



RESEARCH ARTICLE

Eco-control for corporate sustainable management: A sustainability development stage perspective

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Funding information

University of Sri Jayewardenepura, Sri Lanka, Grant/Award Number: ASP/01/RE/MGT/2017/59

Abstract

Eco-control offers an integrated management approach to transitioning toward corporate sustainable development, such as sustainable agriculture management. Despite the need to consider organizational and managerial changes and development in the field of sustainable agriculture, the use of integrated management controls has not yet been explored. This study identifies how the eco-control procedures in sustainable agriculture management change when a commercial tea company transits to different stages of corporate sustainable development. It has developed an analytical framework, combining the sustainability management development perspective with the processual view of integrated eco-control. Using a longitudinal case study approach, the data have been collected via in-depth interviews, site visits, and document analyses, in respect of a commercial tea company in Sri Lanka. The findings show how the processual eco-controls have changed as a result of internal and external challenges faced in the different sustainability management development stages of the transition to sustainable agriculture management. The findings emphasize the need for gaining a better understanding of the actions and decisions at the field (operational) and organizational level in promoting sustainable agriculture management practices in agribusiness firms.

KEYWORDS

agriculture management, corporate sustainable development, eco-control, environmental policy, stakeholder engagement

1 | INTRODUCTION

Organizations require systematic approaches to coordination, resource allocation, communication, motivation, and performance measurement of human, physical, and financial resources when transitioning to sustainable management practices such as sustainable agriculture management (Battaglia, Passetti, Bianchi, & Frey, 2016). Eco-control¹ can help achieve this aim by assisting agribusiness firms to attain sustainability controls and cost savings while pushing them in the direction of sustainability (Gond, Grubnic, Herzig, & Moon, 2012). Eco-control, with its use of integrated sustainability information for sustainable management (Schaltegger & Burritt, 2000), helps to drive a sustainability strategy throughout an agribusiness firm (Henri &

Journeault, 2010; Schaltegger & Burritt, 2000). In doing so, it allows firms to measure, control, and disclose their environmental and social performance (Gunarathne & Lee, 2015; Henri & Journeault, 2010; Lee, 2012). Hence, eco-control through management control and an integrated information management approach provides a useful perspective for agribusiness firms to address the calls for transition to sustainable agriculture management (Schaltegger & Burritt, 2000).

Although eco-control is a relatively novel approach in corporate sustainable management, scholars have shown its relevance and application for various environmental and sustainability management purposes such as carbon management (Lee, 2012), management of ecological and economic performance (Gunarathne & Lee, 2015; Henri & Journeault, 2010; Journeault, 2016), and biodiversity



management (Hellmann, 2005). However, the use of integrated sustainable management control approaches such as eco-control for sustainable agriculture management is novel as traditionally the adoption of sustainable agriculture practices has been considered only as a technical issue requiring the application of science (Vanclay, 2004). As sustainable agriculture management involves a host of environmental, economic, social, and institutional factors together with organizational and managerial change and a development approach (Feola, Lerner, Jain, Montefrio, & Nicholas, 2015; Hellin & Camacho, 2017; Pant, Hambly-Odame, Hall, & Sulaiman, 2012; Vanclay, 2004; Wolf, 2011), the adoption and implementation of eco-control in agribusiness firms can promote the much-needed change in the field of agriculture toward sustainable development.

This is an essential consideration as the transition to sustainable agriculture management practices is not merely the adoption of environmentally friendly and socially responsible agriculture practices, but an organization-wide change and development mechanism occurring over a period of time (Feola et al., 2015; Gafsi, Legagneux, Nguyen, & Robin, 2006; Hellin & Camacho, 2017; Pant et al., 2012; Vanclay, 2004). Without the consistent and long-term support of strategic and policy directions, organizational change management, internal and external stakeholder commitment, and appropriate performance measurement systems, the integration of sustainable agriculture management practices in agribusinesses would not succeed. Nonetheless, there is little empirical investigation of how agribusiness firms develop corporate sustainability management toward sustainable agriculture management practices over time. Such an investigation could provide useful guidance for agribusiness firms to integrate and sustain sustainable agriculture practices in their business strategies. Hence, this article, using a longitudinal case study approach, examines how the eco-control process changes in the different sustainable management development stages of an agribusiness firm moving toward sustainable agriculture management practices.

The rest of the article is organized as follows: Section 2 presents an overview of eco-control for sustainability management and development stages of corporate sustainability management. It also offers the analytical framework of the study. Section 3 deals with the research methodology and Section 4 with the analysis based on an eco-control approach. Section 5 provides a discussion and implications of the study. The last section presents the conclusions.

2 | ECO-CONTROL FOR CORPORATE SUSTAINABILITY MANAGEMENT AND DEVELOPMENT STAGES OF CORPORATE SUSTAINABILITY

This section is in three parts and gives an overview of eco-control for corporate sustainability management, eco-control for sustainable agriculture management, and corporate sustainable management development perspectives.

2.1 | Eco-control for corporate sustainability management

According to Henri et al. (2017), eco-control is defined as “the formalized procedures and systems that use financial and ecological [and social] information to maintain/alter patterns of environmental [and social] activity” (p. 206). Since eco-control supports environmental and sustainability management, it is, by analogy, “the systematic process and anchor for corporate sustainability management” (Schaltegger & Burritt, 2000, p. 383).

With the growing popularity of sustainability management systems in organizations, the issue of eco-control has recently gained heightened interest among academia. The current literature on eco-control highlights two broad research streams: first, research on the eco-control process (which broadly addresses the question of “how”; Gunarathne & Lee, 2015; Lee, 2012; Schaltegger & Burritt, 2000), and second, research on eco-control models and components (which broadly addresses the question of “what”; Henri et al., 2017; Henri & Journeault, 2010; Journeault, 2016).

The processual perspective of eco-control focuses on the implementation of sustainability management systems in an organization to help formulate sustainability policy and goals, secure efficient sustainability accounting, evaluate sustainability performance, plan, steer and implement sustainability activities, and communicate with internal and external stakeholders (Lee, 2011; Schaltegger & Burritt, 2000). These practices are useful for monitoring compliance with environmental and other regulations and internal policies and goals, motivating the continuous improvement of sustainability management activities, providing helpful information for internal and external decision-makers and providing data for external reporting (Henri & Journeault, 2010; Lee, 2011; Lozano, 2020).

In general, all studies that follow a processual perspective, which are few, have supported a static view of eco-control. For instance, Gunarathne and Lee (2015) discuss how a hotel sector organization in Sri Lanka has adopted an eco-control approach to foster corporate sustainability management into routine organizational practices. Their study also provides empirical evidence of how the eco-control approach has been a useful tool in overcoming financial challenges and integrating sustainability management practices into the hotel's routine processes with the support of stakeholders. Further, Lee (2012) analyzes how the automobile industry in Korea uses the eco-control approach in carbon management in its operations and supply chain. This study demonstrates how eco-control fosters the alignment between automakers' carbon management strategy and performance measurement while providing useful information for decision-makers. Although these studies based on real-life organizations give evidence on the practical application of the eco-control approach of Schaltegger and Burritt (2000), it is still unclear how organizations effectively use it with the passage of time during which various development stages of organizational sustainability management are reached. Since the organizational transitions to sustainable development require a long-term oriented strategy and commitment, typically, it is essential to investigate how these transitions occur from a

long-term perspective. This study addresses this aspect by identifying how the eco-control process changes longitudinally when an agribusiness firm reaches (or moves into) different sustainability management development stages.

2.2 | Eco-control for sustainable agriculture management

While there are many specific contextual challenges in emerging and developing economies (EDEs) around the world, the demand for sustainable agriculture management practices has been fueled by growing concerns about significant greenhouse gas emissions, loss of biodiversity, widespread pollution and land degradation, food insecurity and consumer health, and employee welfare associated with the present system of agriculture (DeLonge, Miles, & Carlisle, 2016; UN, 2019). Despite high productivity, the negative consequences of industrialized agriculture systems pose one of the biggest threats to the environment and its capacity to continue producing food while making an environmental and social impact, which is a global concern (DeLonge et al., 2016; Ponisio & Kremen, 2016). There are urgent calls for a transition to agriculture systems and practices based on the principles of sustainability.

Sustainable agriculture defined variously (see Francis, Sander, & Martin, 1987; Gafsi et al., 2006; Lichtfouse et al., 2009 for more details), addresses “social concerns and environmental protection while emphasizing the ability of the agriculture systems to maintain crop productivity in the long run by adapting to changes whilst maintaining economic, environmental and social considerations” (Lichtfouse et al., 2009). It is expected that sustainable agriculture

management practices will use resources efficiently to satisfy human needs while enhancing the quality of the environment and the life of farmers and society as a whole. Usually, sustainable agriculture management practices encompass the effective management of the farm system, conservation of biodiversity and natural resources and the improvement of livelihood and human well-being (see Table 1). This is where sustainable agriculture management systems become crucial for providing the requisite information for effective decision making, organizational change and development.

By positing that the transition to sustainable agriculture management practices is a simultaneous process of technical, organizational, and managerial change and development at the firm level (Feola et al., 2015; Vanclay, 2004), the rest of this section deals with how eco-control can be used for sustainable agriculture management practices of agribusiness firms. Under the processual perspective of eco-control, Schaltegger and Burritt (2000) suggest five procedures for implementing integrated eco-control: (a) formulating goals and policy; (b) managing information (sustainability performance information); (c) supporting decisions; (d) steering and implementing; and (e) communicating internally and externally. These procedures adopted for sustainable agriculture management are shown below (see Figure 1). Figure 1 sets out a process model that suggests that eco-control for corporate responsibility can and should be developed and implemented via a cyclical process of information management, decision support, implementation, and communication guided by sustainability policies and goals (Klettner, Clarke, & Boersma, 2014).

The use of eco-controls in any organization is not uniform and depends mainly on the level of sophistication and integration of sustainability management activities pursued by an organization (Gunaratne & Lee, 2019a, 2019b; Jabbour & Santos, 2006; Kolk &

TABLE 1 Focus areas of sustainable agriculture management

Sustainability dimension	Focus areas	Specific examples
Economic	Effective planning and management system	<ul style="list-style-type: none"> Sold product does not mix with certified product with noncertified products Environmental and social impact assessment for infrastructure Service providers are selected and monitored for compliance Management commitment for compliance with applicable law/standard
Environmental	Biodiversity conservation	<ul style="list-style-type: none"> No destruction of high conservation value areas No conversion of forests and other natural ecosystems No hunting and negative effects on protected areas
	Natural resource conservation	<ul style="list-style-type: none"> Responsible sewage and wastewater discharge Develop and implement an integrated pest management plan No use of prohibited pesticides No use of genetically modified organisms (GMOs) No use of human sewage in production or processing
Social	Improved livelihoods and human well-being	<ul style="list-style-type: none"> No forced labor, child labor, discrimination, and sexual harassment Freedom of association and collective bargaining Payment of minimum wage Better working conditions for workers Basic conditions for housing Availability of occupational health and safety plan Use of personal protective equipment

Note: Adapted from Rainforest Alliance (2017).

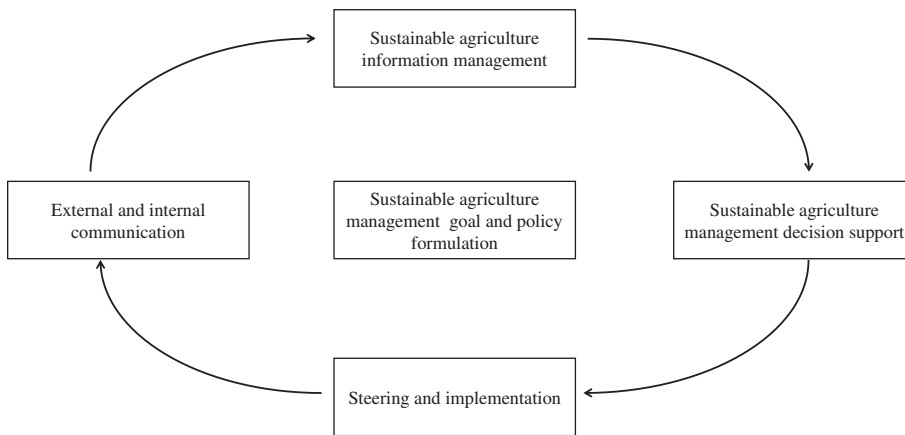


FIGURE 1 Integrated eco-control for sustainable agriculture management. Source: Adapted from Schaltegger and Sturm (1998), Lee (2012), and Gunarathne and Lee (2015)

Mausser, 2002; Ormazabal, Sarriegi, Barkemeyer, Viles, & McAnulla, 2015). In dealing with the level and intensity of sustainability integration in organizational activities, various taxonomical explanations of corporate sustainable development are given in the literature (Gunarathne & Lee, 2019a; Jabbour & Santos, 2006; Kolk & Mauser, 2002). It advocates the use of organizational systems and activities such as eco-controls driven by the development stage of corporate sustainability management. While there is broad academic interest in the different taxonomic explanations, how agribusiness firms can gradually use eco-control in transiting toward sustainable agriculture management practices is yet to be explored.

Although the literature points to possible uses of eco-controls in organizational sustainability management, when agribusinesses progress to higher stages of sustainability management, these procedures undergo a gradual change to deal with their added complexity and scope (Gunarathne & Lee, 2019b). To examine how eco-controls changes over time, this article uses the development stages of corporate sustainability management.

2.3 | Development of corporate sustainability management

With a view to systematizing and classifying corporate sustainability management, many studies provide taxonomic explanations of the development of corporate sustainability management (Jabbour & Santos, 2006; Kolk & Mauser, 2002; Maialle & Jabbour, 2014; Ormazabal et al., 2015; Roome, 1992). All these development perspectives reflect a high level of sustainability management integration into business policy and strategy over time, encompassing a wide range of organizational activities while investing substantial organizational resources (Gunarathne & Lee, 2019a; Kolk & Mauser, 2002). These diverse developmental models include sustainability reactivity, in which companies only meet the regulatory requirements through which companies take voluntary measures to reduce the sustainability impact (Evangelinos, Nikolaou, & Leal Filho, 2015; Jabbour & Santos, 2006; Kolk & Mauser, 2002; Maialle & Jabbour, 2014). Irrespective of the differences in the number of stages and the characteristics of each stage, most of these models show that the evolution

of sustainability management tends to follow similar patterns in virtually all companies.

In this study, we adopt a three-stage model closely in line with the model proposed by Jabbour and Santos (2006). It is based on a systematic analysis of similar taxonomies and thus representing a common and comparative denomination of several authors (Gunarathne & Lee, 2019a; Maialle & Jabbour, 2014). Further, this taxonomy has been validated through many empirical studies (Ferreira, Jabbour, & Jabbour, 2017; Gunarathne & Lee, 2019a, 2019b; Jabbour, Santos, & Nagano, 2010). This model advocates three sustainability management development stages, namely, reactive strategy (functional specialization); preventive strategy (internal integration); and proactive strategy (external integration). In the reactive strategy stage, the focus is on meeting the regulatory requirements and hence reflects a passive reactive approach for sustainability management (Jabbour & Santos, 2006; Roome, 1992). The preventive strategy stage represents a transitional stage during which an organization realizes the benefits of sustainability management, having pursued a compliant strategy. In the proactive strategy stage, a company explores the opportunities to increase its competitiveness in the external context (Jabbour et al., 2010; Jabbour & Santos, 2006; Roome, 1992). Although a detailed discussion of these stages is outside the scope of this article, Table 2 summarizes the essential characteristics of each stage.

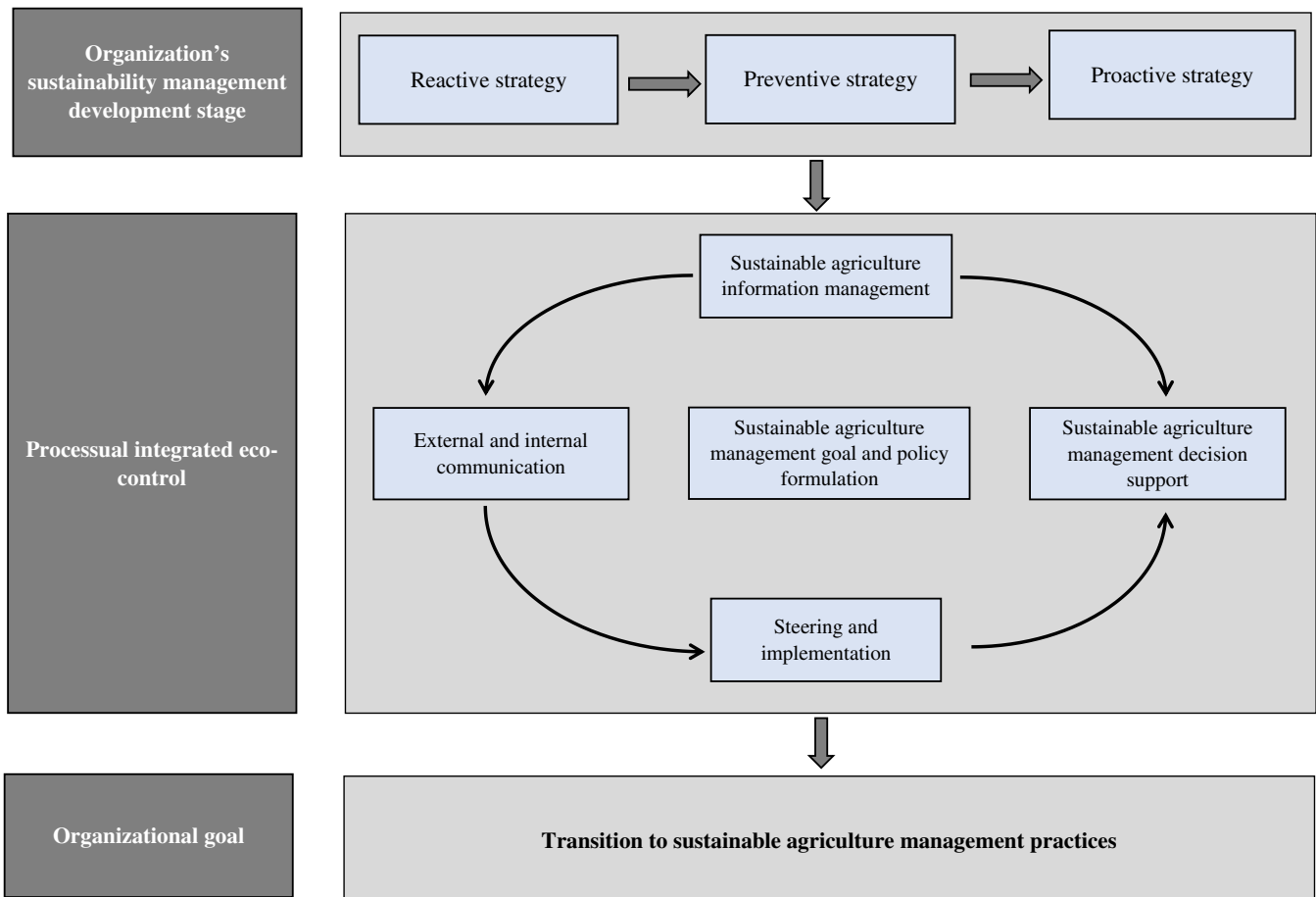
These development stages underscore that an organization enhances its scope, intensity, and depth of sustainability management activities when progressing to higher stages. Accordingly, the use of sustainable management practices in firms will change according to the development stage of sustainability management. This results in gradual changes in how eco-control is used by an organization over time. By combining the development stages of sustainability management with eco-control procedures, the analytical framework of the study can be presented as follows: (see Figure 2).

As outlined in Figure 2, organizations will move from basic levels to advanced levels of sustainability management development over time (i.e., from reactive to proactive), provided these strategies are followed consistently (Gunarathne & Lee, 2015; Ormazabal et al., 2015). During each stage of sustainability management development, the use of the five cyclical procedures of eco-controls for corporate sustainable development differs. Yet, the application of eco-

TABLE 2 Salient features of corporate sustainability management development

	Reactive strategy stage	Preventive strategy stage	Proactive strategy stage
Focus	<ul style="list-style-type: none"> Complying with regulations of stakeholder expectations 	<ul style="list-style-type: none"> Better utilization of inputs and initiation of projects in sustainability management 	<ul style="list-style-type: none"> Exploring the opportunities for improving the competitiveness in the external context
Company perception	<ul style="list-style-type: none"> Additional cost of compliance 	<ul style="list-style-type: none"> Tool for improving eco-efficiency and socio-efficiency 	<ul style="list-style-type: none"> Means for achieving competitive advantage
Role and support of top management	<ul style="list-style-type: none"> Limited 	<ul style="list-style-type: none"> Linked to the improvement of eco-efficiency and socio-efficiency 	<ul style="list-style-type: none"> Continuous

Note: Adapted from Jabbour et al. (2010).

**FIGURE 2** Analytical framework of the study [Colour figure can be viewed at wileyonlinelibrary.com]

control at each stage is geared to reach the corporate goal of achieving corporate sustainable management systems that use resources efficiently while enhancing the quality of the environment and society.

3 | RESEARCH METHOD

We have chosen a case study approach in order to provide an in-depth analysis of the phenomenon within its real-world context (i.e., *scope*) relying on multiple sources of evidence of “data needing to converge on a triangulation fashion” (i.e., *feature*; Yin, 2017, p. 15). In studies that

focus on sustainability, the case study method provides a holistic approach to collect data from complex and multifaceted perspectives while offering flexibility in gathering rich data through multiple sources (Morais & Silvestre, 2018; Seuring, 2008). As most studies that focus on the processual view of eco-control provide only a snapshot of data rather than the changes from a longitudinal perspective, we covered a period of more than 5 years from July 2013 to October 2018 to gather data. This enabled us to understand the dynamics and evolution of eco-control procedure while facilitating a staged-based analytical approach to corporate sustainability development (Abraham & Dao, 2019).

The case setting was a subsidiary tea plantation company (hereafter referred to as “Alpha”), which is a diversified conglomerate in Sri



Lanka. A public listed company on the Colombo Stock Exchange, Alpha is engaged in the cultivation, manufacture, and sale of black tea. We chose this company because, first, it has shown keen interest in following sustainable agriculture management practices in the tea industry over a considerable period of time and is regarded as a pioneer in obtaining Rainforest Alliance certification. Second, as a public limited company, the key sources of information about Alpha, such as annual reports, tea production data, press reports, and sustainability reports are available in the public domain. They formed a rich source of external data for triangulating the data collected through various other methods described in this section and to build a comprehensive picture of their gradual transition to sustainable agricultural management practices. Alpha owns more than 20 tea estates covering a land area of 10,500 ha in various districts in the upcountry region of Sri Lanka. The company was founded in 1992 when the government of Sri Lanka privatized its plantation companies. Currently, the company has a workforce of over 12,000 employees and all its estates are Rainforest Alliance certified.

We collected data from multiple sources, including interviews, observations through field visits and document analyses. This allowed us to triangulate data sources to ensure the reliability of the data collected from different sources (Golafshani, 2003; Yin, 2017). Primary data were collected at three different periods using semi-structured interviews with multiple parties, including estate managers, finance controller, finance manager, general manager, estate employees, account executives, and manager-compliance. These interviews were semi-structured and conducted face-to-face and over the phone. The nature of the open-ended semi-structured questions raised in the interviews depended on the interviewees. Most of the interviews were tape-recorded and then transcribed. When the interviews were not recorded, we noted the main points. The interviews lasted from 20 min to one-and-a-half hours, during which we asked each respondent for information regarding the current state of eco-control, changes/developments since the last interview, and if they had already been interviewed. If they had not been interviewed before, we checked for the changes/developments they perceived over the last periods (Leonard-Barton, 1990).

We also made three site visits to Alpha tea estates and tea factories in the upcountry region. These on-site observations and discussions made with the site employees were an essential source of data for supporting and synthesizing the data collected from other sources (Golafshani, 2003; Yin, 2017). The secondary data was compiled from various sources such as internal company records, newspaper articles, annual reports, emails, media reports, and online sources, including social media.

The interview transcripts and filed study notes were analyzed based on the analytical framework presented in Figure 2. Firstly, Alpha's sustainability management development staging was determined, following the procedures recommended by Murillo-Luna, Garcés-Ayerbe, and Rivera-Torres (2011) and Jabbour (2015). Several key respondents were asked about the company to identify the level of sustainability management development and the time period, based on the corporate characteristics described by Jabbour and Santos (2006) and Jabbour et al. (2010) (see Table 3). The received categorizations, which were mostly similar, were then verified with the interview data and other

TABLE 3 Identification of the sustainability management development stages

Characteristics of corporate sustainability management practices	Development stage
<ul style="list-style-type: none"> Focus of sustainability management (SM) is to follow legislation 	Reactive strategy
<ul style="list-style-type: none"> SM is predominantly linked to production/manufacturing/operations Majority of SM activities is linked to the adoption of cleaner technologies at the end of the production process 	
<ul style="list-style-type: none"> Focus of SM is the efficient use of supplies/raw materials and minimizing cost of labor Majority of SM activities is linked to the substitution and more efficient use of supplies/raw materials and labor 	Preventive strategy
<ul style="list-style-type: none"> Support of SM from other company department is started to receive 	
<ul style="list-style-type: none"> Focus of SM is exploring competitive advantages, such as the creation of sustainable products and access to new markets 	Proactive strategy
<ul style="list-style-type: none"> SM activities are diffused through the supply chain, influencing the company's suppliers Sustainability dimension influences the company's strategy and its long-term objectives 	

Note: These characteristics were developed based on Jabbour and Santos (2006).

secondary sources of the company's position in sustainability management practices as an additional measure to ensure consistency and accuracy. The final sustainability management development stage and time period complied with the key respondents of Alpha. Then, the data were divided under the major themes of the analytical framework, such as policy formulation, information management, decision support, implementation and control, and communication in different development stages. The first researcher was responsible for thematic coding and analysis of the data, while the second researcher randomly checked for consistency to improve the intercoder reliability (Vollero, Siano, Palazzo, & Amabile, 2020). The data collected from various other sources were compared for data triangulation (Denzin, 2017; Shenton, 2004) and for supplementing the interview findings. The next section of the article presents data analysis and discussion.

4 | ANALYSIS

Based on the approach adopted in the previous section, we decided that the period up to 2015 formed the reactive strategy stage of Alpha. Although the data suggested that the years 2015 and 2016 marked a transition period, we considered the period after 2015 as

the preventive strategy stage. This means that Alpha had not yet been able to reach the proactive strategy stage. The rest of the analysis and discussion is based on these two sustainability management development stages of Alpha.

4.1 | Eco-control at the reactive strategy stage

4.1.1 | Sustainable agriculture management goal setting and policy formulation

Regardless of fluctuating profit levels over the years, from inception in 1992, Alpha had rarely made any significant changes to its agriculture operations. Hence, despite the gradual changes in buyer/customer demand for more sustainable agriculture practices, the fundamental practices of the company (and even the tea industry as a whole in Sri Lanka) had not witnessed any significant changes over many years (van der Wal, 2008). This situation inevitably resulted in a lack of policies and goals to transit to sustainable agriculture. The absence of policies and goals to drive Alpha toward sustainable agriculture management had promoted a “business as usual” approach (Hopwood, Mellor, & O'Brien, 2005).

Due to this management approach, the estate managers of Alpha had simply followed century-old industry practices without any significant changes. Although some estate managers had made certain changes oriented toward sustainable agriculture management practices, they all immediately faced strict resistance and sometimes intimidation. Further, when the innovative practices or changes met high levels of resistance, a signal for the other managers at different hierarchical levels of the organization was given to refrain from such changes.

4.1.2 | Sustainable agriculture information management and decision support

Typifying a feature of an organization at the reactive strategy, the information management and decision support of Alpha during this stage were geared to meet the minimum requirements stipulated in the legislation or standards such as Rainforest Alliance (Gunaratne & Lee, 2019a; Jabbour & Santos, 2006; Roome, 1992). The result was the absence of any systematic approach to capturing relevant information and using it in managerial decision making (Gunaratne & Lee, 2019b).

However, most of the information required for sustainable agriculture management (e.g., energy, firewood, chemicals used, daily wages of labor, and accidents) was collected on a routine basis in the tea industry. One of the critical inputs in the tea industry, that is, fertilizer and agrochemical usage, is measured and recorded in stocks books, manuring logbooks, and chemical monitoring records systematically. For instance, Alpha had used 2,555 metric tonnes (mt), 2,306 mt, and 3,006 mt of fertilizers annually from 2013 to 2015, respectively. Similarly, the number of injuries of 134, 78, and 112 for this period has been reported by the factory officers and estate medical officer/assistant in the accident incident record book. However, what

is lacking here is that this information has not been analyzed and communicated to or used by the top management. Accordingly, the key performance indicators (KPIs) such as fertilizer cost as a percentage of the cost of production, different types of fertilizer usage per tea block, accidents per estate and their types (near miss, minor, critical) have not been appropriately analyzed and used in devising an effective fertilizer management program or accident prevention strategy of Alpha. As Burritt (2004) and Jasch and Savage (2005) suggest, this lack of communication between the finance (or sustainability) department and other departments that collect the environmental and sustainability management data results in a fragmentation of the information. This inevitably leads to managers making decisions that are open to outside intervention without a clear rationale.

4.1.3 | Steering/control and implementation and communication

Lack of information and decision support tools have led to poor execution, monitoring, and evaluation of practices that lead to sustainable agriculture. Notably, due to the labor-intensive nature of the tea industry (Van der Wal, 2008), the company has employed a large workforce that is not well educated. Since these field-level employees are used to carrying out standard organizational practices such as nursery maintenance, plucking, weeding, fertilizing, and tea production over a long period, even a marginal change faces a considerable degree of resistance from them and trade unions. This situation poses a major challenge, which the management of Alpha encountered at the field level, which fostered a “business as usual” approach toward sustainable agriculture management. This is partly attributable to the lack of a comprehensive organizational change management approach in their work.

Further, communication aimed at internal and external stakeholders was, at a minimum, mainly because Alpha did not feel the need to communicate. The lack of regular internal communication had created a distance between the top and middle-level managers, finance staff, and field-level staff such as estate managers and estate workers. Similarly, external communications such as newspaper articles, press releases, or web disclosures about the company's (sustainable) agriculture practices were almost nonexistent during this period. However, the finance department, on their own initiative, had prepared a sustainability report for several years. Yet, these sustainability reports contained a very minimum amount of disclosure on sustainable agriculture management practices (see Table 7). The information disclosed was highly descriptive without any measurement or comparative aspects.

4.2 | Period of disturbances in the tea industry and Alpha

The “business as usual” approach in the tea industry faced a major setback when the government of Sri Lanka suddenly banned glyphosate in 2015. Glyphosate was the main chemical used in the tea sector as a weedicide after the ban on the use of other chemicals in the country. The reason for

**TABLE 4** Key indicators of agriculture performance of Alpha

Indicator	Unit	Year								
		2010	2011	2012	2013	2014	2015	2016	2017	2018
Cultivation area	Hectares	6,136	6,064	6,062	6,059	5,917	5,971	5,965	5,974	6,082
Production	Kg '000	10,275	10,141	10,213	9,830	9,162	9,126	9,089	7,831	8,920
Average price	Rs/Kg	370.14	387.46	367.04	436.75	459.48	438.46	427.05	553.59	633.14
Cost of production	Rs/Kg	340.82	341.44	367.44	379.59	405.90	453.27	496.75	506.45	540.42
Yield	Kg '000/ha	1.675	1.672	1.685	1.622	1.548	1.528	1.524	1.311	1.467

Note: Annual reports and researchers' own data.

the prohibition of glyphosate was the allegation that it was causing a severe health problem called "chronic kidney disease of unknown etiology (CKDu)" in some agricultural areas of the country, which had escalated into an epidemic (Jayasumana et al., 2015; Rajapakse, Shivanthan, & Selvarajah, 2016). This unknown disease took the lives of more than 1,400 people annually and made up to 400,000 people ill in Sri Lanka (Kulathunga, Wijayawardena, Naidu, & Wijeratne, 2019). The ban of this critical agricultural input created a massive turmoil in the agriculture industry in the country, particularly the tea sector.

This situation resulted in two types of problems in tea plantation companies such as Alpha. First, the absence of an effective weedicide plagued the tea estates with weeds reducing the level of production. As companies resorted to manual weeding instead of chemical weeding, the labor costs increased, in turn, increasing the cost of production. The second problem was that the companies started using alternative chemicals, which were not recommended or legal. Soon, the use of non-standard chemicals led to chaos in the industry when some premium markets such as Japan and Germany banned Ceylon tea due to the excess of chemicals present in it. For instance, tea exports to Japan were totally banned in 2018 because the residue level exceeded the acceptable level of a chemical called MCPA (Daily FT, 2018). Owing to the pressure on the tea industry years later, in July 2018, the government lifted the ban on glyphosate (Jayawardana, 2018).

As in the other plantation companies, during this period, Alpha too faced the challenge of declining profitability. This was partly attributable to the unavailability of an effective weedkiller and its impact on cost. As depicted in Table 4, the cost of production was on the rise, and yield per hectare was on a gradual decline over the years. To solve this situation, the management was desperately looking for cost savings, productivity improvements and innovations to raise the bottom line. In later years, the quest for improved productivity and profitability had gradually moved the company to the next level of sustainability management development.

4.3 | Eco-control at the preventive strategy stage

4.3.1 | Sustainable agriculture management goal setting and policy formulation

Although there was no formal policy formulation for sustainable agriculture management, even during this stage, certain driving forces

TABLE 5 Mission statements of Alpha in each development stage

Aspect	Mission statement	
	Reactive strategy stage	Preventive strategy stage
No. of stakeholders addressed	Four (employees, investors, community, and customers)	Six (employees, investors, community, customers, supply chain partners, and smallholders ²)
Identification of separate mission for stakeholders' categories	Not present	Separately identified (e.g., Employees—the most preferred employer in the plantation sector)
Consideration of agriculture value chain partners in mission statement	Absent	Yes (supply chain partners and tea smallholders are included)

that emerged in the disturbance period had a definite impact on the company's policies. For instance, during the strategic committee meetings, the chairman of Alpha had placed greater emphasis on the need to reduce the consumption of fertilizer and chemicals, which in turn motivated the management team to set KPIs to monitor and control the use of agrochemicals at the estate level. Hence the top management commitment has been a major driving force to incorporate sustainable practices into organizational business policy and practice (Mzembe, Lindgreen, Maon, & Vanhamme, 2016).

Although this does not reflect a holistic approach to sustainable agriculture management covering the farm management system, biodiversity, natural resources, and livelihoods and human well-being, as outlined in standards such as Rainforest Alliance (2017), it provides considerable evidence of formal goal setting. Further, some of the changes taking place in this area are reflected in the strategic direction of Alpha toward more inclusive sustainable agriculture management practices (see Table 5, which shows how the mission statement of Alpha has changed over time). The expanded mission statement has

(a) separately identified the mission for each stakeholder category, and (b) included supply chain partners and smallholder farmers as stakeholders.

4.3.2 | Sustainable agriculture information management

A fundamental change taking place in Alpha's eco-control procedure is the development of information capturing systems. The finance division of Alpha has come up with a few new formats to collect information regularly, particularly for the annual report, by following GRI (Global Reporting Initiative) Guidelines and the newsletter. Besides, Alphas developed some KPIs based on the information gathered for certification and accreditation purposes (see Table 6). Table 6 shows how Alpha has expanded its coverage of KPIs in all three dimensions of sustainability when transiting from the reactive strategy phase to a preventive strategy phase. In using information collection formats, Alpha has focused more on physical, environmental, and sustainability management accounting information such as energy, chemicals and fertilizer, waste,

firewood, employee salaries and working hours and health and safety (Burrirt, Hahn, & Schaltegger, 2002).

4.3.3 | Sustainable agriculture management decision support

Policy changes, together with internal and external challenges, have made a considerable impact on Alpha's decision making. The decision making of the company has gradually shifted toward the inclusion of environmental and social considerations in their management practices while considering the long-term implications on the eco-system and the plantation community (see Table 6). Although the information is collected on a regular basis, there is no evidence that Alpha uses it on a routine basis for decision making.

4.3.4 | Steering/control and implementation

In line with the changes taking place at Alpha, many changes have taken place in the steering, implementation, and control of agriculture as well as in management aspects. Some of them include: the

TABLE 6 Key performance Indicators (KPIs) of Alpha

Aspect	KPI	Availability of KPI	
		Reactive strategy phase	Preventive strategy phase
<i>Effective planning and management system (economic dimension)</i>			
• Refused tea	• Refused tea % of graded made tea	√	√
• Energy and firewood	• Energy usage per kg of made tea	x	√
• Tea production from certified estates	• No KPI is calculated	x	!
• Worker productivity	• Estate worker and factory labor output	√	√
• Production and sales	• Cost of production; bought leaf crop quantity; crop per hectare; net sales average	√	√
<i>Biodiversity and natural resource conservation (environmental dimension)</i>			
• Carbon footprint	• Carbon footprint per made tea	x	√
• Wastewater	• No KPI is calculated	x	!
• Waste generated	• No KPI is calculated	x	!
• Fertilizer	• Fertilizer usage per kg of made tea	√	√
• Agrochemical used	• Chemical usage per kg of made tea; weeding cost per made tea	x	√
<i>Improved livelihoods and human well-being (social dimension)</i>			
• Injuries	• No KPI is calculated	x	!
• Employee training	• Training hours per employee	x	√
• Payment of basic daily wages	• Average daily wage cost	√	√
• No. of new houses built for employees	• No KPI is calculated	!	!

Note: √ = KPI is available; x = KPI is not calculated; ! = KPI is not calculated, but the total is monitored.

**TABLE 7** Evolution of sustainability reporting of Alpha

Aspect	Year			
	2013/2014	2014/2015	2015/2016	2016/2017
Standard followed	No standard	No standard	Started to follow some standards of GRI	GRI-G4 reporting guidelines
No of pages on sustainability reporting	14	16	16	22
Identification of materiality aspects for sustainable agriculture	No	No	No	Yes
Environmental aspects covered	Energy, hydro power plants	Water, energy, firewood; soil and forestry conservation	Water, energy, firewood; soil and forestry conservation	Materials; firewood; energy; hydropower
Social aspects covered	Worker welfare; health and awareness	Labor management; health and education	Labor management; Health and safety; training and education; child and community development	Employee development; Health and safety; training and education; employee health; child and community development
Nature of disclosures	Descriptive	Descriptive	Descriptive	Descriptive with some comparative figures
Sustainable agriculture management in chairman's review	Not mentioned	Not mentioned	Mentioned with minimum details	Mentioned (Note 1)
Sustainability in governance aspects	Not mentioned	Not mentioned	Not mentioned	Disclosed

Note: Note 1: Provided under different sections, for example, economic, aspects sustainability, welfare; Note 2: Discussed the changes toward climate-smart agriculture taking place at Alpha. Source: Based on the annual reports of Alpha.

TABLE 8 Summary of the application of eco-controls of Alpha in each stage

Eco-control procedure	Application	
	Reactive strategy stage	Preventive strategy stage
Goal setting and policy formulation	<ul style="list-style-type: none"> No clear policies to adopt sustainable agriculture management Business as usual approach Narrowly defined mission 	<ul style="list-style-type: none"> Emergence of formal goal setting Expanding mission toward inclusive sustainable agriculture management
Information management	<ul style="list-style-type: none"> Generated information for regulatory compliance and meeting certification standards Ad-hoc capturing and fragmentation of information 	<ul style="list-style-type: none"> Generation of information beyond compliance Development of formal procedures for information collection
Decision support	<ul style="list-style-type: none"> Limited support with mostly physical information (e.g., quantity of fertilizer, kWh of energy) 	<ul style="list-style-type: none"> Gradual shift toward inclusion of sustainability information in decision making Limited uses of information for routine decision making
Steering/control and implementation	<ul style="list-style-type: none"> Limited initiatives toward sustainable agriculture and poor exercise of controls 	<ul style="list-style-type: none"> Expanded coverage of field-level practices toward sustainable agriculture management Changes in organizational structures and systems to support sustainability practices
Communication		
<i>Internal</i>	<ul style="list-style-type: none"> Lack of systematic internal communications One-way (only top down) 	<ul style="list-style-type: none"> Provision of key sustainability information for employees
<i>External</i>	<ul style="list-style-type: none"> Minimum disclosures in sustainability reports No other external communications 	<ul style="list-style-type: none"> Advanced disclosures in sustainability/integrated reports

establishment of a separate organizational position called “Manager Compliance”; nonuse of any unauthorized chemicals in plantations; improved focus on biodiversity conservation; investment in crop diversification and enhancing forest cover; provision of improved welfare for estate workers; training of employees in sustainable agriculture practices; and the imposition of strict safety conditions in fieldwork. In line with these changes, management has taken action to win the support of estate workers for the changes. Further, Alpha has obtained some certifications such as Rainforest Alliance, ISO 22000 Food Safety Management System, UTZ Standard, Fair Trade Labelling and followed standards that are directly relevant to sustainable agriculture management. These standards/certificates have been used to formalize the company systems and procedures in addition to using them as a means of meeting the pressure of international buyers/buying markets.

4.3.5 | Communication

The changes taking place at Alpha are reflected in its internal and external communications. To improve internal communications, Alpha has launched a monthly newsletter that communicates the highlights of the company. Among other things, it also contains vital information regarding environmental initiatives, labor practices, and other corporate social responsibility initiatives. In addition to the provision of

details of key sustainability initiatives, it also acts as a source of motivation by recognizing the noteworthy practices at the estate level.

Another notable development was the change in the external reporting of Alpha due to the changes in the goals and policies followed by information management in eco-control. The annual reports of Alpha also reflect their progress in disclosures on the company in general and sustainable agriculture management in particular (see Table 7).

A summary of the key findings of the application of eco-controls by Alpha in each of the sustainability management development stages is provided in Table 8.

5 | DISCUSSION AND IMPLICATIONS

The longitudinal analysis of the case of Alpha in the Sri Lankan tea industry raises several important points for discussion on the use of the eco-control process for sustainable agriculture management at different sustainability management development stages. These points are discussed below.

The case of Alpha reconfirms the interconnected, cyclical nature of eco-control procedures (Gunarathne & Lee, 2015; Lee, 2012; Schaltegger & Burritt, 2000). During the reactive strategy stage, the absence of a clear policy and a set of goals for sustainable agriculture management resulted in poor information gathering and decision



support, lethargic implementation of sustainable agriculture management practices, and finally, inadequate internal and external communication. But when the company policies were gradually oriented toward sustainable agriculture management in later years, the eco-control process changed in a cyclical manner (Klettner et al., 2014). Further, as the case of Alpha reveals, the sudden ban on glyphosate and other critical agricultural inputs and lifting the ban later once the tea industry suffered a massive loss, show a lack of consistent policies and of institutional support for business organizations, which is a common drawback to the sustainable development agenda of many of the EDEs (Gunarathne & Lee, 2019a).

Alpha is still in the transition stage of preventive strategy without enjoying the benefits of a proactive strategy. Although the company collects most of the information needed for sustainable agriculture management practices at the estate level, the fragmentation of environmental and sustainability management information and poor communication between information collectors and users is an impediment (Jasch & Savage, 2005). It is the inadequate corporate managerial systems that hinder organizational change and the development of corporate sustainability (Burritt, 2004). Further, top management has to provide clear guidance and policy direction to integrate environmental and sustainability management into the organizational reporting mechanisms as part of daily decision making with the assistance of managerial approaches such as eco-control (Epstein & Buhovac, 2010; Gunarathne & Lee, 2015).

As this case shows, corporate sustainable development practices such as sustainable agriculture management is a combination of an agricultural and managerial approach (Feola et al., 2015; Vanclay, 2004). Understanding actions and decision making at the field and organizational level within a socio-ecological context is of paramount importance for the promotion of socio-technical change and innovation toward sustainable agriculture management (Feola et al., 2015). Hence, there should be a shift of agriculture management to a social and managerial process in addition to being a technology-driven process (Hellin & Camacho, 2017; Pant et al., 2012; Vanclay, 2004). Ignorance of this vital aspect in corporate sustainability management can render these initiatives less effective and unproductive.

In this study, we extend Schaltegger and Burritt's (2000) eco-control approach with the development stages perspective in order to analyze how the new framework can provide better integrated sustainability management for corporate decision-makers. Using a case study from the commercial tea industry, this study shows how corporate entities can benefit from organizational change and development approaches such as eco-control in maneuvering higher-order sustainability development stages. Notably, in the tea industry, if field-level sustainable agriculture management practices are not supported by organization-wide changes such as policy directions and support, awareness and change management, internal and external stakeholder communication and performance measurement and appraisal, a transition to sustainable agriculture management is doomed. In this organization-wide transition to sustainable agriculture management, eco-control with its approach to integrated environmental and social

information for sustainable management helps drive a sustainable strategy throughout an organization (Henri & Journeault, 2010; Schaltegger & Burritt, 2000). Hence, this study brings evidence as to how eco-control can be used as a potential broad managerial approach in corporate sustainability development for business entities. However, this study also stresses the need for the development of a detailed eco-control procedure to suit the industry-specific requirements (for instance, the inclusion of biodiversity and natural resource management in the tea industry), organizational-specific activities (for example, consideration of unique operational activities such as agriculture management), and organizational contingencies (such as sustainable development stage). Accordingly, we are of the view that the processual eco-control procedure of Schaltegger and Burritt (2000) provides the scope to encompass these broad factors that are central to a selected corporate sustainability management setting.

The study has several important implications for business practitioners and policymakers. For agribusiness practitioners, it highlights the need for facilitating organizational change and development through proper information management when implementing sustainable agriculture management. Since the tea industry (or broadly plantation agriculture) in developing countries is usually characterized by the long-established beliefs, it is essential to solicit the support and commitment of various internal and external stakeholders for the purpose of adopting any innovative practices (Vanclay, 2004). As it is, the behavior of field-level workers as the agents undertaking sustainability policies, programs, and practices, primarily affects the success of these practices (Feola et al., 2015). Internal and external communication, facilitated by the decision to implement sustainable agriculture management practices, is vital for achieving the desired organizational change (Lee, 2017). This is particularly imperative in labor-intensive agribusinesses such as the tea industry, where there is a large workforce with diverse levels of education, training and awareness, and an unfavorable corporate culture that does not accommodate the change. Accordingly, the practitioners should aim for changes that occur over a considerable period of time. Thus, the study further supports and opens up specific practical avenues for the plantation agriculture industry in implementing the ideas echoed in the proposition that agriculture is a social process (Hellin & Camacho, 2017; Pant et al., 2012; Vanclay, 2004; Wolf, 2011). In particular, agribusiness practitioners should pay special attention to aspects such as change management, stakeholder (both internal and external) communication, and engagement and information management, which are ignored in typical sustainable agriculture management. These aspects should be supported by a clear long-term vision and policies, expecting a gradual evolution over time toward sustainable agriculture management.

For policymakers and regulators in EDEs, the study emphasizes the need to set clear guidelines to facilitate the transition to sustainable agriculture management development. Lack of government leadership has often been identified as a significant obstacle in corporate sustainability transition (Chkanikova & Mont, 2015). As this case reveals, inadequate macro-level support would make the setting up of clear policies and goals for corporate sustainable development,

including sustainable agriculture management, a challenge for EDEs. Hence, consistent policies and regulatory support are essential to assist the agribusiness firms in EDEs to transit toward sustainable agriculture management practices (Pant et al., 2012). Further, policymakers and the relevant governmental institutions should not only provide technical support to move toward sustainable agriculture management, but also guide for the agribusinesses to build their internal capacity and systems through initiatives such as management training, organizational system development, and promotion of industry collaborations. As highlighted in this study, integrated sustainable management control approaches, such as eco-control, offers a potential managerial tool to promote. This is an essential consideration as, so far, the managerial concerns paying attention to organizational change and development aspects have been largely ignored at the policy-making level.

6 | CONCLUSIONS

The purpose of this study was to provide an in-depth discussion on how processual eco-controls are changed in response to external and internal challenges in the different sustainability management development stages of an agribusiness transiting to sustainable agriculture management. The case underscores the importance of considering sustainable agriculture management practices as an organization-wide change and development mechanism in addition to adopting technology-oriented sustainable agriculture management practices at the farm level. The pursuit of managerial control approaches such as eco-control, with emphasis on organizational change and development, would be a promising progression toward sustainable agriculture management practices.

By examining how corporate sustainable development through organizational development and an eco-control approach, this article makes several contributions. Firstly, it develops “the processual view of the eco-control model” in conjunction with a sustainability management development stage. Secondly, by focusing precisely on organizational development in the context of sustainable agriculture management practices, it emphasizes the need to consider this movement as a combination of social and technical processes (Hellin & Camacho, 2017; Pant et al., 2012; Vanclay, 2004; Wolf, 2011). The emphasis on a managerial control approach to sustainable agriculture management marks a notable departure from previous studies since most prior research still considers agriculture management to be a technically driven process. Finally, it highlights strategizing for and operationalizing corporate sustainable development in EDEs from an eco-control viewpoint, in the context of the agribusiness sector by providing an in-depth empirical case.

Although this study has revealed several important findings and implications, its limitations should be acknowledged. We are of the view that the findings may be difficult to generalize (Yin, 2017) due to some limitations inherent in the study. These limitations include the unique location, industry and case setting (i.e., a single company from the tea industry in Sri Lanka), and national cultural factors. Hence, it

will be worth carrying out future studies that investigate the broader aspects of corporate sustainable development in different industries in EDEs and developed countries to identify the dynamics of social, cultural, institutional, and managerial practices in the adoption of corporate sustainable management practices. Finally, as Lane and Devin (2018) opines, in a process-based study of this nature, there can be sequencing and linkages between events and phases, such as the application of eco-control and sustainability development stages. In other words, the use of eco-control can drive organizational sustainability development. Hence, identifying as to how eco-control supports (or impedes) corporate sustainability stage development will be a fertile subject matter for future research.

ACKNOWLEDGMENT

This work was supported by the University of Sri Jayewardenepura, Sri Lanka (Grant number ASP/01/RE/MGT/2017/59).

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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ENDNOTES

¹According to Henri, Journeault, and Brousseau (2017), eco-control can also be referred to as sustainability control systems or environmental management control systems. In this study, eco-control is used in a broad sense to encapsulate both ecological and social perspectives.

²Tea smallholder farmers currently produce over 74% of tea production in the country (Central Bank, 2017). Their tea leaves are processed by the tea processing factories owned by the tea plantation companies. These smallholder farmers are an important source of raw material supply for tea plantation companies' business operations.

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How to cite this article: Gunarathne ADN, Lee K-H. Eco-control for corporate sustainable management: A sustainability development stage perspective. *Corp Soc Responsib Environ Manag.* 2020;27:2515–2529. <https://doi.org/10.1002/csr.1973>