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Stakeholder Collaboration in Climate-Smart Agricultural Production Innovations: Insights from the Cocoa Industry in Ghana

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Abstract

Although collaboration is vital in addressing global environmental sustainability challenges, research understanding on stakeholder engagement in climate-smart production innovation adoption and implementation, remains limited. In this paper, we advance knowledge about stakeholder collaboration by examining the roles played by stakeholders in scaling up ecological sustainability innovations. Using the illustrative context and case of green cocoa industry in Ghana, the analysis identified three distinctive phases of stakeholder engagement in ecological sustainability innovations implemented from 1960-2017. We highlight defining periods of ecological challenges encompassing the production recovery sustainability initiative phase solely driven by the Ghana Cocoa Board (COCOBOD)–a governmental body responsible for production, processing and marketing of cocoa, coffee and sheanut. During the period, major initiatives were driven by non-governmental organisations in collaboration with COCOBOD to implement the Climate-Smart agriculture scheme in the cocoa sector. The findings have implications for cocoa production research and stakeholder collaboration in environmental innovations adoption.

Keywords: Stakeholder collaboration, Environmental innovation, Ecological sustainability, Historical pathways, Scaling up, Cocoa industry

1. INTRODUCTION

In this era of increasingly environmental awareness, organizations and governments are increasingly recognising that reducing environmental degradations, waste and reversing deforestation require collaboration not only among businesses and governments but also including non-governmental organisations (Green et al. 2012; Rondinelli and London 2003). As the global population continue to surge, increasingly pressures are also being exerted on production and natural resource exploitations (Asongu and Jingwa 2012). Past studies suggest that creating green national economies and green industries to promote sustainability is essential (Amankwah-Amoah and Sarpong 2016; Asongu and Jingwa 2012). Thus, ecological sustainability improvement remains a major strategic imperative for industries and government alike. In the global cocoa commodity chains and networks, this is no different (Bitzer et al. 2012; Ton et al. 2008). However, the current literature lacks any insights on how governments and other stakeholder collaboratively initiative a shift towards "green" in industrial sectors. Indeed, there is dearth of understanding of the state of the art as far as stakeholder collaboration in environmental innovation towards a green cocoa industry (CI) is concern.

Although there are myriad of ecological initiatives introduced by both public and private sector actors at different levels (Glin et al. 2015), many have not had the needed impact as unsustainable practices persists in the industry (Blaser et al. 2017). The inability to reverse the prevailing ecological decline (soil fertility depletion and soil quality degradation – see Tondoh et al. 2015) amidst the introduction of numerous ecological innovations (climate-smart agroforestry initiative on the use of shade trees and compost – Ingram et al., 2018) raises questions about ecological innovation implementation challenge, particularly stakeholder involvement.

Despite the potentially pivotal role of value added and stakeholder collaboration (SC) in ecological sustainability programmes (Deans et al. 2018; Sarkis and Zhu 2018), there is limited research

54 understanding on the state of the art, for example, a historical evolution of ecological sustainability
55 programmes implemented. Against this backdrop, the aim of this study, the first of its kind, is to
56 critically evaluate and interpret existing knowledge embedded along periods of ecological evolution
57 challenges and the role of stakeholders in ecological innovation adoption and implementation. We
58 contend that the co-creation of the capabilities of CI stakeholders is critical for the implementation
59 of ecological innovations to address the huge and complex sustainability challenge. Our analysis
60 covered the period from the late 1960s—2017; a defining period in the CI in Ghana as far as
61 ecological challenges are concern.

62

63 Our choice of the CI in Ghana as an exemplar setting for this study is based on several factors.
64 The study focusses on the CI because the bulk of the world's cocoa (69.7 %) is cultivated in the
65 tropics of West Africa, with Ghana considered a large player in the world market (Aboah et al.
66 2019) given that it is the second largest producer and exporter of cocoa beans after the Ivory Coast
67 (Verter 2016). Cocoa is considered as the backbone of the Ghanaian economy, serving as a key
68 source of foreign exchange and contributing about 13% to the country's gross domestic product
69 (Asubonteng et al. 2018). Although, cocoa contributes approximately 23% of total export earnings
70 of the country, its contribution to the agricultural Gross Domestic Product (GDP) has decreased
71 to 11% by 2013, from 34% contribution in 1964 (Boansi, 2013). Figure 1 shows recent export of
72 cocoa from Ghana to the top global markets (European Union, the United States and Asia)
73 between 2006 and 2016 (Bangmarigu and Qineti 2018). It can be seen that the cumulative export
74 of cocoa from Ghana has generally increased from 2010 levels.

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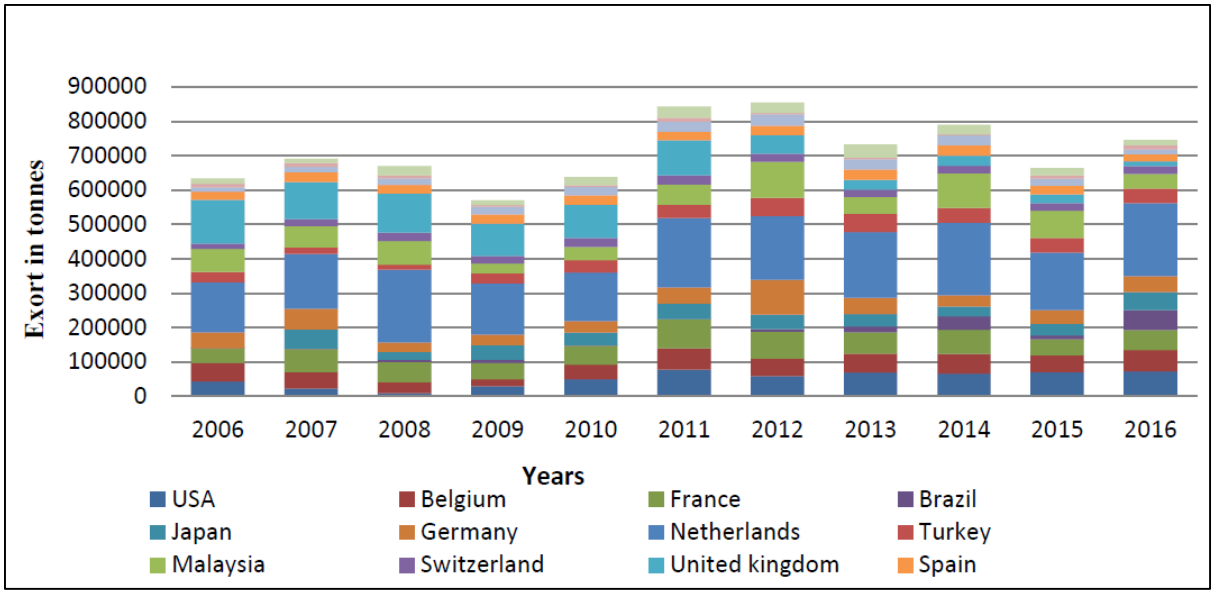

Figure 1: Export of cocoa from Ghana to top global markets (Bangmarigu and Qineti 2018)

Despite the important role that the CI plays in poverty alleviation and economic advancement, in recent years, the cocoa sector has been confronted with the challenge of low yield. Cocoa production yield has either stagnated or declined in most of the cocoa growing regions in Ghana (Anim-Kwapong and Frimpong 2005; Baffoe-Asare et al. 2013). The Ghana Cocoa Board (COCOBOD)–the governmental body in charge of production, processing and marketing of cocoa, coffee and sheanut has been the main stakeholder at the helm of most of the decisions affecting the cocoa sector.

Drawing on the instrumental form of stakeholder theory; see Donaldson and Preston (1995) and advancing knowledge on SC (Amankwah-Amoah et al. 2019), we examine the roles played by cocoa sector stakeholders in scaling up ecological sustainability innovations. The historical analyses of the archival data revealed three distinctive phases of stakeholder engagement (SE) in ecological sustainability innovations implemented from 1960-2017. Further contribution is derived from the development of a historical pathway model of the process through which ecological innovations have evolved and implemented to facilitate the shift towards a green CI. In addition, the paper

93 contributes to existing knowledge through its revealing account that: 1) the production recovery
94 sustainability initiative phase from late 1960s–1982 was solely driven by one stakeholder, the
95 COCOBOD 2) major initiatives during the cocoa sector recovery stage (1983–1990s) were
96 initiated and implemented by non-governmental organisations (NGOS); 3) the third phase
97 (sustainability initiative, revival and expansion era from 2000–late 2017) showed many NGOs
98 collaborated with COCOBOD to implement the climate-smart agriculture scheme in the cocoa
99 sector.

100 To achieve the research aim and specific objectives highlighted, the rest of this paper is organised
101 as follows. We first review the literature on SC for effective scaling up of innovations. This is
102 followed, in Section 3, by the description of the archival data. The next section 4 presents the
103 historical analyses of ecological sustainability challenges as well as SE in ecological sustainability
104 innovation programmes in Ghana's CI. Section 5 provides discussion, contributions and research
105 implications of the findings.
106
107

108 2.0 STAKEHOLDER COLLABORATION AND SUSTAINABILITY INITIATIVE

109 For context, the study adopts Freeman's definition of stakeholder for this paper - 'those groups
110 and individuals who can affect or be affected' by the actions connected to value creation and trade
111 (Freeman et al. 2010, p9). The stakeholder theory essentially enjoins stakeholders to cooperate for
112 mutual benefits as they do not function in isolation (Freeman 2010; Savage et al. 2010). Notably,
113 Goodman et al. (2017) suggests a dual collaborative and proactive roles of stakeholders and opined
114 that secondary stakeholders may play a more prominent role in sustainability innovation adoption
115 that primary stakeholders.

It is also important to draw on Donaldson and Preston (1995) to differentiate between the two forms of stakeholder theory–traditional versus contemporary stakeholder models and how they apply to the specific case of the CI in Ghana for which we seek to examine stakeholder collaboration. These adaptions are presented in Figure 2 and 3 respectively to reflect the traditional and emerging stakeholder models of the CI. It is also worth highlighting that stakeholder theory has been applied in some ecological, socio-economic and sustainable development research (Pullman and Wikoff 2017; Simpson and Sroufe 2014; Sodhi and Tang 2018).

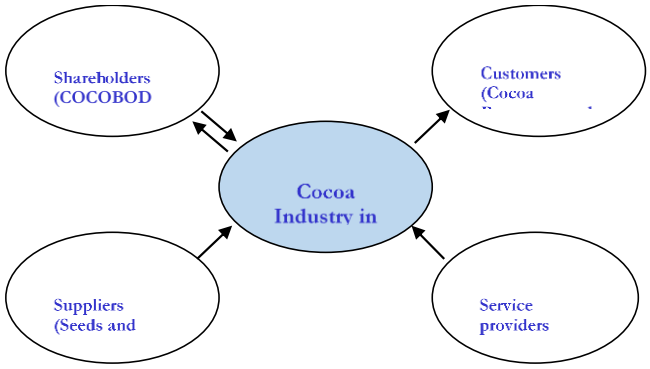

Figure 2: Traditional Cocoa Industry Stakeholder Model

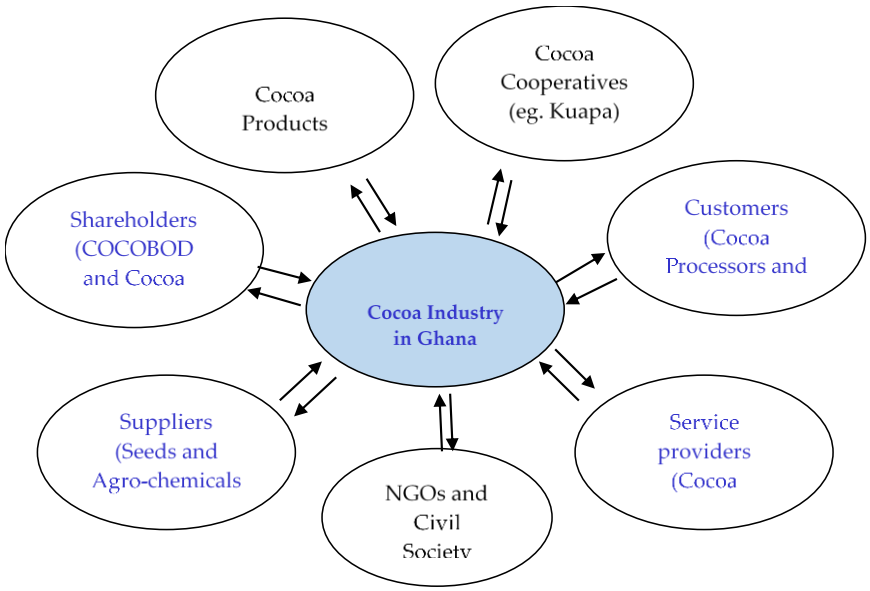

Figure 3: Emerging Cocoa Industry Stakeholder Model

The need for SC to ensure effective scaling-up of sustainability initiatives such as climate smart agriculture scheme in the CI is driven by economic, social and environmental imperatives (Akrofi-Atitianti et al. 2018; Amlalo and Oppong-Boadi 2015). SC is critical to the different levels of decision making and governance systems with a typical agricultural production chain (Despoudi et al. 2018; Wigboldus et al. 2017). Hence, the willingness and ability to identify the various ways in which practices, systems, and their impacts are assessed by stakeholders is cardinal to the success of innovation adoption and implementation. This is partly because any sustainability initiative is a complex triple bottom that requires collective agreement and decision regarding its content (Goodman et al. 2017) to enhance its chance of successful implementation. The value of SE within a supply chain is to create value addition and this is well articulated in academic literature (Genovese et al. 2013; Kannan 2017; Millard 2011; Nudurupati et al. 2015). The value accruing from stakeholder engagement is attained through the myriad roles stakeholders play in sustainability initiatives such as stimulator, initiator, broker/mediator, concept refiner, legitimator, educator, context enabler and impact extender (Goodman et al. 2017). Attempts towards addressing climate change and natural resource depletion issues has focussed research attention on industry partners' collaboration towards environmental innovation for sustainability; see Perl-Vorbach et al. (2014) and Dangelico (2016). However, harnessing stakeholders' interests, relationships and unique roles to promote scaling up ecological innovations in the CI remains a huge research challenge (Cramer 1999; Gibbon 2004; Talbot 2002).

2.1 Scaling-up and Sustainability Initiatives

The central plank of scaling-up is to ensure effective dissemination of best practices (ecological innovation in the context of this study) that lead to efficient deployment of resources (Hartmann and Linn 2008). Scaling-up thus involves 'expanding', 'adapting' and 'sustaining successful policies, programmes or projects in different places and over time' for the benefit of many people

(Hartmann and Linn 2008) or end users (Jowett and Dyer 2012) or stakeholders (Hörisch et al. 2014). It is important to indicate that scaling up agriculture-related innovations ought to consider the complex interactions between all biophysical, socio-economic and institutional issues, including SC (Leeuwis 2000; Wigboldus et al. 2017).

Thus, scaling-up sustainability initiatives within the CI in Ghana can be fostered through inclusive wider stakeholder partnership consisting of public-private-civil society-producer-research engagement (Ingram et al. 2018). Such a widened societal approach as opposed to the traditional public-private collaboration will facilitate expanding, adapting and sustaining successful sustainability policies, programmes or projects such as: complete replanting of old cocoa fields (Wessel and Quist-Wessel 2015); the use of improved planting materials (Edwin and Masters 2005); Voluntary certification of sustainability standards (Ingram et al. 2018), among others. Overall, there is a growing recognition that scaling-up of sustainability initiatives within the CI will succeed when initiatives foster continuous improvement and the farmer stakeholder is convinced of the (re)investment value of the sector with minimal external support (Molenaar et al. 2015; Wessel and Quist-Wessel 2015). Therefore, the need for inclusive stakeholder participation in scaling up ecological innovations cannot be overemphasised.

Drawing on the conceptual framework of Hörisch et al. (2014), that was developed for increased applicability of stakeholder theory in sustainability management, we develop an integrated framework of SE in facilitating scaling-up of ecological innovations in the CI. We contend that the CI's ecological sustainability priorities entail both accessing superior ecological innovation intervention and effective SE for a sustainable CI, as summarised in Figure 4.

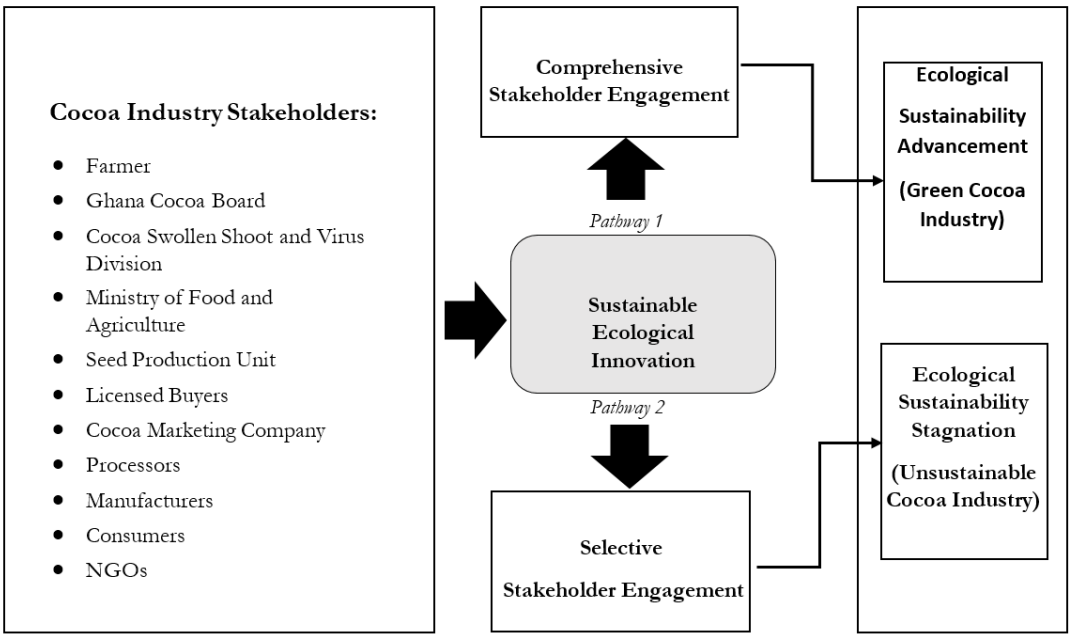

Figure 4: A framework for Cocoa industry SE in scaling up ecological innovation

Although the ecological impact of cocoa production has encouraged scholars to delve into the CI's greening policies, limited attention has been given to the evolution of the scaling-up process via SC. Indeed, limited success at scaling up of ecological innovations has hampered the industry's attempts at improving its sustainability credentials. It has rendered it susceptible to low yields and the prospect of the industry is threatened by unsustainable production practices. Based on the above premise, the study draws on historical trends to improve our understanding of the state of ecological innovations in the Ghanaian CI from a stakeholder perspective.

3.0 RESEARCH SETTING

The CI has been the mainstay of the Ghanaian economy for many decades. It is presently the second largest producer of cocoa in the world after Côte d'Ivoire and close to 6.3 million Ghanaians depend on the cocoa sector as source of livelihood. Since the first export of cocoa beans (40,000 tonnes) in 1911(Austin, 2014), the industry has experienced fluctuation in export

value, yield and prices as shown in Figure 5. The trends depicted in Figure 5 suggest the basic economic principle of demand and supply determining price has not always applied to cocoa pricing over the period.

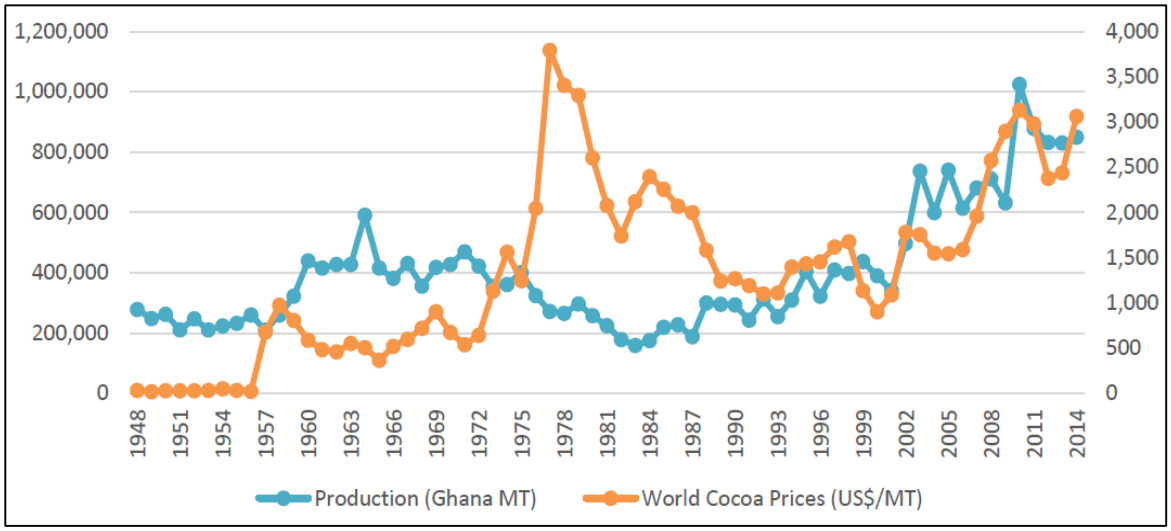

Figure 5: Historical Overview of Cocoa World Prices and Ghana Production: 1947–2014 (Source: Vigneri and Klavali, 2018).

It is also important to highlight that increases in cocoa area of production has not always resulted in a proportionate increase in volume of cocoa beans produced (Boansi, 2013), as presented in Figure 6 covering the period 1961 – 2011.

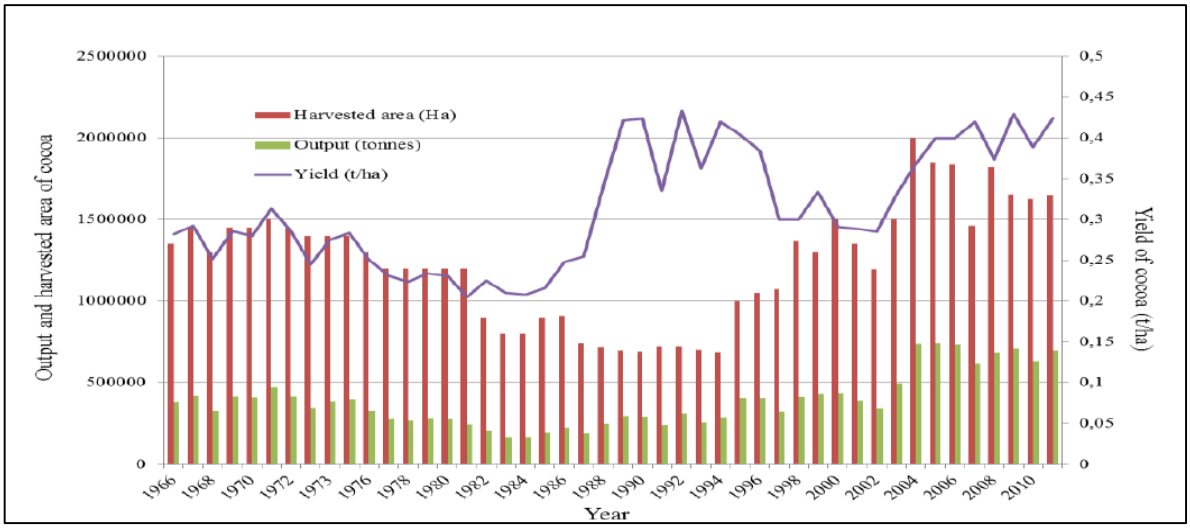

Figure 6: Trend in cocoa production, harvested area and yield 1961 - 2011 (Source: Boansi, 2013)

Another important industry indicator is the producer price (price that cocoa farmers receive) yearly which is a percentage of the world export value to Ghana's COCOBOD. Figure 7 indicate that generally world price of cocoa directly influence the producer price paid to farmers. Although, there have been periods such as 1981-83 when increasing world prices of cocoa rather corresponded to reducing producer prices.

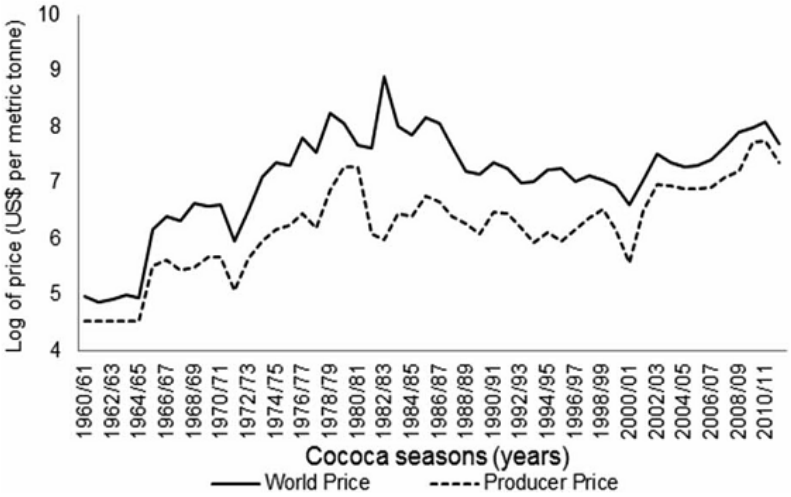

Figure 7: World and Producer Prices in US$ per metric tonne, 1960–2011 (Source: Quarmine et al., 2014)

Further, the industry is saddled with ecological challenges that has spurred some number of initiatives over the past 5 decades. There has been a significant effort to tackle ecological challenges associated with the industry to make cocoa production more sustainable. The persistent characteristic unsustainable practices however points to meagre success of these initiatives. A constant feature across all implementation reports on these ecological sustainability programmes is the limited or lack of effective SC among other reasons.

The production recovery sustainability initiative stage of the late 1960s-1982 showed failure of government action at mass spraying without any other SE. Indeed, farmers as key stakeholders were not involved in the design and implementation plan. The same period witnessed the government of Ghana's unsuccessful attempt to curd smuggling of cocoa beans to neighbouring

227 countries because farmers were not engaged in the planning process. Despite the increased cocoa
228 producer prices by 30 percent, farmers could not reconcile the government's support for cocoa
229 production with the unwillingness or inability of the same government to provide the conditions
230 for the continued growth of this important commodity because of the lack of subsidy to support
231 replanting and spraying campaigns. Indeed, Gockowskei (2012) confirmed that there was no
232 subsidy to Ghanaian cocoa farmers before the year 2000.
233 The appreciable success recorded during the cocoa sector's steady recovering stage (1983-late
234 1990s) also witnessed collaboration among non-governmental organizations (NGOs) in Ghana
235 who focused on cocoa sustainability initiatives, example, Fairtrade International, the Kuapa Kokoo
236 Farmers Union, UTZ certified and Rainforest alliance. This was the period of the Economic
237 Recovery Programme (ERP) which included a special programme to revive the CI (the Cocoa
238 Rehabilitation Project), the Cocoa Sector Development Strategy (CSDS) and the liberalization of
239 the internal marketing of cocoa and increase in the producer price. Thus, a connection can be
240 inferred between SC and ecological sustainability initiatives. The relatively improved level of SC
241 that accompanied the implementation of a Climate-Smart Agriculture (CSA) scheme in the cocoa
242 sector to drive sustainability goals within the CI within phase three further give credence to the
243 critical role of SE. It is important to underscore that lack of consultation with farmers' impeded
244 effective implementation of adaptation techniques.
245
246 The average cocoa yields in Ghana is 450 kg ha^{-1} compared to countries such as Ivory Coast,
247 Indonesia and Malaysia which produces 800 kg, 1000 kg and 1800 kg per hectare respectively
248 (Baffoe-Asare et al. 2013; Gockowski and Sonwa 2011). The relatively low yield record has been
249 attributed to ecological challenges such as land degradation (Blaser et al. 2017) resulting from
250 unsustainable farming practices like shifting cultivation in Ghana (Kusimi 2008). In addition,
251 Gockowski and Sonwa (2011) confirmed that past increased cocoa yield was mainly due to

increased land area committed to cocoa production. This production practice is a major contributor to deforestation in Ghana (Gockowski and Sonwa 2011).

In terms of the environment, Ghana's forest cover has significantly dwindled but cocoa growing areas are still planting cocoa trees in forest areas to ensure continuous cocoa production to meet national targets and keep cocoa farmers in business. This situation is likely to persist as cocoa is a major foreign exchange earner for the country and global demand for chocolate and other cocoa products continue to increase (Nieburg 2014). The urgent need for effective implementation of ecologically sustainable innovations to promote higher yield per hectare (Wessel and Quist-Wessel 2015) is further amplified by the high demand and limited virgin forest for continuous cocoa production dilemma.

Regarding stakeholder participatory approach in the industry, COCOBOD has been the main stakeholder making most of the decisions affecting the cocoa sector for many decades. COCOBOD controls many parts of the cocoa supply chain; they set prices, control the quality, tests and distribute inputs, undertake research and provide extension services. It is also involved in buying and processing part of the cocoa beans. The board is also the sole exporter of cocoa beans from Ghana. Per its remit, the COCOBOD appears to prioritise achieving production targets and offering favourable producer prices to incentivize cocoa farmers (Laven and Boomsma 2012) over seeking SC for a sustainable cocoa production. Meanwhile, the global multi-stakeholder conference on 'Sustainable Cocoa' that took place in Panama in April 1998 ended in a consensus statement that sustainable production of cocoa will 'use constructive partnerships that are developed to involve all stakeholders with special emphasis on small-scale farmers' (Shapiro and Rosenquist 2004). But this does not appear to have had a practical expression in the case of ecological sustainability programmes of Ghana's CI.

There is an increasing recognition that the adoption of effective ecological innovations is not only essential in addressing the debilitating ecological challenges but also to provide the foundation towards achieving the long-term survival of the CI (Asante and Amuakwa-Mensah 2015; Asare et al. 2017; Krauss 2016; Somarriba and López Sampson 2018). This is critical to guarantee the livelihoods of the numerous producers, provide the vital foreign exchange for the country and ensure the continuous existence of the many large multinational companies that rely on the CI.

Ecological innovations such as organic cocoa production, Fairtrade policies, certification of cocoa produced under shade trees, carbon credit and good agronomic practices have been introduced to cocoa farmers by both public (COCOBOD) and private sector stakeholders at different levels of the production process to make the cocoa production more sustainable (Glin et al. 2015; Krauss 2016). However, these policies and ecological innovations have not had the needed impact at the farmers' level, since lands are still degraded (Blaser et al. 2017), and multipurpose shade trees are being cut down and cocoa is still grown under full-sun (UNDP 2011); a practice that is not sustainable (Glin et al. 2015).

3.1 Research Method

The study employed archival data consisting of expert reports, production records, COCOBOD and government policy documents (Amankwah-Amoah and Sarpong 2016), published expert interviews and policy feedback literature with relevant CI stakeholders, to identify key stakeholders and their respective roles in ecological sustainability innovations programme design and implementation. Besides examining government and relevant stakeholders' policy documents, we also examined other secondary sources. To identify the relevant archival data, we employed key words in combination such as farmers, stakeholders, stakeholder collaborations, stakeholder engagement, Ghana Cocoa Board, COCOBOD and cocoa traders. Using these keywords to search databases such as Clarivate Analytics and EBSCO, and Ghanaweb (https://www.ghanaweb.com/)

identity and trace reports and articulate helped expanding the scope of our search. After identifying articles and documents, the authors examined the content to determine inclusion and exclusion (i.e. data must focus on stakeholder collaborations towards achieving sustainability in the CI). The analysis for the study commences from the late 1960s when the cocoa sector faced an outbreak of the three killer diseases (cocoa swollen shoot virus, black pod disease and capsid damage), which led to a significant decline in production with its attendant ecological problems. Archival data sourced from the Ministry of Food and Agriculture and Finance, Ghana COCOBOD and the Ecobank Group is also analysed to delineate defining periods in the history of the industry as far as ecological challenges that faced the cocoa sector between the late 1960 and 2017 is concern to identify significant phases in the evolution of SE in ecological sustainability innovations implementation.

4.0 RESEARCH FINDINGS

4.1 Environmental Sustainability Challenges

The archival documents reviewed and analysed uncovered two dimensions within two broad periods of close to five decades of cocoa sector production strategy and stakeholder involvement evaluations. Both dimensions were characterized by distinctive phases of cocoa production policy and strategy, notable ecological sustainability challenges and SE in ecological sustainability innovations implementation over the period (1960s–2017). The two identified dimensions straddle across three strategic phases of cocoa production, namely production recovery, the steady recovery and expansion stages as presented in Table 1.

325 **Table 1: Cocoa Production Policy/Strategy, Ecological Challenges and SE - (Late 1960s – Late 2017)**

Phases of Production Policy and Strategy	Causes of Ecological Challenge and Manifestations	Type/Level of SC
Production recovery stage (Late 1960s – 1982) The steady recovery stage (1983 – Late 1999)	Major disease outbreaks – *(Pesticide misuse and residual effect on environment and destruction of cocoa farms).* Forest land expansion for cocoa production – *(Massive deforestation due to more land being committed to cultivation).*	Single stakeholder *(Government of Ghana – COCOBOD)* Multiple cocoa industry SE *(Non-governmental organizations: Fairtrade international, Kuapa Kokoo Farmers Union, UTZ certified and Rainforest alliance)*
Expansionist policy stage (2000 – Late 2017)	High yielding hybrid variety introduced with increased inorganic fertilizer usage – *(Intensive inorganic fertilizer usage and full sun practice led to soil fertility loss and land degradation).* Unrestrained small-scale mining and cocoa – rubber plantation substitution – *(Increased soil toxicity that affects cocoa beans quality, limited land for cultivation and disease control challenges).*	Multiple SC *(COCOBOD, Ministry of Food and Agriculture, Rockefeller Foundation, Nature Conservation Research Centre and Forest trends)*

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328 **4.2 Dimension One: Historical Pathways to a Green CI in Ghana**

329 Dimension one of the historical pathways to a green CI encapsulates a shift of thoughts in cocoa
330 production policy and strategy, notable causes of ecological challenges and their manifestations,
331 types and levels of stakeholder involvement in ecological innovations gleaned from late 1960s and
332 late 1990s. The two main cocoa production policy and strategies uncovered under dimension one
333 were the production recovery stage of late 1960 to 1982 and the steady recovery stage between
334 1983 and 1999. Each production policy and strategy adopted coincided with a particular ecological
335 challenge and manifestation that distinctive stakeholder(s) attempted to tackle. Major cocoa
336 diseases outbreaks and forest land for expanded production were the main causes of ecological
337 challenges captured within the framework of dimension one. In terms of ecological sustainability

initiatives undertaken to combat diseases and deforestation within the scope of dimension one, two major initiatives planned and executed by a single stakeholder - the government of Ghana. The focus of this dual sustainability initiative was to achieve a quick recovery of yields lost to the three major disease outbreaks in the late 1960s. The first initiative was the mass spraying campaigns of cocoa farms. This was in response to the outbreak of cocoa swollen shoot virus, black pod disease and capsid damage which accounted for an estimated loss of 50,000 to 75,000 tonnes of cocoa each year. Production later dipped further to 159,000 tons in 1982/83. Having suffered about two decades of low yield in cocoa production from the late 1960s to the early 1980s, the then government introduced two free mass spraying of cocoa farms to reinvigorate the sector as part of the World Bank-supported Economic Recovery Programme (Nyanteng 1980).

Although the government reported the campaign was successful with the claim that the spread of diseases had been brought under control (Addo et al. 1979), it did not improve yields as expected (Oluyole and Lawal 2008) and it was subsequently terminated in the proceeding cocoa season. The reasons for the failure were inadequate supply of insecticides and spraying machines for effective spraying of all cocoa farms and lack of involvement of key stakeholders like farmers who ended up spending huge amounts of money to buy and apply chemicals which were supposed to be free by government agencies (Oluyole and Lawal 2008). The second initiative was the increase of cocoa producer prices and payment of bonuses to farmers.

After the major decline, the government of Ghana increased the cocoa producer prices by 30 percent and farmers were paid bonuses for top grade cocoa beans production (Kolavalli and Vigneri 2011). This initiative was a direct response to the smuggling of cocoa beans to neighbouring countries (Ivory Coast and Togo) due to the low in-country prices during the late 1960s to early 1970. However, the consistent low yield neither provided farmers adequate income nor a better prospect for an appreciable future revenue for their livelihoods and care for their trees

or gather the pods (Leiter and Harding 2004). Hence, despite the increased producer price initiative, tens of thousands of tons of Ghana's cocoa were smuggled annually to neighbouring Ivory Coast by the end of the 1970s to early 1980s (BulÌř 2002; Jacobeit 1991). Moreover, the increased producer prices were inconsistent with government's lack of subsidy for replanting and spraying campaigns. As a result, it was difficult to reconcile the government's support for cocoa production with the unwillingness or inability of the same government to provide the conditions for the continued growth of this important commodity (BulÌř 2002; Leiter and Harding 2004).

The failure of these major programmes during the production recovery initiative stage (late 1960s-1982) meant an escalation of the negative ecological effects due to increased use of pesticides as well as an increased demand for land to boast cocoa production than would otherwise be required. It is evident that the two major initiates during this period (late 1960s-1982) were driven mainly by one stakeholder, the government of Ghana through COCOBOD. Surprisingly, all other key stakeholders including farmers were not engaged in the entire process as the government solely initiated and managed the two programmes; mass spraying campaign of cocoa farms and increased cocoa producer prices by 30 percent plus bonuses for farmers that produced top grade cocoa beans (Nyanteng 1980).

The second ecological sustainability initiative was undertaking during the cocoa sector's steady recovering stage (1983-late 1990s). Ghana's cocoa production levels during this period (1983-late 1990s) increased gradually to an average yield of 400,000 metric tonnes per year (Abekoe et al. 2002) compared to the 159,000 tonnes in 1982. However, it was still considerably lower than the production levels attained in the mid-1960s. Three major initiatives accounted for this gradual recovering. The first initiative was the Economic Recovery Programme (ERP) in 1983 which included a special programme to revive the CI (the Cocoa Rehabilitation Project). The Cocoa Sector Rehabilitation Project included reviewing the architecture and operations of COCOBOD

(the Government agency responsible for cocoa production) by restructuring and re-organising some of its subsidiaries for efficiency - staff numbers were reduced to around 10,400 by 1995 and then to 5,140 (Williams 2009). This reduction in staff numbers of almost 95% freed up considerable resources and this was one of the primary contributing factors to the price increases that ushered in the sector's regeneration (Fosu and Aryeetey 2008).

Policy changes included increasing the farm gate prices paid to Ghanaian farmers relative to those paid in neighbouring countries, thus minimizing the incentive to smuggle, and devaluing the Ghanaian currency (Cedi), and as a result reducing the level of implicit taxation of farmers (Kolavalli and Vigneri 2011). As part of the Cocoa Rehabilitation Project, improved high-yielding hybrid varieties were introduced in 1984 for adoption by farmers (Kolavalli and Vigneri 2011). The farmers were also compensated for removing trees infected with swollen shoot virus and planting the hybrid varieties (Kolavalli and Vigneri 2011).

This effort led to substantial rehabilitation, with many farmers planting the improved hybrid varieties developed by the Cocoa Research Institute of Ghana (Bloomfield and Lass 1992; Boahene et al. 1999). The World Bank and the Government of Ghana were the main stakeholders involved in the planning and implementation of this project with the farmer as a passive beneficiary. The second initiative was the Cocoa Sector Development Strategy (CSDS) in 1991 which was to help boost cocoa production (Cobbina 2015). Under the strategy, cocoa production was projected to increase from 335,000 tonnes in 1991 to about 500,000 tonnes by 2004/2005 and then to 700,000 tonnes by 2009/2010 (Cobbina 2015; Dormon 2006). As part of the reforms, in 1992 COCOBOD shifted responsibility for domestic cocoa procurement to six privately licensed companies (commonly known as licensed buying companies or LBCs). However, the Produce Buying Company (state-owned enterprise and a subsidiary of the COCOBOD) is still the leading buyer of cocoa beans although its market share was limited to about 68% as of 1997/1998.

The third initiative was in 1999 when the government of Ghana adopted a development strategy with the objective of improving the performance of the cocoa sector. Under this strategy, production levels were expected to reach 700,000 Mt by the year 2010. The resulting reforms led to the liberalization of the internal marketing of cocoa and increase in the producer price from 56% to 70% of the fob ('free on board') price over the period 1998/1999– 2004/2005 (Dormon 2006). The fob price is the price at which government sells cocoa to foreign buyers and includes, apart from a profit margin, all costs incurred in buying and transporting the beans to the port. The cocoa sector development strategy also involved shifting responsibility for cocoa extension services from the Cocoa Services Division, a subsidiary of the COCOBOD to the Ministry of Food and Agriculture (Dormon 2006). This period also marked the emergence of many non-governmental organizations (NGOs) in Ghana who focused on cocoa sustainability initiatives, example, Fairtrade International, the Kuapa Kokoo Farmers Union, UTZ certified and Rainforest alliance (Laven and Boomsma 2012).

4.3 Dimension Two: Historical Pathways to a Green CI

Dimension two of the historical pathways to a green CI was characterised by a major shift of thoughts in cocoa production policy and strategy from recovery to expansionist focus; accompanied with ecological challenges due to a) the introduction of high yielding varieties, b) unconstrained small scale mining and cocoa–rubber plantation substitution. Dimension two is also characterised by a multiple SC for ecological innovations from 2000 to late 2017. Indeed, the steady growth in cocoa production and yield became obvious from the early 2000s. A combination of a record-high world prices, increased producer price to farmers and a set of interventions rolled out by the COCOBOD to improve farming practices accounted for the steady growth in production and yield (Vigneri and Santos 2009). The implementation of three distinct but complementary initiatives contributed immensely to the revival of the cocoa sector during over the past one and

435 half decades. The first initiative was the Government of Ghana mass-spray of all cocoa farms.
436 Since 2001 the government has mass-sprayed all cocoa farms under the nationwide Cocoa Disease
437 and Pest Control Project (CODAPEC) (Dormon et al. 2004). Under this programme, cocoa farms
438 across the country were sprayed with insecticides and fungicides at no cost to the farmers (Dormon
439 et al. 2004).
440 This exercise resulted in tremendous increases in cocoa production from 340,562 metric tons in
441 the 2001/02 season to 496,846 metric tons in 2002/03 and 736,000 metric tons in the 2003/04
442 seasons (Appiah 2004). However, along with the positive effects of the CODAPEC programme,
443 some negative impacts on the environment have also occurred. For instance, the extensive and
444 intensive use of pesticides on the farms led to the destruction of part of the soil flora and fauna
445 through both physical and chemical deterioration (Ntiamoah and Afrane 2008).

446 The second initiative was the 'Cocoa High-Tech' programme. In 2002/03, the COCOBOD rolled
447 out the 'Cocoa High-Tech' programme which was managed jointly by the Cocoa Research Institute
448 of Ghana (CRIG), COCOBOD and the Ministry of Food and Agriculture-MoFA (Dormon et al.
449 2004). Under this programme, the Government supplied fertilizers on credit at subsidies prices to
450 farmers to encourage them to apply a minimum of 5 bags per hectare (Kolavalli and Vigneri 2011).
451 In addition, there was an increased supply of pesticides to farmers and the provision of 60 million
452 high yielding hybrid seedlings per year for replanting of over-aged plantations and for
453 establishment of new farms (Vigneri and Santos 2009). Thus, this period marked the beginning of
454 Government subsidies that has since increased by an average of US$344 million as at 2010 and
455 2011 (Vigneri and Kolavalli, 2018). In its first year, 50,000 farmers benefited from the programme,
456 a number that increased to 100,000 one year later.

457 In 2003, its first year of testing, the package raised yields from 510 to 1,081 kilogrammes per
458 hectare and to 2,317 kilogrammes per hectare after the third year (Dormon et al. 2004). In 2006

459 the Cocoa Abrabopa Association (CAA) was established, under which groups of farmers with
460 mature trees on at least one hectare of land were given the inputs package on credit and offered
461 technical and business training (Opoku-Ameyaw et al. 2012). However, because of inadequate
462 engagement of major stakeholders in the cocoa sector, as this was mainly driven by the
463 Government of Ghana through COCOBOD, a substantial proportion of farmers, nearly 40
464 percent, dropped out of the programme, so the benefits of the CAA package reached only a small
465 share of cocoa growers; the programme finally collapsed without making the needed impact
466 (Opoku-Ameyaw et al. 2012).

467 The third initiative during this period was the implementation of a Climate-Smart Agriculture
468 (CSA) in the cocoa sector (Amlalo and Oppong-Boadi 2015) to drive sustainability goals within
469 the industry post 2016 (Asare 2014; Hutchins et al. 2015). Akrofi-Atitianti et al. (2018) cites the
470 Food and Agriculture Organisation's to the effect that CSA combines the triple bottom line of
471 economic, social and environmental dimensions of sustainable development to 'build on three
472 main pillars as follows: (1) sustainably increasing agricultural productivity and incomes; (2)
473 adapting and building resilience to climate change and; (3) reducing and/or removing greenhouse
474 gases emissions relative to conventional practices'. Integral to CSA objectives is to enable
475 organisations develop carbon offset projects and attract carbon finance into forest and farming
476 communities (Kragt et al. 2016). Prior to the implementation of CSA, a Climate-Smart Cocoa
477 Working Group (CSCWG) had earlier been formed to address issues of sustainability within the
478 sector and to explore the potential for carbon finance or climate mitigation benefits in February
479 2011 under the auspices of the Rockefeller Foundation, the Nature Conservation Research Centre
480 (NCRC) and Forest Trends.

481 Despite the strong focus of this World Bank-led CSA programme to Reduce Emission from
482 Deforestation and Forest degradation (REDD+) on the cocoa sector, Aneani et al. (2012) reported

that greater percentage cocoa farmers still employed traditional unsustainable methods of production. It is instructive to report that although the programme has the backing of major players it does appear to struggle because of the limited insight into the inhibiting factors for the effective implementation of adaptation techniques by farmers (Antwi-Agyei et al. 2013)–another typical case of minimal or limited key SC and engagement.

In a nutshell, Ghana's cocoa sector has been saddled with ecological issues from its embryonic stage as a thriving industry and a key foreign exchange earner for the country. In retrospect, the prevalence of ecological challenges associated with the CI in the 21st century (Gockowski and Sonwa 2011) gives an indication that the ecological problems have persisted but expressed in different forms and at varied levels of severity throughout the history of the industry.

Rapid expansion of extensive cocoa production systems in the last 20 years is a major cause of deforestation and forest degradation in West Africa (Gockowski and Sonwa 2011; Obiri et al. 2007). It is therefore not surprising that concerns over the ecological impact of cocoa farming and its sustainability is a pressing issue requiring urgent attention (Asare et al. 2017; Graefe et al. 2017; Krauss 2016; Owusu-Amankwah 2015). Based on the above findings we contend that the CI's ecological sustainability priorities entail both accessing superior ecological innovation intervention and effective SE for a sustainable CI, as summarised in Figure 4.

5. DISCUSSION AND CONTRIBUTIONS AND IMPLICATIONS

5.1 Discussions

This paper set out to investigate the historical pathways of the roles played by stakeholders in scaling up ecological sustainability innovations. By interrogating the archival data, we identified four defining periods of ecological challenges in the history of the CI as well as three distinctive phases of SE in ecological sustainability innovations implemented from 1960-2017. We examined

the evolutionary pathways to a green CI against the background of a prevailing ecological decline amidst the introduction of several ecological innovations between 1960–2017. Of special interest is the role of industry stakeholders in ecological innovation implementation as the state has led many of the initiatives including the flagship organic cocoa network.

The four ecological sustainability challenges in Ghana's CI for the period considered identified were: 1) the major disease outbreak era - late 1960s to early 1970, 2) forest land expansionist production strategy era - 1970s–late 1990s, 3) high yielding hybrid varieties introduction era - early 2000s–late 2010 and the 4) unrestrained small scale illegal mining (´Galamsey`) and rubber plantations for cocoa farms era - Post 2010–late 2017. Key highlights during the major disease outbreak era include farmers shifting from cocoa production to other crops, some deliberately cutting down and destroying cocoa farms to make the land available for alternative use; adopting simple technologies and clearing virgin forest for new farms. The net effect of the major disease outbreak within this phase lower yield of cocoa in Ghana due to low inputs use, planting of low yielding local varieties and farmers inability to control important pests and diseases outbreak.

The next phase of forest land expansionist production strategy era (1970s–Late 1990s) was characterised by massive deforestation as the major disease's outbreaks were not properly resolved. Farmers found it more economical to expand their farms rather than to replace old and diseased trees. This period could be described as the epoch of ecological damage to forests in the country for cocoa cultivation. It was not surprising that the next challenge was to improve cocoa yields within the constraint of less or no more fertile forest lands for cultivation.

The next phase was the era of the introduction of high yielding hybrid varieties introduction era (early 2000s–Late 2010). This phase witnessed the introduction of 'Cocoa High-Tech' programme designed to encourage farmers to plant high yielding hybrid varieties and to apply high inorganic fertilizers that had implications for environmental damage. Thus, the ecological challenge was

rather pronounced on the back of high yielding variety introduction due to the side effects of heavy inorganic fertilizer usage. The adoption of full sun for hybrid variety cultivation was another event that contributed to land degradation and deforestation.

Phase four of the ecological challenge described as the unrestrained small-scale illegal mining (´Galamsey`) and rubber plantations for cocoa farms era (post 2010 – Late 2017) has had the most rapid devastating effect on the CI.

During this phase, some cocoa farmers have their farms encroached by illegal miners and in some cases, due to immediate high financial returns, farmers have sold their cocoa farms to miners.

The three phases of the evolution of SE in ecological sustainability innovations implementation have unique features and different outcomes. Phase one was an era that ecological sustainability initiatives were mainly planned and executed by the central government via the COCOBOD. This level of limited or no SC reflected in the meagre success or total failure of the various initiatives during the period (1960s–1982). In fact, the lack of cooperation by farmers due to lack of consultation rather heightened ecological challenges as disease outbreaks were not managed properly (See, Joo et al. (2018) for a comparative case from Korea's manufacturing industry). Hence, the need for intensive use of inorganic fertilizers in phase two to support the introduction of hybrid seeds.

The cocoa sector steady recovering stage was also characterised by collaboration among non-governmental organisations such as Fairtrade International, the Kuapa Kokoo Farmers Union and UTZ certified and Rainforest alliance. SC during phase three involved more stakeholders from public, non-governmental and International institutions. They included the COCOBOD, Ministry of Food and Agriculture, Rockefeller Foundation, Nature Conservation Research Centre and Forest trends. A working group was even set up towards the implementation of the third initiative within this phase – the Climate Smart Cocoa Working group. Judging from the incremental success

556 achieved under these three distinctive phases and the corresponding increase in the yield of cocoa
557 beans, it can be argued the success or failure of ecological sustainability initiatives is directly related
558 to the extent of collaboration among stakeholders within the CI. It rather intriguing to report that
559 consent farmers are yet to be fully involved in the design of any ecological sustainability initiative.
560

561 **5.2 Research Contributions**

562 The results of the study contribute to the academic literature on stakeholder theory, scaling up and
563 ecological sustainability innovation literature. Firstly, the study is a novel attempt to connect
564 stakeholder theory and the scaling up of new ecological sustainability innovations towards
565 fostering the sustainable CI agenda. Existing studies such as Glin et al. (2015) and Owusu-
566 Amankwah (2015) have highlighted the lack of participation of stakeholders, especially farmers
567 but limited in terms of examining the role of shareholder collaboration in the design and
568 implementation of ecological sustainability innovations within the CI. To the best of our
569 knowledge no study in stakeholder theory and scaling-up of ecological sustainability innovations
570 have given thought to the influence of history and evolutionary pathways.

571 We enhance this strand of research by showing that historical events and variables shape ecological
572 sustainability innovation implementation outcomes. The study contributes to the literature on
573 sustainable CI by Nelson and Phillips (2018) by highlighting the how ecological sustainability
574 challenges has evolved and the historical pathways that innovations and initiatives has been
575 followed to embed sustainability into CI management and practices. The historical narrative
576 approach is in conformity with previous studies that recommended drawing on history to research
577 policy and initiatives (Amankwah-Amoah and Sarpong 2016; Jones and Khanna 2004).
578

579 **5.3 Research Implications**

The study further has implications for CI practices and ecological sustainability policy. The finding that the lack of stakeholder involvement compounded ecological problems is a classic case with industry practice implications. The CI players particularly the government of Ghana and COCOBOD ought to begin to involve all stakeholders, particularly farmers even in an emergency operation as lack of engagement is bound to aggravate ecological and diseases outbreaks challenges. The findings indicate SE play a critical role in the success or failure of ecological sustainability innovations. Thus, effort need to be made to involve all consent stakeholders for every ecological sustainability innovation initiated from the design phase through its implementation and control stages.

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REFERENCES

Abekoe M, Obeng-Ofori D, Egyir I (2002) Technography of Cocoa in the Forest Zone of Ghana. Report presented at the 'Convergence of Sciences' International Workshop, 23–29 March 2002, Benin 29

Aboah J, Wilson MMJ, Bicknell K, Rich KM (2019) Identifying the precursors of vulnerability in agricultural value chains: A system dynamics approach International Journal of Production Research:1-19 doi:10.1080/00207543.2019.1704592

Addo NO, Nyanteng VK, Mabey SJ (1979) Socio-Economic Analysis and Evaluation of Cocoa rehabilitation Projects in Ghana. The Eastern Region Cocoa Project Institute of Statistical, Social and Economic Research (ISSER); University of Ghana, Legon Vol. 1

Akrofi-Atitianti F, Ifejika Speranza C, Bockel L, Asare R (2018) Assessing climate smart agriculture and its determinants of practice in Ghana: A case of the cocoa production system Land 7:30

Amankwah-Amoah J, Sarpong D (2016) Historical pathways to a green economy: the evolution and scaling-up of solar PV in Ghana, 1980–2010 Technological Forecasting and Social Change 102:90-101

Amankwah-Amoah J, Danso A, Adomako S (2019) Entrepreneurial orientation, environmental sustainability and new venture performance: Does stakeholder integration matter? Business Strategy and the Environment 28:79-87

Amlalo D, Oppong-Boadi K (2015) Ghana's third national communication report to the UNFCCC Republic of Ghana Report, Accra

Aneani F, Anchirinah V, Owusu-Ansah F, Asamoah M (2012) Adoption of some cocoa production technologies by cocoa farmers in Ghana Sustainable Agriculture Research 1:103

Anim-Kwapong G, Frimpong E (2005) Vulnerability of agriculture to climate change-impact of climate change on cocoa production Accra, Ghana

Antwi-Agyei P, Dougill AJ, Stringer LC (2013) Barriers to climate change adaptation in sub-Saharan Africa: evidence from northeast Ghana & systematic literature review

Appiah M (2004) Impact of cocoa research innovations on poverty alleviation in Ghana. Ghana Academy of Arts and Sciences,

Asante FA, Amuakwa-Mensah F (2015) Climate change and variability in Ghana: Stocktaking Climate 3:78-99

Asare R, Asare RA, Asante WA, Markussen B, Ræbild A (2017) Influences of shading and fertilization on on-farm yields of cocoa in Ghana Experimental agriculture 53:416-431

Asare RA (2014) Understanding and defining climate-smart cocoa: Extension, inputs, yields, and farming practices Nature Conservation Research Centre and Forest Trends Climate-Smart Cocoa Working Group, Accra, Ghana

Asongu S, Jingwa B (2012) Population growth and forest sustainability in Africa International Journal of Green Economics 6:145-166

Asubonteng K, Pfeffer K, Ros-Tonen M, Verbesselt J, Baud I (2018) Effects of Tree-crop Farming on Land-cover Transitions in a Mosaic Landscape in the Eastern Region of Ghana Environmental Management 62:529-547 doi:10.1007/s00267-018-1060-3

Baffoe-Asare R, Danquah JA, Annor-Frempong F (2013) Socioeconomic factors influencing adoption of CODAPEC and cocoa high-tech technologies among small holder farmers in Central Region of Ghana Journal of Experimental Agriculture International:277-292

Bangmarigu E, Qineti A (2018) Cocoa Production and Export in Ghana. Paper presented at the European Association of Agricultural Economists (EAAE), 162nd Seminar, April 26-27, 2018, , Budapest, Hungary, 2018-04-26

Bitzer V, Glasbergen P, Leroy P (2012) Partnerships of a feather flock together? An analysis of the emergence of networks of partnerships in the global cocoa sector Global Networks 12:355-374

Blaser WJ, Oppong J, Yeboah E, Six J (2017) Shade trees have limited benefits for soil fertility in cocoa agroforests Agriculture, Ecosystems & Environment 243:83-91

Bloomfield EM, Lass RA (1992) Impact of structural adjustment and adoption of technology on competitiveness of major cocoa producing countries

Boahene K, Snijders TA, Folmer H (1999) An integrated socioeconomic analysis of innovation adoption: the case of hybrid cocoa in Ghana Journal of Policy Modeling 21:167-184

BulÌř A (2002) Can price incentive to smuggle explain the contraction of the Cocoa supply in Ghana? Journal of African economies 11:413-439

Cobbina J (2015) Technical efficiency of Cocoa production in Ghana: a case study of Upper Denkyira East municipality. Kwame Nkrumah University of Science and Technology

Cramer C (1999) Can Africa industrialize by processing primary commodities? The case of Mozambican cashew nuts World Development 27:1247-1266

Dangelico RM (2016) Green product innovation: Where we are and where we are going Business Strategy and the Environment 25:560-576

Deans H, Ros-Tonen MAF, Derkyi M (2018) Advanced Value Chain Collaboration in Ghana's Cocoa Sector: An Entry Point for Integrated Landscape Approaches? Environmental Management 62:143-156 doi:10.1007/s00267-017-0863-y

Despoudi S, Papaioannou G, Saridakis G, Dani S (2018) Does collaboration pay in agricultural supply chain? An empirical approach International Journal of Production Research 56:4396-4417 doi:10.1080/00207543.2018.1440654

Donaldson T, Preston LE (1995) The stakeholder theory of the corporation: Concepts, evidence, and implications Academy of Management Review 20:65-91

Dormon EN (2006) From a technology focus to innovation development: the management of cocoa pests and diseases in Ghana Wageningen University

Dormon Ev, Van Huis A, Leeuwis C, Obeng-Ofori D, Sakyi-Dawson O (2004) Causes of low productivity of cocoa in Ghana: farmers' perspectives and insights from research and the socio-political establishment NJAS-Wageningen journal of life sciences 52:237-259

Edwin J, Masters W (2005) Genetic improvement and cocoa yields in Ghana Experimental agriculture 41:491-503

Fosu A, Aryeetey E (2008) Ghana's Post-Independence Economic Growth: 1960-2000. The Economy of Ghana—Analytical Perspectives on Stability Growth and Poverty, James Currey, Suffolk

Freeman RE (2010) Strategic management: A stakeholder approach. Cambridge university press,

Freeman RE, Harrison JS, Wicks AC, Parmar BL, De Colle S (2010, p9) Stakeholder theory: The state of the art. Cambridge University Press,

Genovese A, Lenny Koh SC, Acquaye A (2013) Energy efficiency retrofitting services supply chains: Evidence about stakeholders and configurations from the Yorskhire and Humber region case International Journal of Production Economics doi:http://dx.doi.org/10.1016/j.ijpe.2012.12.019

Gibbon P (2004) Commodities, donors, value-chain analysis and upgrading. International centre for trade and sustainable development (ICTSD),

Glin LC, Oosterveer P, Mol AP (2015) Governing the Organic Cocoa Network from G hana: Towards Hybrid Governance Arrangements? Journal of Agrarian Change 15:43-64

Gockowski J, Sonwa D (2011) Cocoa intensification scenarios and their predicted impact on CO 2 emissions, biodiversity conservation, and rural livelihoods in the Guinea rain forest of West Africa Environmental Management 48:307-321

Goodman J, Korsunova A, Halme M (2017) Our collaborative future: Activities and roles of stakeholders in sustainability-oriented innovation Business Strategy and the Environment 26:731-753

Graefe S, Meyer-Sand LF, Chauvette K, Abdulai I, Jassogne L, Vaast P, Asare R (2017) Evaluating farmers' knowledge of shade trees in different cocoa agro-ecological zones in Ghana Human ecology 45:321-332

Green KW, Zelbst PJ, Bhadauria VS, Meacham J (2012) Do environmental collaboration and monitoring enhance organizational performance? Industrial Management & Data Systems

Hartmann A, Linn JF (2008) Scaling up: a framework and lessons for development effectiveness from literature and practice Wolfensohn Center for Development Working Paper

Hörisch J, Freeman RE, Schaltegger S (2014) Applying Stakeholder Theory in Sustainability Management Links, Similarities, Dissimilarities, and a Conceptual Framework Organization & Environment 27:328-346

Hutchins A, Tamargo A, Bailey C, Kim Y (2015) Assessment of climate change impacts on cocoa production and approaches to adaptation and mitigation: a contextual view of Ghana and Costa Rica International Development Studies:1-22

Ingram V, Van Rijn F, Waarts Y, Gilhuis H (2018) The impacts of cocoa sustainability initiatives in West Africa Sustainability 10:4249

712 Jacobeit C (1991) Reviving Cocoa: Policies and perspectives on structural adjustment in Ghana's
713 key agricultural sector' Ghana: The political economy of recovery:221-232
714 Jones G, Khanna T (2004) Bringing history into international business. Division of Research,
715 Harvard Business School,
716 Joo H-Y, Seo Y-W, Min H (2018) Examining the effects of government intervention on the firm's
717 environmental and technological innovation capabilities and export performance
718 International Journal of Production Research 56:6090-6111
719 Jowett A, Dyer C (2012) Scaling-up successfully: Pathways to replication for educational NGOs
720 International Journal of Educational Development 32:733-742
721 Kannan D (2017) Role of multiple stakeholders and the critical success factor theory for the
722 sustainable supplier selection process International Journal of Production Economics
723 https://doi.org/10.1016/j.ijpe.2017.02.020
724 doi:https://doi.org/10.1016/j.ijpe.2017.02.020
725 Kolavalli S, Vigneri M (2011) Cocoa in Ghana: Shaping the success of an economy Yes, Africa
726 can: success stories from a dynamic continent:201-217
727 Kragt ME, Gibson F, Maseyk F, Wilson KA (2016) Public willingness to pay for carbon farming
728 and its co-benefits Ecological Economics 126:125-131
729 Krauss JE (2016) Cocoa sustainability initiatives and the environment: mapping stakeholder
730 priorities and representations. University of Manchester.
731 Kusimi JM (2008) Assessing land use and land cover change in the Wassa West District of Ghana
732 using remote sensing GeoJournal 71:249-259
733 Laven A, Boomsma M (2012) Incentives for sustainable cocoa production in Ghana Royal
734 Tropical Institute, Amsterdam 49
735 Leeuwis C (2000) Reconceptualizing participation for sustainable rural development: towards a
736 negotiation approach Development and Change 31:931-959
737 Leiter J, Harding S (2004) Trinidad, Brazil, and Ghana: three melting moments in the history of
738 cocoa Journal of Rural Studies 20:113-130
739 Millard E (2011) Incorporating Agroforestry Approaches into Commodity Value Chains
740 Environmental Management 48:365-377 doi:10.1007/s00267-011-9685-5
741 Molenaar J, Gorter J, Heilbron L, Simons L, Vorley B, Blackmore E, Dallinger J (2015) Sustainable
742 Sector Transformation How to Drive Sustainability Performance in Smallholder-
743 Dominated Agricultural Sectors Aidenvironment, New Foresight, IIED, Commissioned
744 by IFC: Amsterdam, The Netherlands
745 Nelson V, Phillips D (2018) Sector, landscape or rural transformations? Exploring the limits and
746 potential of agricultural sustainability initiatives through a cocoa case study Business
747 Strategy and the Environment 27:252-262
748 Nieburg O (2014) The chocolate league tables 2014: Top 20 consuming nations Confectionery
749 News com
750 Ntiamoah A, Afrane G (2008) Environmental impacts of cocoa production and processing in
751 Ghana: life cycle assessment approach Journal of Cleaner Production 16:1735-1740
752 Nudurupati SS, Bhattacharya A, Lascelles D, Caton N (2015) Strategic sourcing with multi-
753 stakeholders through value co-creation: An evidence from global health care company
754 International Journal of Production Economics 166:248-257
755 doi:http://dx.doi.org/10.1016/j.ijpe.2015.01.008
756 Nyanteng V (1980) The declining Ghana cocoa industry: an analysis of some fundamental
757 problems Technical Publications Series Inst of Statistical, Social and Economic Research,
758 Univ Ghana (Ghana)
759 Obiri BD, Bright GA, McDonald MA, Anglaaere LC, Cobbina J (2007) Financial analysis of
760 shaded cocoa in Ghana Agroforestry systems 71:139-149

761 Oluyole K, Lawal J (2008) Determinants of the occurrence of black pod disease of cocoa in Edo
762 State, Nigeria: A multivariate probit analysis approach Journal of innovative development
763 strategy 2:1-4
764 Opoku-Ameyaw K, Oppong F, Acheampong K, Amoah F (2012) Long term assessment of the
765 agronomic and economic benefits of cocoa food crop intercropping in the absence of
766 fertilizer application Journal of Experimental Agriculture International:186-197
767 Owusu-Amankwah R (2015) Certifications, child labour and livelihood strategies: an analysis of
768 cocoa production in Ghana. Wageningen University
769 Perl-Vorbach E, Rauter R, Baumgartner RJ Open innovation in the context of sustainable
770 innovation: findings based on a literature review. In: 9th International Symposium on
771 Sustainable Leadership, 2014, 2014. p 169
772 Pullman M, Wikoff R (2017) Institutional sustainable purchasing priorities: Stakeholder
773 perceptions vs environmental reality International Journal of Operations & Production
774 Management 37:162-181 doi:doi:10.1108/IJOPM-07-2014-0348
775 Rondinelli DA, London T (2003) How corporations and environmental groups cooperate:
776 Assessing cross-sector alliances and collaborations Academy of Management Perspectives
777 17:61-76
778 Sarkis J, Zhu Q (2018) Environmental sustainability and production: taking the road less travelled
779 International Journal of Production Research 56:743-759
780 doi:10.1080/00207543.2017.1365182
781 Savage GT, Bunn MD, Gray B, Xiao Q, Wang S, Wilson EJ, Williams ES (2010) Stakeholder
782 collaboration: Implications for stakeholder theory and practice Journal of Business Ethics
783 96:21-26
784 Shapiro H, Rosenquist E (2004) Public/private partnerships in agroforestry: the example of
785 working together to improve cocoa sustainability Agroforestry systems 61:453-462
786 Simpson D, Sroufe R (2014) Stakeholders, reward expectations and firms' use of the ISO14001
787 management standard International Journal of Operations & Production Management
788 34:830-852 doi:doi:10.1108/IJOPM-02-2012-0063
789 Sodhi MS, Tang CS (2018) Corporate social sustainability in supply chains: a thematic analysis of
790 the literature International Journal of Production Research 56:882-901
791 doi:10.1080/00207543.2017.1388934
792 Somarriba E, López Sampson A (2018) Coffee and Cocoa Agroforestry Systems: Pathways to
793 Deforestation, Reforestation, and Tree Cover Change
794 Talbot JM (2002) Tropical commodity chains, forward integration strategies and international
795 inequality: coffee, cocoa and tea Review of International Political Economy 9:701-734
796 Ton G, Hagelaars G, Laven A, Vellema S (2008) Chain governance, sector policies and economic
797 sustainability in cocoa: a comparative analysis of Ghana, Côte d'Ivoire, and Ecuador
798 Markets, Chains and Sustainable Development Strategy & Policy paper 12
799 UNDP (2011) Environmental Baseline Report on Cocoa in Ghana. UNDP,
800 Verter N (2016) Cocoa export performance in the world's largest producer Bulgarian Journal of
801 Agricultural Science 22:713-721
802 Vigneri M, Santos P (2009) What Does Liberalization without Price Competition Achieve? The
803 Case of Cocoa in Ghana.
804 Wessel M, Quist-Wessel PF (2015) Cocoa production in West Africa, a review and analysis of
805 recent developments NJAS-Wageningen journal of life sciences 74:1-7
806 Wigboldus S, Hammond J, Xu J, Yi Z-F, He J, Klerkx L, Leeuwis C (2017) Scaling green rubber
807 cultivation in Southwest China—An integrative analysis of stakeholder perspectives
808 Science of The Total Environment 580:1475-1482
809 Williams T (2009) An African success story: Ghana's cocoa marketing system IDS Working Papers
810 2009:01-47

811

812