2016 International Conference on

Climate Change and Sustainable Innovation

EMAN-AP Annual Conference

A Joint Conference with SSR Academy and IGCForum

Joint Conference on Climate, Environment, Energy, and CSR

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☑ Dates : June 29-July 1, 2016

☑ Venue : 60th Anniversary Hall, Inha University, Korea

☑ Organized by EMAN-AP and SSR Academy in Partnership with IGCForum

☑ Sponsored by SMRI and Incheon Tourism Organization

Accounting as an information system to facilitate biodiversity management in the plantations sector

Chamara Jayakody, Upekha Atupola, & Nuwan Gunarathne*
Department of Accounting, University of Sri Jayewardenepura, Sri Lanka
*Corresponding author: nuwan@sjp.ac.lk

Environmental degradation and social inequality has continuously threatened the ability of the future generations to meet their own needs in the pursuit of satisfying the needs of the present generations. Global warming, routine pollutants, industrial accidents, deforestation and loss of biodiversity are few such environmental threats that have received heightened attention of both public and private sectors. Among these, the variability among living organisms from all sources or *biodiversity* (Spicer, 2006) and its threats started receiving the limelight particularly after the Earth Summit in Rio which paved the way for Convention on Biological Diversity (Balmford et al., 2005). Furthering these developments, at present, businesses consider biodiversity either as corporate social responsibility or as a part of their business strategy. However, the business entities that have direct interaction with the natural environment tend to incorporate biodiversity management into their mainstream business management. Plantations sector provides a prolific example of such entities that have to embed biodiversity in corporate decision making on a regular basis. Consequently, the demand for biodiversity information systems in the spheres of identifying, recording, and reporting (i.e. the main functions of accounting) become quite essential in the plantations sector. The changes in business landscape coupled with stewardship towards stakeholders, have expanded the role of accounting to provide non-financial information along with monetary information in managing natural capitals such as biodiversity. Yet, it is little known how biodiversity can be accounted for in the plantations sector in a systematic manner. This ongoing exploratory study therefore attempts to demonstrate how biodiversity accounting can be brought into mainstream accounting in the plantations sector in Sri Lanka.

In operationalizing biodiversity accounting, different approaches are available such as inventory model, sustainable cost and resource flow model (refer Gray et. al, 1993 for more details). This paper applies and evaluates the use of Jones (1996) natural inventory model

(NIM) to account for biodiversity in the tea plantations sector. NIM is a model that has received worldwide attention and recognition in accounting for bio-diversity by providing a systematic and simple hierarchical framework to record, value and report natural habitats, flora and fauna (Jones and Solomon, 2013). The hierarchical model of NIM comprises of three stages: recording, valuing and reporting of flora, fauna and habitats. Six levels of natural inventory are arranged in a pyramid of hierarchical criticality (Jones, 1996) (refer Table 1).

Table 1: Natural Inventory Model

Level	Recordings	Common features
Level 1	Provides a baseline set of habitat information by recording only the habitat type and natural capital status (i.e. whether that habitat is endangered, vulnerable or rare)	Primary level of reporting
Level 2	Records all the critical flora and fauna both by species and by total population on all habitats	Highlight critical habitats and critical flora and fauna
Level 3	All species in the critical habitats are surveyed	
Level 4	Identifies the critical habitats' flora and fauna by total population by replicating the level 3 inventory by the population level	
Level 5	A general inventory of all flora and fauna by species is conducted	Broader levels and can be impracticable levels
Level 6	General inventory is extended to the total population	

Source: Jones (1996)

The researchers selected a tea estate in Lindula region in Sri Lanka that belongs to a large listed plantations company in the country. Primary data were collected by visiting the estate and having interviews with the middle and estate management. By analyzing internal company records such as log books, sighting records, web sources and other reports, the secondary data were collected. The collected data were analyzed as per the hierarchical levels in the NIM. Further reporting mechanisms were evaluated with a view to evaluating the different stages of NIM.

The findings of the study suggest that the tea plantations companies use their own model to account for biodiversity in their estates and those models are largely in congruent with the NIM. However, higher layers of the NIM cannot be applied due to the lack of information similar to the findings of Jones (2003) and Siddiqui (2013) irrespective of whether it is a developed or developing country context. This leaves plantations companies with incomplete biodiversity accounting reports which can limit their potential to better manage biodiversity. It is also identified that different informational levels in an organization, a) *operational* (information provided for day-to-day operations at divisional levels), b) *organizational* (information provided for internal users at business unit levels), and c) *stakeholder level* (information provided to external stakeholders) use NIM stages in different magnitudes. We further found that in the plantations sector, reporting on biodiversity has been advanced owing to the requirements to comply with certification and accreditation standards such as Rainforest Alliance Certification, Ethical Tea Partnership Certification, Fair Trade Standards, etc. and assurance requirements. Moreover, there are international guidelines such as Global Reporting Initiative (GRI) (refer GRI G4 Specific Standard Disclosure Guidelines EN 11-14) (GRI, 2013) and other non-financial reporting frameworks such as Integrated Reporting that shed light on the reporting aspects of biodiversity. Compared to the reporting stage, recording and valuation stages have therefore been less progressed in the models such as NIM. Thus, further guidelines and assistance are warranted to apply these models in effectively managing biodiversity.

This ongoing study is an initial step taken to explore how biodiversity can be brought into mainstream accounting which will facilitate and enable various analysis to identify value creation or diminution through business operations. The study suggests that systematic adoption of biodiversity accounting, by using models such as NIM, can foster biodiversity management in plantations sectors while earning international accreditations and financial benefits for the plantations entities.

Key words *– Biodiversity, biodiversity accounting, Natural inventory model, Plantations, Sri Lanka*