	66
Ilesha	110	4	106
Total	501	30	471

Source: Field survey (2010).

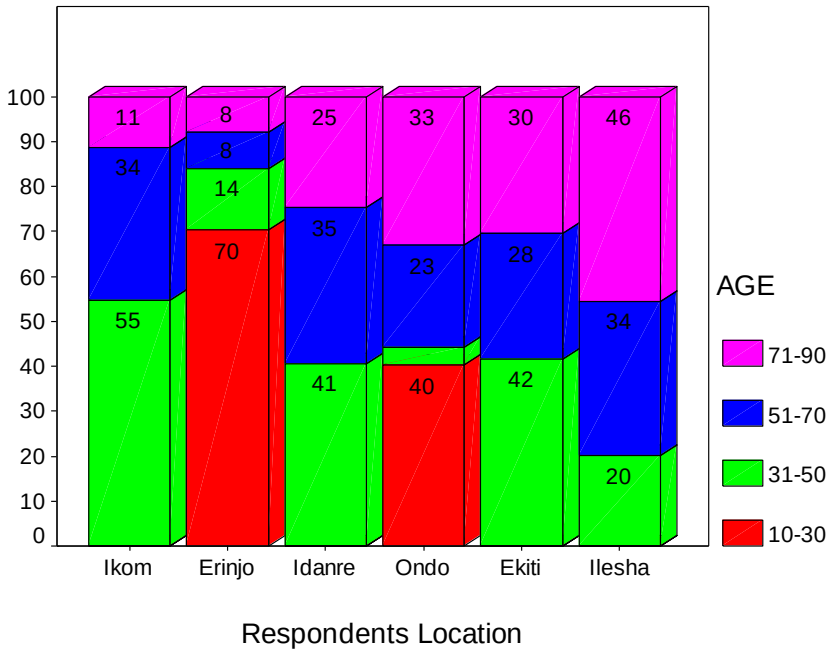

Figure 1. Organic farmer's age distribution.

Statistical Package for Social Science Research (SPSS) as a tool of analysis. Descriptive statistics (percentages and mean statistics), graphs and tables were used to describe farmers personal and socioeconomic characteristics, T-test statistics was used to compare the baseline data collected in 2006/2007 season (yield, pesticide usage, input cost and income generated) with results obtained in 2010/2011 season (yield, pesticide usage, input and income generated).

RESULTS AND DISCUSSION

Age distribution

Data shows that 29.3% of the farmers are in the age class of 31 to 50 years (highest class), 27% are 51 to 70 years. Also, 25.7% are within the ages of 71 to 90%, while only 18% are below 30 years (Figure 1). In terms of productivity and sustainability, 47.3% are within the ages of 10 to 50 years. The mean age of the farmers was 55 years. This shows a relatively growing and productive group with capacity for farm expansion and dynamism for adoption of innovation. Erinjo and Ondo locations had greater percentages of their farmers 70 and 40%, respectively below 30 years; this may be a pointer for greater sustainability and adoption. Ilesha had the oldest farmers in the study and this reflects in their low production. The younger the farmer, the more likely he is to adopt innovation in its early cycle. Older farmers rely less on external information, and therefore, do not get in touch with innovations in the market as early as their younger colleagues (Diederen et al., 2002; Schinitkey et al., 1992)

Respondents' sex

Data in this study shows that there are 88.1% male

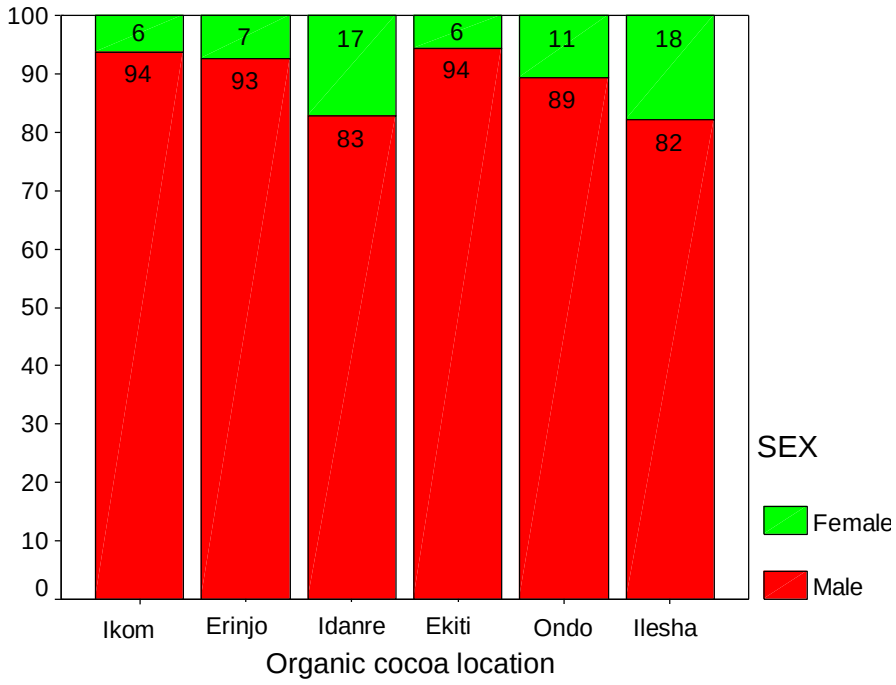

Figure 2. Respondents percentage sex distribution.

respondents and 11.9% females (Figure 2). This is not un-expected as land tenure and inheritance rights mostly reside in custody of males in Nigeria as such decision over land is vested largely in males who had control over the family by native law and custom. However, with cocoa becoming a cash crop and a plantation that can be contracted out for maintenance, more and more women are becoming cocoa owners. The initial large number of females especially in Ilesha and Idanre may also be as a result of willingness of more women to join the program at inception as most men in the area adopted a wait and see attitude causing many of them to join after seeing positive results from pioneers (Faturoti et al., 2008). Adoption is a copying process which diffuses to other users when the superiority of the innovation becomes visible to others (Rogers, 2003).

Educational status

Data collected on the respondents educational status shows that one third of the respondents (27.6%) had no educational background with majority coming from Ilesha and Erinjo. 29.5% had primary education, 25.3% secondary education, while 17.6% had university education. Primary and secondary education accounted for 54.8% of the respondents (Figure 3). The result shows relatively high literate respondents with over 70% literacy. This has implication for adoption as educational level has been found to have a positive correlation with adoption (Lemchi et al., 2005a).

Land ownership

Result shows that 49.67% respondents bought their land and owned it personally, 21.83% derived their title ownership from family and has unlimited control over the land, 20.5% rented their lands with renewable tenors that can be revoked, while 8% lease their farms from government this can also be revoked (Figure 4). The majority 71.5% of the respondents which has unlimited long-term tenor on their land has serious implication and positive effects on adoption of organic and other certified farming innovations that requires undisturbed access and control over a long period of time to actualize sustainable certification, as land is the certified object on which the crop derived its certification (IFOAM, 2004).

Land size

Data collected on land distribution show that the respondents were predominantly small holder farmers with 47.2% having land holding between 1 to 10 ha. Only 14% had land larger than 20 ha (Figure 5). This suggested that aggressive aggregation has to be done to increase land under organic/certified produce as more farmers will continuously be needed for production increase. Land size was found to have positive correlation with innovation adoption where farmers can try an innovation on a smaller scale before full scale adoption when satisfied with the outcome (Dielderen et al., 2002). The predominantly small landholders' farmers

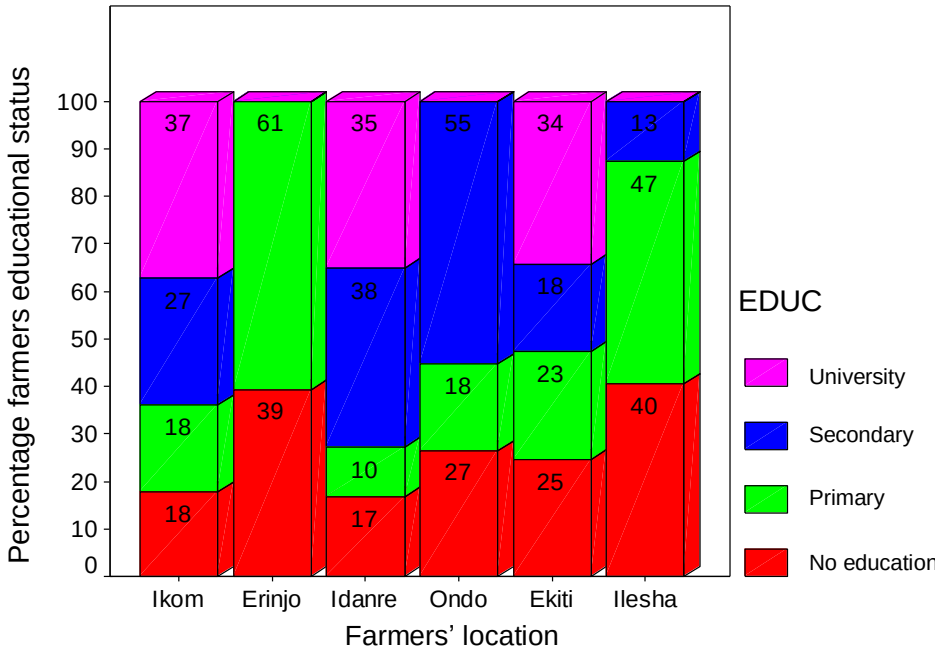

Figure 3. Organic farmers' educational status.

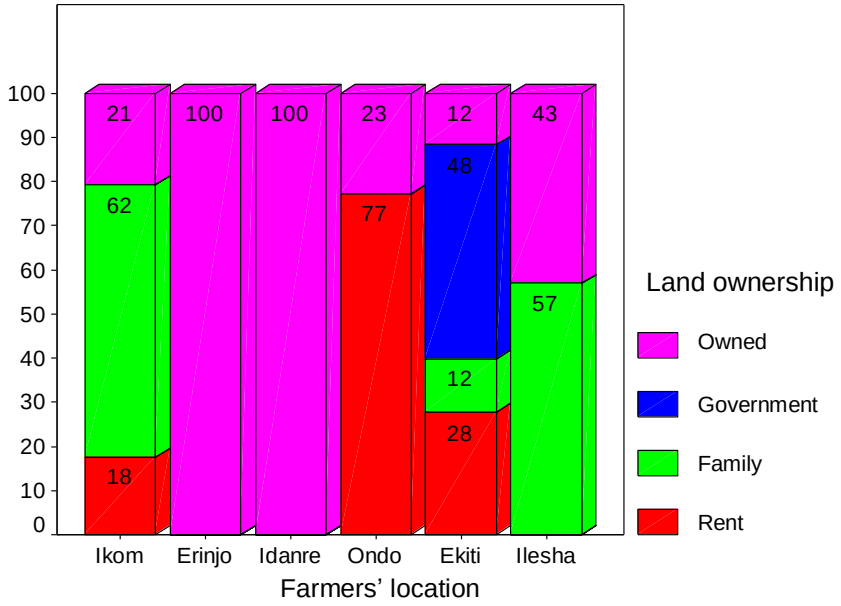

Figure 4. Organic farmers' land ownership status.

in this study are a reflection of the generally small holder cocoa production system in Nigeria and fragmented land inheritance pattern.

Average yield per hectare under organic production

The result of baseline yield per hectare of the compliant organic cocoa farms monitored over a 4-year period show 100% yield increase in Ekiti (0.3 mt in 2007 to 0.6 mt in 2010). Erinjo and Ondo also recorded appreciable yield increase of 50 and 40%, respectively. A below average yield increase of 25 and 14% was recorded in Ilesha and Idanre, respectively from 2007 to 2010 (Figure 6). However, a marginal yield increase of 9% was recorded at Ikom (1.1 mt/ha in 2007 to 1.2 mt/ha) over

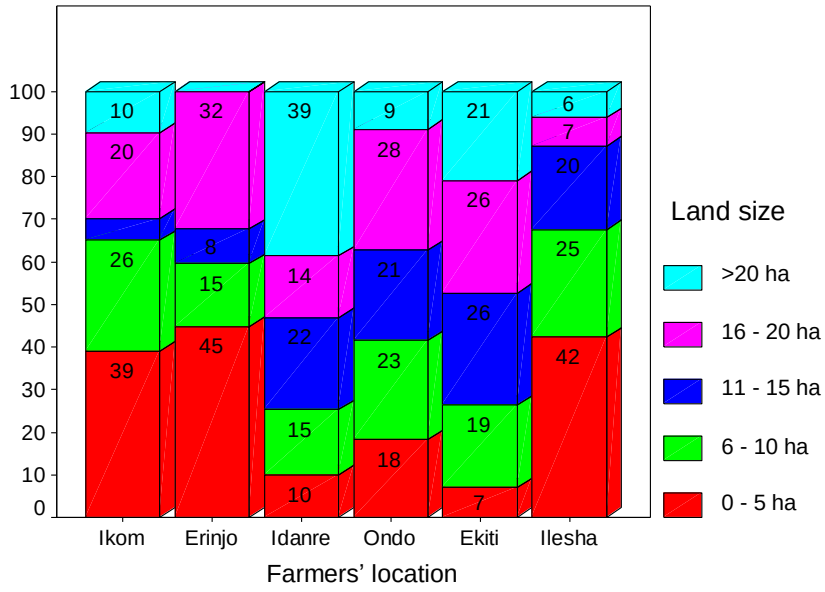

Figure 5. Organic farmers' land size distribution.

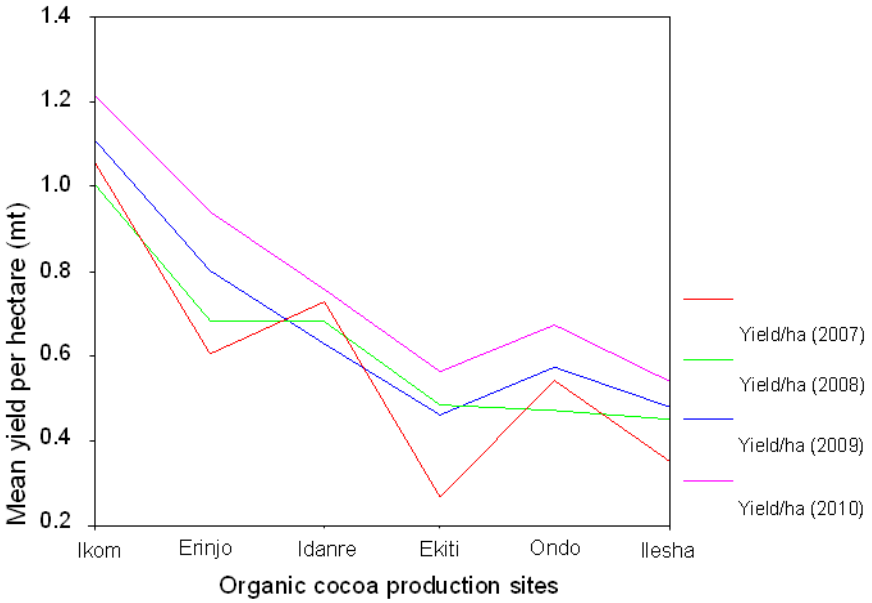

Figure 6. Yield per hectare of organic production.

the study period. It was also observed that the current average yield per hectare in the study area is well above the national average of 0.4 mt/ha, whereas Ekiti, Ondo and Ilesha were around the national average in 2007 when the project started but has surpassed the current national production average (Gain Report, 2011). This may not be unconnected with the impact of the good agricultural practice that resulted in lesser black pod disease and better soil management which were basic concern of the project (Roundtable for a sustainable cocoa economy, 2009).

Fungicide consumption in the study

Data in Figure 7 shows that there has been general decrease in allowed fungicide usage in the study area. Results show that there was more than 40% reduction in fungicide usage across study location. The highest reduction in fungicide usage was recorded in Idanre with 40.6%, while the lowest reduction in fungicide usage was recorded in Ilesha 34.6%. This is a substantial economical savings and environmental friendliness for the project area. Idanre was noted for her high intensification

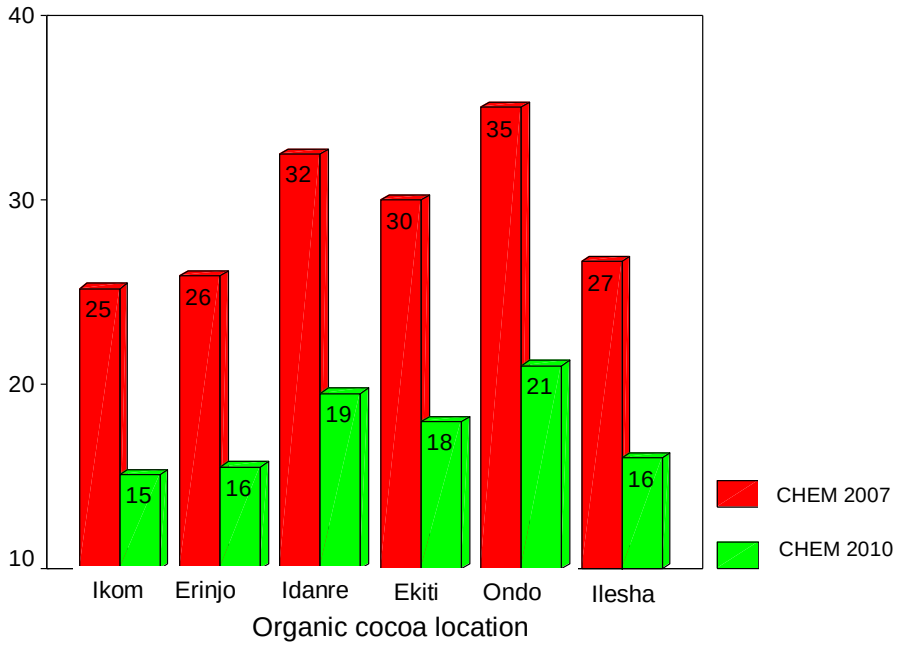

Figure 7. Fungicide usage hectare 2007 and 2010.

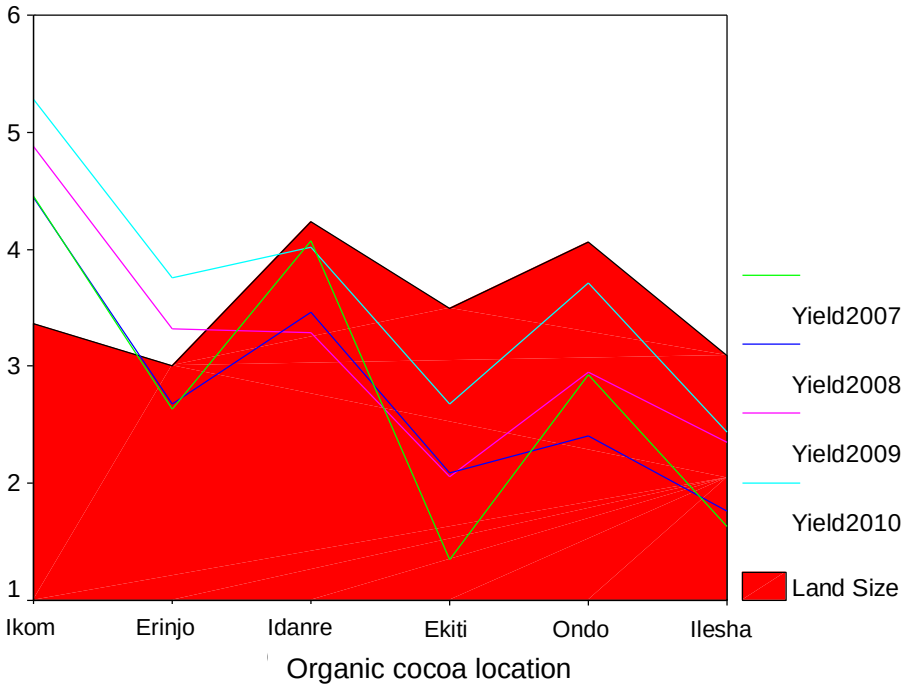

Figure 8. Respondents mean yield per organic land area.

of cocoa production with emphasis on pesticide usage as such adoption of organic cocoa production resulted in lower pesticide use which translates to higher monetary savings for farmers in the study with more financial benefits accruing to Idanre farmers.

Average yield per land area available to organic farmer

Results obtained (Figure 8) when respondents yield was compared to average land area available in the project in

Table 2. Differences in means of farmers economic returns in 2007 and 2010 as a result of organic cocoa intervention.

Variable	Mean 2007	Mean 2010	T-value
Mean yield mt/farmer	2.77	3.51	9.20*
Mean yield mt/ha	0.56	0.73	11.01*
Mean fungicide kg/farmer	29.48	17.68	70.12*
Mean fungicide kg/ha	8.20	4.90	2.00*
Mean fungicide cost (N)	15,886.76	44,129.89	2.00*

Source: Field survey (2010). *Significant (P<0.05).

Ikom project area, 40.7% yield increase at Erinjo 27%, increase in ondo, 60% increase at Ilesha, while Ekiti recorded 115% yield increase over the four season period. This result has accelerated willingness to be part of the program with a resultant effect of adjoining villages persuading operators of the program to come over and work in their area too. On the contrary however, there was no significant yield increase at Idanre during the period of study, which accounted for the less cooperative attitude of Idanre farmers to the program. This reactive process is explained by the established theory of adoption, that adoption is favored and enhanced where the gains are visible and more profitable than existing innovation (Rogers 2003; Lemchi et al., 2005b).

Impact assessment variables

Result revealed significant statistical difference in the means of five impact related variables considered in the study. The variables are yield per farmer, yield per hectare, fungicide used per farmer, fungicide rate per hectare and fungicide cost; the means were significantly higher in 2010 than 2007 when the project commenced. Significant yield increase was recorded in the study, yield per hectare increased from 0.56 to 0.73 mt/ha; this was well above the national average despite the generally unrestrained use of pesticide in the conventional cocoa production in Nigeria. However, the significant difference recorded for fungicide rate and cost was not strange as organic production regulates allowable use of copper fungicides and places emphasizes on good agricultural practices (pruning, farm sanitation, removal of infected pods), which in turn reduces black pod incidence and consequent reduction of fungicide usage (IFOAM, 2011). There was however, general increase in fungicide cost which impacted less on the respondents' farmers as a result of their reduced fungicide use resulting from good agricultural practice in the study (Table 2).

Revenue generation profile in organic cocoa production 2007 versus 2010

Table 3 shows the income generation profile of the organic cocoa program in Nigeria, contrary to the widely held believe that organic cocoa initiative will reduce farmers yield and consequent income stream; the study accepts the alternative hypotheses as remarkable revenue increase from 2007 to 2010 was recorded. There was 27.63% increase in yield during the study period, which may have come from good agricultural practices (timely protection with allowable fungicides and general farm sanitation) on which the project was formed and operated. Fungicide application rate also reduced by 40% over the study period; this fungicide reduction and yield increase has monetary implication as recorded in this study.

Despite the 362% increase in the national cost of copper fungicide between 2007 to 2010, a savings of N13,201,971.60 m was recorded as a result of reduction in rate of fungicide application between 2007 and 2010; this is no doubt a substantial amount of money considering the hectares involved. Price of cocoa increased globally by 50% over the study period, therefore, the 27.63% yield increase recorded translates to N112,652,400.00 in 2010 compared with 2007. Another source of income in the study is premium paid for organic certified cocoa farmers, most of which were paid in kind through, training, subsidy on fungicide, protective gears and warehouse separation and packaging. However, the total cash premium paid to the farmers was to the tune of N24,780,000 m. All these streams of income put together amounted to N158,107,950 m accrued to the organic farmers in this study. This translated to N127, 609.32/mt, and N93,676.95 extra income generated per hectare of organic cocoa production. This is no doubt a morale booster that can ignite further participation and investment in organic cocoa production (Rundgren, 2006).

Respondent's benefits from organic cocoa

Results obtained as recorded in Table 4 show that increased yield (34.4%) and increased income (24.6%) were the two most visible benefits accrued to farmers in this study, though benefits related to health were equally ranked high by beneficiary farmers (reduced sickness

Table 3. Comparison between 2007 and 2010 revenue generation profile in organic cocoa production.

Variable	Mean 2007	Mean 2010	Difference	% Change
Land area	1,687.80	1,687.80	0.00	0.00
Total yield	970.78	1,239.00	268.22	27.63
Price (naira/mt)	280,000.00	420,000.00	140,000.00	50.00
Fungicide application rate (kg/ha)	8.20	4.90	-3.30	-40.24
Mean fungicide cost/farmer	15,886.76	44,129.89	28,243.13	177.78
National cost of cupper fungicide (naira/kg)	540.00	2,500.00	1,960.00	362.96
Fungicide cost/ha	4,442.00	12,341.00	7,899.00	177.83
Total fungicide cost	7,473,578.40	20,675,550.00	13,201,971.60	176.65
Total fungicide cost at 2007 rate of application	7,473,578.40	34,599,900.00	27,126,321.60	362.96
Actual revenue gain from fungicide reduction	7,473,578.4	20,675,550	13,201,971.60	176.65
Revenue from sales of cocoa	271,818,400	520,380,000	248,561,600	91.44
Cash premium	0.00	24,780,000	24,780,000	100
Total revenue	279,291,478	541,055,550	261,763,571	93.72
Revenue from yield increase at 2010 price	407,727,600	520,380,000	112,652,400	27.63
Total revenue gain/loss	407,727,600	565,835,550	158,107,950	38.78

Source: Field survey (2010), $1 = N130 in 2007 and N150 in 2010.

Table 4. Respondents benefits from organic cocoa project.

Code	Location	Benefits					Total
		Increased income	Increased yield	Less sickly	Health awareness	All combined	
Farmers' code	Ikom	22	14	11	17		64
	Erinjo	15	5	6	4	11	41
	Idanre	37	35	15	16	1	104
	Ekiti	13	44	29	3	1	90
	Ondo	8	14	13	27	4	66
	Ilesha	21	50	14	14	7	106
Total		116	50	14	14	7	471
Percent farmers benefits		24.6	34.4	18.7	17.2	5.1	

Source: Field survey (2010).

frequency 18.7%, health awareness 17.2%), In most of the operating zones, increased income and yield pooled more than half of accrued benefits except in Ondo where health benefits (health awareness 41% and less sickly 20%) ranked highest; this may not be unconnected with the fact that Ondo had the highest pesticide consumption at inception of the program and has been found in this study to also have highest rate of reduction of pesticide usage over the study period (Figure 7), this may have proved the negative effects of pesticide usage to the respondents. However, increased productivity as represented in terms of income and yield increase remain the main motivating factor to organic cocoa production as recorded in this study.

Dissemination of organic cocoa information by beneficiary

Result obtained as shown in Table 5 explained that the highest number of farmers informed by respondents was 1 to 5 farmers (53.9%), 6 to 10 farmers (18.1%) and only 7.6% informed more than 10 farmers each. Sadly, a very high proportion of the farmer 20.4% has not informed any other farmer about the program. This result is not strange as one third of the respondents had no formal educational background which obviously explained the poor dissemination of the program by these set of farmers (Figure 3).

CONCLUSION AND RECOMMENDATIONS

Massive economic and environmental rewards associated with organic cocoa production program were recorded in the study area. The significant increase recorded in the bioeconomic indices evaluated, where five variables (Yield per farmer, yield per hectare, fungicide per farmer, fungicide per hectare and fungicide

Table 5. Dissemination of organic cocoa information by beneficiary farmers.

Code	Location	No. informed				Total
		None	1-5 farmers	6-10 farmers	>10 farmers	
Farmers' code	Ikom	11	28	12	13	64
	Erinjo	4	27	1	9	41
	Idanre	14	75	12	3	104
	Ekiti	28	34	28		90
	Ondo	5	46	4	11	66
	Ilesha	34	44	28		106
Total		96	254	85	36	471
Percent informed farmers		20.4	53.9	18.1	7.6	

Source: Field survey (2010).

cost) showed significant difference in 2010 over 2007 pointed to positive impact of the program. Environmental safety, health consciousness and yield increase were tripartite gain of the project; this is achieved through rational and reduced use of pesticide which reduces risk of contamination and cost incurred on inputs which accounted for high revenue savings of N13.2 m, the initial fear of the respondents of yield loss as a result of non allowed use of fertilizer or other synthetic inputs/additives were allayed with the consistent yearly increase in yield and commensurate decrease in black pod disease as a result of good agricultural practice which is a major mandatory deliveries of organic cocoa production and certification codes. Despite the fixed land area used by the pilot farmer over the study period yield increase of 28% was recorded with total revenue of N112.6 m in 2010 compared to 2007. Revenue from premium to organic (N24.8 m) was also a major revenue boost that contributed to the project impact.

Therefore, the OCP impacted positively in increased yield, input cost reduction, environmental and health improvement and increased revenue. Perhaps, the most sustainable gain of the project is the reduced use of pesticide and health awareness of the respondents which keeps the environment safe for all to use and safe food from cocoa and associated food crops on the organic land. It was also ascertained in the study that sustainability has to do with fairness interaction of productive factors (man, crop and environment) on each other which ensures that today actions preserves tomorrow needs. Therefore, the OCP as sponsored by SARO Agro Allied and her foreign partner ADM/ Schokinag, has ensured sustainability bringing yield per hectare above the national average of 0.45 mt/ha; intensification and scaling up of these program will no doubt bring huge foreign exchange to the economy of Nigeria and raise the farmers income level while also providing assured produce for SARO and her foreign partners. Finally, integrating organic agriculture into overall agricultural policies and poverty reduction strategies, and building organic agriculture supply capacities through education, research, extension services, local and regional market development and export facilitation, are key to realizing the benefits that organic agriculture offers.

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