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Comparison of Conventional and Organic Modes of Low Country Tea Cultivation using Life Cycle Approach: A Study in Neluwa DS Division, Sri Lanka

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Abstract

Tea industry is the fifth highest foreign exchange earner for the country. Despite such benefits, it generates significant environmental impacts along its entire life cycle. Environmental impacts of organic and chemically intensive tea cultivation practices of Sri Lanka has long been a controversial topic, hampered in part by lack of adequate evidence. The present study therefore aimed to quantify and compare the key environmental impacts along the life cycle of low country organic and conventional tea cultivation using Life Cycle Assessment framework.

The methodology involved four steps: goal and scope definition, life cycle inventory preparation, life cycle impact assessment and interpretation. Input-output data were gathered from small holder farmers in Neluwa DS division. Twenty one organic farmers and 15 non-organic farmers were selected. The functional unit was considered as 100 kg of fresh tea leaves. Six impact categories were considered, namely global warming, eutrophication, atmospheric acidification, human toxicity, terrestrial eco-toxicity and aquatic eco-toxicity. In order to determine the impact categories from the identified emissions, CML-IA baseline method in SimaPro 9.1 was used.

Significant differences were observed between organic and non-organic modes of cultivation under the selected six impact categories. Chemically intensive cultivations showed nearly five times higher global warming potential and eutrophication potential, nearly three times higher atmospheric acidification potential and over 330 times higher human toxicity potential compared to organic tea cultivations. It can be concluded that organic tea cultivation contributes to lower environment impacts than conventional tea cultivation methods. Greenhouse gas emissions from organic farming can further be reduced by nursery establishment and organic fertiliser production within close proximity to the tea cultivation. Implications for policy include the need to provide adequate incentives to encourage the practicing of organic tea farming in order to pave the way for a more sustainable industry.

Keywords: Life cycle analysis, Tea cultivation, Environmental impacts