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Chapter

Cocoa Plant, People and Profit in Ghana

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Abstract

Cocoa production assumed commercial dimension by the beginning of the nineteenth century in Ghana. Soon after that the country became the world's leading producer of cocoa. Since then the ecological system of the cocoa plant, people involved in its management and their profit motives have been interwoven. The cocoa plant ecosystem in Ghana has been performing well under variable soil and climatic conditions. In addition, the different cocoa actors have unequal powers which affect sharing of the incentives from the sale of cocoa beans. Hence, sustainability of the cocoa industry in Ghana depends on ethical unity amongst the multi-stakeholders. By using the conceptual 3Ps approach to analysis of sustainability (environment, sociocultural and economic), benefits accruing and problems will become evident to elicit appropriate remedy.

Keywords: cocoa plant, people, profit, sustainability, Ghana

1. Introduction

Cocoa, *Theobroma cacao*, is a very important crop because it provides food, income, employment, industrial raw material and resources for poverty reduction [1]. Besides the provision of livelihood for millions of smallholder farmers, cocoa also provides raw material for the multibillion global chocolate industry. Hence, reduction in cocoa production is immediately felt by the smallholder farmers and the chocolate industry. As of 2013/2014 cocoa crop year, Africa contributed the majority of production (72%), Latin America (16%) and Asia together with Oceania (12%). With regards to dried cocoa beans as industrial raw material, Europe and Russia process/grind (39%), North and South America (21%), Asia and Oceania (21%) and Africa (19%). In terms of cocoa consumption, the European Union (EU) accounted for 36%, North America (24%), Asia and Oceania (16%), Europe outside the EU (10%), Latin America (10%) and Africa (4%) [2]. Therefore, the maintenance of cocoa to ensure continuous production and supply is of international concern. An analysis of world cocoa economy between 2011/2012 and 2022/2023 found steady decline in cocoa stock [2]. The media recently started announcing the threat faced by the cocoa industry. "We'll run out of cocoa [beans for chocolate production] in just SEVEN years-the world in just SEVEN years—the world will officially run out [of cocoa] on October 2, 2020" Star Sunday 6 October 2013, "no more chocolate by 2020!—Chocolate bars may get replaced by slabs of palm oil and vegetable fats packed with raisins and nougats by 2020" The Times of India 13 April 2014, "manufacturers warn that the world may soon run out of chocolate!" The Week 17 November 2014, "don't panic, but we could be running out of

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chocolate"—by 2020, "the world could see chocolate deficit of 1 million tonnes" the Telegraph 17 November 2017, "enjoy today's Easter eggs: they could become a luxury" the Observer 4 April 2015 [2].

An analysis on the feared extinction of cocoa indicated a number of debilitating factors such as low cocoa productivity, pests and diseases, declining soil fertility, unavailability of inputs, high cost of inputs, outdated production systems, poor farm management practices, adverse effects of weather and climate change on environment, inefficient marketing systems, low uptake of innovations, technology and knowledge transfer as well as inadequate extension and advisory services [2]. The commercial cultivation of cocoa has always been affected by pests and diseases. The diseases include black pod (*Phytophthora* spp.), witches' broom, frosty pod rot (*Moniliophthora roreri*) and the cacao swollen shoot virus. The pests which infest cocoa include insect and vertebrate pests. Examples of insect pests include tea mosquito bug (*Helopeltis theivora*) in the family Miridae (capsid bug), cocoa mirid (*Distantiella theobroma*/*Sahlbergella singularis*/*Helopeltis* spp./*Monalonion* spp.), cocoa mealy bugs (*Planococcus* spp./*Pseudococcus* spp.), aphids (*Toxoptera aurantii*), leaf-eating caterpillar, ring bark borer (*Phassus hosei*) and cocoa pod borer (*Conopomorpha cramerella*). Examples of vertebrate pests are rats and squirrels [3]. In Ghana, mirids (capsids) are the most aggressive black pod (*Phytophthora* pod rot/*Phytophthora palmivora*/*Phytophthora megakarya*/*Phytophthora capsici*) and cocoa swollen shoot virus disease (CSSVD) is the main indigenous pests and diseases. Pests and diseases have coevolved to threaten cocoa production as well as sustainability to the farmer, environment and industry [4, 5]. These diseases could reduce crop yield from 20 to 86% in West Africa [6]. Recently, impacts of extreme weather events on cocoa, particularly, drought associated with the global climate change have been reported [7]. In Brazil, 2015–2016 drought resulting from El Nino Southern Oscillation (ENSO) led to cocoa tree mortality of 15% and reduced cocoa yield by 89% [7]. Consequently, several scientific methods have been developed to manage and control these cocoa pests and diseases. For instance, integrated pest management has been employed to deal with pests. Various sociocultural, mechanical, physical, biological/agronomic and chemical measures are available to control and manage cocoa pests and diseases [3]. Research in cocoa varieties tolerable to changing global and local climates and adherence of research to stringent cocoa quality criteria are ongoing. Also, whether cocoa biotechnology research is a plus or minus to cocoa sustainability agenda needs careful consideration [8].

The existing literature has concentrated much on the cocoa plant (cocoa natural environment) by discussing cocoa diseases. Also, other authors have studied cocoa farmers' perception on environmental issues, particularly, climate change [9–11]. In the context of cocoa farmers (cocoa people), the focus has been cocoa farmer livelihood which is often tied to cocoa profit (economic aspect of sustainability) [1, 12, 13]. The linkages between cocoa natural environment regarding yield/production and cocoa purchasing as well as the multiple effects on poverty and carbon reduction have also been researched [14, 15]. A literature gap still exists regarding the consideration of the natural environment of the cocoa plant together with all stakeholders (people) and the economic sustainability (cocoa profit/incentive).

This chapter contributes to the discourse by arguing that sustainability of *Theobroma cacao* goes beyond the cocoa plant/crop to include the people involved in its management and sharing of incentives and profits thereof. Hence, the traditional "3Ps" usually used in the analysis of sustainable development applies to this study. The "3Ps" refer to profit (economy), people (society) and planet (environment) as the three main pillars of sustainability, otherwise, referred to as the triple bottom line [16]. Instead of planet representing environment, this chapter uses the natural environment of cocoa plant/crop. The people include primary producers of cocoa

(cocoa farmers) and secondary cocoa workers such as cocoa farmers' labourers working in the cocoa farms for wages, workers of Ghana Cocoa Board (COCOBOD) as well as employees of private and public cocoa-purchasing companies. The profit accruing from the sale of dry cocoa beans is depended on by all the cocoa people, in particular, and the country of Ghana as a whole.

2. Methodology

The study area is Ghana, the world's second largest cocoa producer after Cote D'Ivoire and located in West Africa. Cocoa is grown in the deciduous and rain forest as shown in **Figure 1**. Data were drawn from one district in the Volta Region (Ho

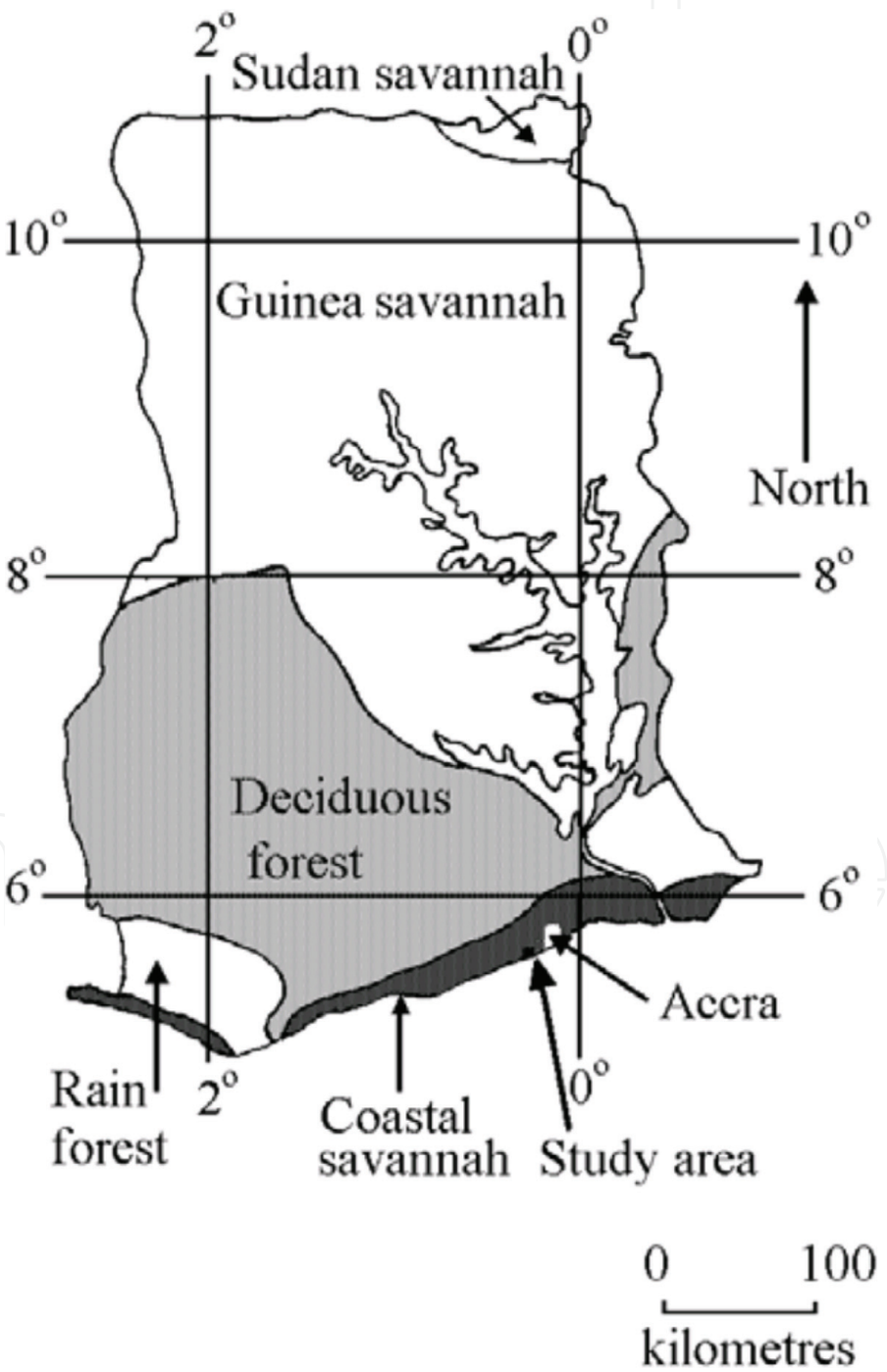


Figure 1.
Rain and deciduous forest of Ghana. Source: Adopted from ([17], p. 226).

West District) and two districts in the Brong-Ahafo Region (Asunafo North Municipal and Asunafo South District). This was a qualitative study in which data were sourced through the use of key informant interviews. Data were triangulated with community farmer meetings and focus group discussion. These were supported with information from the literature. The theoretical underpinnings were based on elaboration on the "3Ps" (the triple bottom line of sustainability). The assumption that sustainability of cocoa (SC) is the function of the "3Ps" (cocoa plant, people and profit) indicated by Eq. (1) provided the base from which subsequent equations were developed.

$$SC = f(Cocoa\ Plant + People + Profit) \tag{1}$$

$$\begin{aligned} Cocoa\ Plant = {} & Natural\ Environment\ Sustainability\ Only \\ & + \{Cocoa\ Plant \cap Profit\} + \{Cocoa\ Plant \cap People\} + \{3Ps\} \end{aligned} \tag{2}$$

where

$$3Ps = \{Cocoa\ Plant \cap People \cap Profit\} \tag{3}$$

$$\begin{aligned} People = {} & SocioCultural\ Sustainability\ Only + \{People \cap Profit\} \\ & + \{Cocoa\ Plant \cap People\} + \{3Ps\} \end{aligned} \tag{4}$$

$$\begin{aligned} Profit = {} & Economic\ Sustainability\ Only + \{Cocoa\ Plant \cap Profit\} \\ & + \{People \cap Profit\} + \{3Ps\} \end{aligned} \tag{5}$$

Also,

$$\{Cocoa\ Plant \cap Profit\} \tag{6}$$

refers to as conservation of cocoa

$$\{Cocoa\ Plant \cap People\} \tag{7}$$

refers to as deep ecology of cocoa

$$\{People \cap Profit\} \tag{8}$$

refers to as political economy of cocoa

$$\{Cocoa\ Plant \cap People \cap Profit\} \tag{9}$$

refers to as sustainability of cocoa.

In this context, conservation of cocoa implies sustainable maintenance in its natural environment either *in situ* or *ex situ*. During the conservation process, evolutionary changes in cocoa are permitted provided such changes engender present and future benefits. Also, deep ecology of cocoa extends the right to live (freedom) to cocoa plant/crop. Therefore, this right to survival does not depend on the expectations of cocoa people. Again, political economy of cocoa refers to the linkages between economic, social and political considerations, in which economic stands for profit whilst social and political refer to the cocoa people.

Following from the "3Ps" assumption, it is argued that sustainability of the cocoa industry in Ghana depends on ethical unity between the multi-stakeholders. This argument is based on the theory of ethical economy pivoted upon conflicts and compromises. Ethics as applied hereafter does not build on the meaning of general

rules of morality but rather as intrinsic value in economics. *Ethics is not to be conceived as an extrinsic limitation to economic pursuit but, on the contrary, as an intrinsic source of economic value. This is an approach that conceives of ethics as the practice of creating values and norms of action (a nomos) that is particular to a specific situation at hand* [18]. This brings in Eq. (10) which states that sustainability of cocoa is a function of ethical economy. Then, ethical economy refers to the intersection of multi-stakeholders, their interests, responsibilities and linkages that confer value to the multi-stakeholders and the country in the management of the cocoa industry.

$$\{Cocoa\ Plant \cap People \cap Profit\} = f(ethical\ economy) \quad (10)$$

$$Ethical\ economy = multistakeholders\ interests\ responsibilities \cap linkages \quad (11)$$

3. Results

The results of the study are presented under cocoa plant, people and profit, respectively.

3.1 Cocoa plant

Cocoa plants produce cocoa beans which are converted into dry cocoa beans, paste/liquor, cake, butter, powder, chocolate, chocolate products and waste as by-products. **Table 1** shows Ghana's cocoa production for three consecutive crop seasons as compared with that of Cote D'Ivoire.

Globally, 2016/2017–2017/2018 crop years (in 1000 tonnes) show that cocoa production has decreased from 4739 to 4645 tonnes (−2%) [20]. The 2017/2018 crop year in 1000 tonnes indicates La Cote D'Ivoire as the leading producers with 2000 tonnes and Ghana follows with 900 tonnes. The rest of Africa contributed 618 tonnes, the rest of Latin America 317 tonnes, Indonesia (280 tonnes), Ecuador (270 tonnes), Brazil (165 tonnes) and the rest of Asia (88 tonnes) [21]. There is a slight difference in the global cocoa production estimates of ICCO (4645 tonnes) and 2018 Cocoa Barometer (4638 tonnes) for 2017/2018 crop year [20, 21]. Ghana made a gain in cocoa production from 850 to 900 tonnes (in 1000 tonnes), about 6% increase in production from 2016/2017 to 2017/2018.

Generally, there are two cocoa populations, Criollo and Forastero. Trinitario, a hybrid of the other two, is considered as the third population. The type planted in Ghana is of the Forastero group. It was first introduced in 1815 and 1843 by the Dutch and Swiss, respectively, but failed to survive. Later in 1879, a Ghanaian, Tetteh Quarshie, successfully started a cocoa farm and raised about 300 trees by 1890.

Country	2014/2015 (tons)	Global supply (%)	2015/2016 (tons)	Global supply (%)	2016/2017 (tons)	Global supply (%)
Cote D'Ivoire	1796	42.1	1581	39.9	1900	41.7
Ghana	740	17.4	778	19.6	850	18.7
Africa (total)	3074	72.1	2911	73.4	3365	73.9

Source: Adopted from [19].

Table 1.
Ghana's cocoa production from 2014 to 2017.

However, due to efforts put into the cocoa industry by the British colonial administration and the independent government of Ghana after 1957, Ghana became the leading producer and exporter of dried cocoa beans from 1939 to mid-1960 [22]. Presently, Ghana is the second in the world's cocoa production and export after Cote D'Ivoire.

Whereas the soil on which the cocoa farms are found, the weather, climate and other environmental effects keep changing, the cocoa trees often term Tetteh Quarshie have kept their original physiology unchanged in many farms in Ghana. The stems of the Tetteh Quarshie cocoa trees remain very large and their heights compare with the medium layer tropical forest trees. Their productivity is very low indeed. Over the years, Cocoa Research Institute of Ghana (CRIG) has developed cocoa seedlings with shorter gestation period (5 years) than the Tetteh Quarshie (7 years). Farmers called it "agric" as the seedlings were introduced by the Ghana Agricultural Extension Service. These seedlings were modelled along the lines of the Tetteh Quarshie in terms of environment requirement (shade loving), height and stem development. However, the yield is by far superior. The soil remains heavily leached, and soil nutrients are mined for nearly 100 years of cocoa cultivation in addition to changing climate and other environmental factors. The soil is treated with doses of cocoa chemical fertilisers, and the cocoa trees are sprayed with various agrochemicals to prevent or control pests and diseases.

In the context of sustainable agriculture and sustainability of Ghana's cocoa, the third cocoa seedling has been introduced in Ghana (Tetteh Quarshie seeds is the first; "agric" cocoa seedling is the second). A subsidiary of Ghana COCOBOD, Cocoa Health and Extension Division (CHED), is tasked to assist cocoa farmers to cut down and remove old cocoa trees and replant with the new cocoa seedlings. The work is tedious for the cocoa farmers; many of whom are old people. The new cocoa seedlings at maturity are relatively shorter in height, have smaller stems and are sun loving rather than shade loving. Hence, deforested areas have become qualified areas for cocoa farming. The gestation period has been further reduced from 5 to 3 years. Therefore, cocoa farming has become attractive once again in Ghana's forest areas. One farmer intimated: *regarding the new cocoa farm one can use the manual spraying machine to spray the farm, but my cocoa farm with its tall trees I still use the machine powered by motor engine, that is the only way I can send the agro-chemicals to the branches and leafs at that height*. Another farmer expressed the fear that: *some of the old cocoa trees are as old as 70 years, yet they keep bearing fruits. Whether this third new cocoa seedling will be able to bear fruits/pods after 20 years is my fear*. The farmers are still using their knowledge of the Tetteh Quarshie and "agric" to manage the new cocoa seedlings. For instance, a farmer said: *one cannot clear a piece of land, prepare it and plant only the new cocoa seedlings on the farm. First of all, we plant plantain (Musa ABB), cassava (*Manihot esculenta*), cocoyam (*Colocasia esculenta*) and "cocoa farm" yam (Dioscorea), major food staples of farmers to provide shade for the young seedling and food for farmers*. In about 2 years when fruiting of the new cocoa trees begins, we start to remove the food crops from the cocoa farm. Even trees are permitted in the newly started cocoa farm for the first 2 years to provide shade for the young cocoa seedlings from the scorching sun. Then, the gradual removal of the trees will begin. Hence, cocoa agroforestry as was the case with Tetteh Quarshie and "agric" cocoa trees would not be the case with the newly introduced cocoa seedlings. Farmers alluded to the fact that yield of the new cocoa

[1] A farmer claimed that: *even though the seedlings are the same for the smallholder farmers and the agricultural demonstration farms, the Ghana COCOBOD cocoa demonstration farms produce more fruits/pods than the farms of the smallholder cocoa farmers.*

breed is far superior than the two earlier breeds.[1] Hence, farmers are yet to bring their cocoa management practices closer to the expectation of the Ghana COCOBOD in order to enjoy full benefits of the new cocoa seedlings. These developments are taking place under the "Cocoa Rehabilitation and Intensification Programme" (CORIP) which is funded by the Dutch government. To achieve the same end is "The Next Generation Cocoa Programme" (MASO) funded by MasterCard Foundation is collaborating with COCOBOD on cocoa farms rehabilitation and job provision for the youth aged 18-25 years. These are implemented by COCOBOD.

Another issue bordering on sustainability of Ghana's cocoa is agricultural land use conflict between cocoa farming and gold mining. The latter has taken precedence over cocoa farming due to the higher and quick returns to gold mining as land use [1].[2] The threat posed to the sustainability of cocoa farming in Ghana by gold mining is real. The fear is heightened by the fact that many of the gold miners operate illegally as "galamsey," meaning "gather them (gold) and sell." The land tenure arrangement in the country places tenant cocoa farmers at a disadvantage. The customary land owners have greater control on land than the tenant cocoa farmers. The "galamseyers" deal directly with the land owners who do not benefit directly from the proceeds of the cocoa farm. They gave the land out to the tenant cocoa farmers sometime in the past. Ghana's cocoa frontier has moved from Tetteh Quarshie's cocoa farm in the Eastern Region to Ashanti, Brong-Ahafo plus Volta and Central Region to the Western Region which share boundary with La Cote D'Ivoire [23]. Irrespective of which region the farmers come from Ghana, they move along with the cocoa frontier changes. This has given rise to customary land owners and tenant cocoa farmers (local cocoa farmer investors). The protection of the investments of these farmers hold sway for the sustainability of Ghana's cocoa industry, with particular reference to land tenure and land use conflict with gold mining.

3.2 Cocoa people

In Ghana, the top-down blueprint approach is more prominent than the bottom-up approach in decision-making. The need to reverse this trend and put the cocoa farmers first rather than Ghana COCOBOD is necessary for the sustainability of Ghana's cocoa industry. The cocoa farmers are the fulcrum which sits the rest of the cocoa people. The multi-stakeholders of the cocoa industry include the farmers, COCOBOD staff and many private sector players (e.g., employees of the licenced cocoa-purchasing companies, transporters and logistics handling companies and assistants of private transport companies).

Cocoa farmers on the average cultivate about 4 ha of land. The farms are held under various tenure arrangements such as customary land owners' cocoa farms and tenant cocoa farms. There are shared croppers and monetary cash rental of land tenure arrangements. However, the cocoa farmer is the one who possesses passbook and has used it to sell dry cocoa bean. Cocoa farms are considered as big assets no matter the size. They are inheritable assets often passed on from parents, uncles, aunties and other relatives to their loved ones or the person next in succession.

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[2] A cocoa farmer has this to say: *the Chief Executive Officer (CEO) of Ghana COCOBOD came to Asummura and I asked him that, CEO, if the chair of Ghana Chamber of Mines comes to your office to tell, Isaac, I have found gold under your office (referring to the Ghana Cocoa House in Accra), take away all your files, furniture and computers and let me pull down the Ghana Cocoa House and mine the gold under it; and, you the CEO of Ghana COCOBOD will fold your two arms on your chest and look into her eyes and say to her, Joyce, you know I am a gentleman, please go ahead with your request. I asked, is that how you will behave?*

Hence, there are cocoa farmers who do not cultivate the farms they own. Some farmers also bought already cultivated and fully matured farms.

The COCOBOD is made up of its chief executive officer and two deputies, one for cocoa agronomy and the other for cocoa operations. There is the board of directors appointed by the government to oversee the entire activities. The COCOBOD operates under the Ministry of Finance. It is subdivided into eight directorates, seven departments and five subsidiaries. The directorates are human resource, research, audit, finance, medical, legal, special services—security and intelligence and general services—estates, civil works and transport. The departments include public affairs, security, procurement, scholarships, information service, estate and transport. The subsidiaries work to achieve cocoa production and marketing. They include Cocoa Research Institute of Ghana (CRIG), Seed Production Division of COCOBOD (SPD), Cocoa Health and Extension Division, Quality Control Company and Cocoa Marketing Company.

The cocoa private sector players are non-governmental firms licenced to buy cocoa and their employees. There are several non-salary workers who do various paid jobs in the cocoa farms on contract, at the marketing depots and at the harbours during shipment. These private labour providers are very important cocoa people in the production and supply chain.

With regard to sustainability of cocoa in Ghana, the COCOBOD is rather the pivot that carries the other cocoa people including the farmers. So far not much has been done to bring all the cocoa people together by the COCOBOD, even in terms of representatives to discuss their various roles in the industry. There is the association for cash crop farmers such as Cocoa, Coffee and Shea Nuts Pickers Association (COCOSHE) which interacts with the COCOBOD. Hence, national cocoa farmers association is not in existence, although cocoa buying firms have established various farmers associations to increase their share of the dry cocoa beans from the farmers. The lack of national common front for cocoa farmers has an effect on farmers' share of cocoa incentives which then becomes a function of the benevolence of the ruling government. Often, cocoa people who do office work at the COCOBOD and at the private cocoa marketing firms enjoy better living standards than the cocoa farmers who produce the beans. Gone are the days when cocoa farmers were better off than most salaried workers in Ghana. The notion of rich cocoa farmers belongs to a few farmers owning over 50 acres of mature cocoa farm. The need to improve on the standard of living of cocoa farmers is very critical to the sustainability of the cocoa industry. The issue is not about merely living above the poverty line. A much better standard of living would provide incentive for farmers to increase cocoa production through intensification and where land is still available by cultivating addition land. We have cocoa farmers who do not drink or eat chocolate. The reason is simple; income from the sale of dry cocoa beans is used for essential items on the farmers' scale of preference. Chocolate drink or bar is a luxury which is unaffordable. A farmer retorted: *do not come empty handed to interview cocoa farmers for data for your thesis or other research work. At least, you could come with a bar of chocolate to encourage us. I do not remember the last time I ate chocolate*. The same may apply to branded chocolate drinks in Ghana. In a family of six, when asked how many times you feed your family in a day, the father—a cocoa farmer—said: *we eat three times in a day. The main food for the day is done as supper/dinner. The reminder of that food is used for breakfast (first meal in the day) and lunch (second meal in the day). The only exception is when the supper/dinner is fufu and soup. Sometime, I ask my wife to prepare fufu and soup for the family as first meal in the day*. Fruits were not a usual part of their meal. The farmer said: *fruits do not do well in my cocoa farm and that avocado pear, citrus and mango disturb the cocoa trees. Sometimes, I get banana from my backyard garden*.

Another issue is the unequal power relationship amongst the cocoa people as often shown in the functions of the various stakeholders. The COCOBOD is tasked by the state to market cocoa beans and products, ensure quality control, evacuate/transport cocoa, undertake research and training, manage and control cocoa pests and diseases, carry out cocoa rehabilitation and maintenance projects and perform cocoa farmer extension services. The licenced private cocoa buying firms are to provide extra funds to purchase cocoa under the directives of the COCOBOD. Cocoa farmers are to produce and supply dry cocoa beans. The secondary employees (from COCOBOD, licenced private cocoa buying firms and others) supply supplementary labour. Although all the cocoa people revolve around the dry cocoa beans, COCOBOD by the nature of its functions weld considerable power than any other stakeholder. Hence, decision-making resides in the COCOBOD.

3.3 Cocoa profit

Normally, cocoa year begins on October 1 and ends on September 30 of the following year. Presently, the COCOBOD has sourced US$ 1.3 billion loan from the Dutch government to purchase cocoa for 2018/2019 (TV3 News360, September 19, 2018). Whatever incentives accrue to cocoa farmers depend on the magnanimity of the COCOBOD to encourage cocoa farmers. This approach is mostly informed by the target of government revenue from cocoa which is indicated in Ghana's budget by the Ministry of Finance. Other considerations include disparity between farmers' incentives in Ghana and their counterparts in Cote D'Ivoire and Togo. Also, the COCOBOD is mindful that sustainability of cocoa depends on the supply of dry beans by farmers. It is guided by the history of cocoa purchases which includes the 1924 as well as 1937–1938 cocoa "hold ups" by farmers and other Africans against expatriate buyers [24]. Hence, farmer incentives are determined by these factors rather than what farmers rightly deserve.

Farmers bear all the risks in cocoa price volatility as the COCOBOD can hedge cocoa at the stock exchange and reduce the risk. COCOBOD uses forward contract and by so doing transfer price and exchange rate risks from cocoa buyers to farmers [19, 21]. Again, the COCOBOD has not succeeded in stabilising farm-gate price. In addition to the motive of the country's cocoa revenue, cocoa farmers do not receive decent incentives [19]. **Table 2** shows cocoa farm-gate price in Ghana and Cote

Items	**Cocoa farm-gate prices for countries**	
	La Cote D'Ivoire	**Ghana**
Yield (t/ha)	0.49	0.42
Size of the farm (ha)	3.5	2.6
Total output (ton)	1.7	1.1
Farm-gate price ($/ton)	1487	1630
Total cocoa income ($)	2528	1793
Input cost ($/ton)	872	393
Net income ($)	1656	1400
FOB price ($/ton)	3120	3120
Producer price as % of FOB	47.7	52.2

Source: Adopted from ([19], p. 26).

Table 2.
Cocoa farm-gate price in Ghana and La Cote D'Ivoire.

D'Ivoire. Once the farm-gate price in Ghana is higher than that of Cote D'Ivoire, then, incentives to farmers become less a concern. The net income per farm in Ghana is lower than that of Cote D'Ivoire due to lower yield in Ghana. Hence, the attention of the COCOBOD is placed on yield/production increases rather than farmers' incentives. In such a situation, a farmer wishing to increase his/her incentive should think of increasing crop yield/production as price increase is no go area for farmers.

Figure 2 shows annual cocoa purchases in Ghana since 1959/1960 cocoa crop year. The trend line displays increases in purchases. The implication is that cocoa production is increasing as well as the availability of dry cocoa beans for purchase in Ghana. Furthermore, it implies that illegal cocoa trade from Ghana to its neighbours of La Cote D'Ivoire and Togo is reducing.

Table 3 presents information in a passbook of a farmer with his express permission. The data on inflation is to help in analysing the changes in the farmers' income, the lowest inflation (0.04% in May 1999) and the all-time highest (63% March 2001). It is clear that at the beginning of cocoa production, farmers' income comes in trickles (December 11, 2011 = GHS19.37, December 30, 2011 = GHS16.14, February 13, 2012 = GHS6.46 and September 24, 2012 = 64.55). The income is spent as it comes. Often, the dry cocoa beans are sold to cater for immediate family expenditure. The farmer intimated that no amount of income is left to be plucked back to improve the cocoa farm. Also, it is evident that price changes did not happen often. For instance, in 2011/2012 cocoa year, 5 kg brought to the farmer GHS16.14, but in 2012/2013, it increased to GHS16.69, about 3% increase in income. As to how come the same 5 kg in 2013/2014 was rewarded with GHS10.62 is difficult to understand.

With regard to COCOBOD scholarship available for secondary school education, the farmer said: *I got cocoa scholarship for my son during his 3 years in the senior secondary school. He has completed the school but I could not afford the fees at the university. He has moved to Accra to look for work*.

Another concern on cocoa profit is the issue of illegal cocoa trade. It includes traders who purchase cocoa illegally from farmers and transport them to Cote D'Ivoire or Togo. Presently, illegal cocoa trade is discouraged by the higher Ghanaian price than that of the two neighbouring countries. The only problem is that sometimes the purchased cocoa in Ghana does not come with immediate cash returns (farmers are not paid promptly, after weighing the beans). It takes between 2 and 3 weeks before the farmers are reimbursed with their monies. In such situations, farmers who are in dire need of money release their cocoa beans at the lower price to the illegal cocoa buyers because of prompt payment.

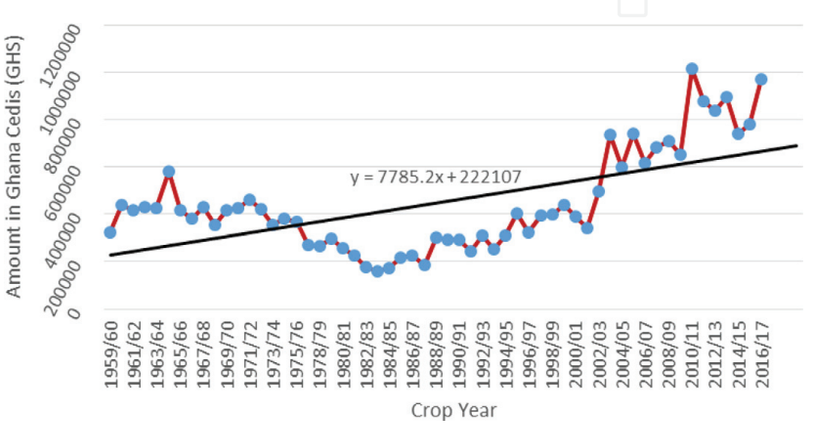


Figure 2.
Cocoa purchases in Ghana (1959/1960–2016/2017). Source: [25].

Crop year	Date	Cocoa beans output (kg)	Value (GHS)	Ghana inflation rate (%)
2011/2012	11 December 2011	6	19.37	8.6 (December 2011)
	30 December 2011	5	16.14	8.6 (December 2011)
	13 February 2012	2	6.46	8.6 (February 2012)
	24 September 2012	20	64.55	9.4 (September 2012)
Subtotal		33	106.52	
2012/2013	12 November 2012	20	66.79	9.3 (November 2012)
	03 December 2012	6	20.03	8.8 (December 2012)
	07 February 2013	3	10.01	10.4 (February 2013)
	09 May 2013	11	36.72	11.0 (May 2013)
	29 June 2013	5	16.69	11.6 (June 2013)
	20 September 2013	35	116.82	11.9 (September 2013)
Subtotal		80	267.06	
2013/2014	17 November 2013	43	143.52	13.2 (November 2013)
	25 December 2013	15	50.17	13.5 (December 2013)
	01 May 2014	5	16.69	14.8 (May 2014)
	27 July 2014	10	33.73	15.3 (July 2014)
	21 August 2014	5	10.62	15.9 (August 2014)
Subtotal		78	254.73	
2014/2015	28 October 2014	37	207.20	16.9 (October 2014)
	22 December 2014	13	72.80	17.0 (December 2014)
Subtotal		50	280.00	
2015/2016	23 October 2015	19	265.20	17.4 (October 2015)
Subtotal		19	265.20	
2016/2017	21 October 2016	37	281.20	15.8 (October 2016)
	04 November 2016	6	45.60	15.5 (November 2016)
Subtotal		42	326.80	
2017/2018	15 September 2017	28	212.80	12.2 (September 2017)
	08 December 2017	25	190.00	11.8 (December 2017)
	28 December 2017	20	144.00	11.8 (December 2017)
	19 January 2018	5	38.40	09.9 (August 2018)
Subtotal		78	575.20	

Source: Author's field work (2018).
Source of inflation data: GSS (www.statsghana.gov.gh>CPI) 25 September 2018.

Table 3.
Details of a smallholder farmer passbook.

4. Discussion

The discussion is organised along conservation of cocoa, deep ecology of cocoa, political economy of cocoa and sustainability of cocoa as summarised in the equations, respectively.

4.1 Cocoa conservation

The conservation of cocoa is the primary concern of both the farmer and the COCOBOD. Whereas the farmers are conserving all the three tree types of cocoa (Tetteh Quarshie, "agric" and the new type), the COCOBOD wants the farmers to switch to the newly introduced type. There are farmers who still prefer Tetteh Quarshie due to its resistance to pest and disease as well as to the changing environmental conditions. Some of the 1920 cocoa farms are still available in Ghana; no wonder, yield per hectare is low. Conservative cocoa farmers slowly adopt new cocoa seedlings. A farmer said: *Tetteh Quarshie paid my school fees. My father died and left the cocoa farm to me. I am using it to pay my children's school fees. I do not see the need to cut the trees down and replace with "Agric*." In the same cocoa farm, one can find a mixture of Tetteh Quarshie and "agric." However, there are many farms which contain only the "agric."

4.2 Deep ecology of cocoa

The cocoa farmers are more attached to their cocoa trees. Every single cocoa tree is very important to the farmer. Hence, the right to live as enjoyed by the cocoa trees will continue due to their significance to the farmers. To bring grid electricity to Asummura, the cocoa trees along the Aboum, Asummura road, were cut down to make path for the grid lines. One of the affected farmers said: *We need electricity so some cocoa tree have to be destroyed. We cannot say we do not want the electricity. So I agreed to the cutting down of some trees*. The grief of this farmer could be seen on his face and be heard in his voice. Farmers are willing to protect their cocoa trees, and they enjoy the support of the COCOBOD. The problem is the land use conflict with gold mining. The problem becomes aggravated when the cocoa farmer is a tenant, and the land is owned by another customary group of people.

4.3 Political economy of cocoa

The government of Ghana inherited the cocoa industry from the British colonial regime. The paternalistic attitude of owning the industry and farmers as children of the government continues at the detriment of the farmers. Government revenue is the primary factor in the cocoa industry. Cocoa farmers' incentive is of secondary concern. As farmers receive a lot more incentives from their cocoa farm, the more they will protect the trees in order to continue to enjoy such incentives. Hence, the politics, the economics and the social concerns of cocoa farmers are interlinked in the cocoa industry. Increase in cocoa farmer incentives means reduction in government revenue and vice versa.

4.4 Sustainability of cocoa

The importance of cocoa plant either as Tetteh Quarshie, "agric" or the new cocoa seedlings will continue to be conserved by cocoa farmers. The survival of cocoa trees now and in the near future is in the hands of cocoa farmers who attached so much significance to their farms no matter how small the size. The government of Ghana and its COCOBOD's interest in the cocoa industry will continue now and into the future. Improvement in the cocoa industry is therefore assured by the COCOBOD. Unless there is a catastrophe, extinction of cocoa does not appear to be imminent, at least, in Ghana's case.

5. Conclusion and recommendations

The study concludes that the sustainability of the cocoa industry depends on the three major aspects of the industry: cocoa plant, people and profit. Equity in the distribution of the profit will encourage all the people involved, particularly, the primary producers—cocoa farmers. The farmers will continue to attach great importance to their farms and sustain them. The plants will enjoy better management from the farmers with the support of the COCOBOD.

It is recommended that as the cocoa farmers increase, COCOBOD should categorise them into new and old farmers. Then, targeted incentives should flow from the COCOBOD to these farmers based on their needs. The new farmers have trickle income, whilst the old farmers have stabilised a more reliable income. COCOBOD should go beyond the prices of cocoa and see to the raising of cocoa farmers' living standards. Cocoa farmers should be made to enjoy some cocoa products like chocolate bars and chocolate drinks.

Regarding scholarships, the COCOBOD should step up the scheme to the university level in the face of the recent government policy of free education for senior secondary school.

It is strongly suggested to the government and its COCOBOD to adopt the ethical economy approach to ensure cocoa sustainability in Ghana. In this case, corporate social responsibility (CSR) is not a moral obligation to cocoa farmers, their communities and other cocoa workers or compliance to international standard; rather, CSR becomes an economic pursuit with an economic value and return to all the multi-stakeholders including the government and the country.

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Conflict of interest

I declare that there is no conflict of interest.

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