Evaluating Rural Farming Livelihood Outcomes from Sustainability Standard Certification Practices by Smallholder Tea Growers in Sri Lanka

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Abstract

Recent rapid transformations have shaped the development and use of voluntary sustainability standard initiatives that seek to address critical issues along global commodity supply chains. Smallholder farming communities that form an integral part of these supply chains have often been left exposed to increased livelihood insecurity. We explore how certification interventions of the Rainforest Alliance programme in Sri Lanka impact various classes of farming livelihood assets of smallholder tea growers and identify how these assets are combined and transformed to achieve their desired livelihood outcomes. A research framework was developed that integrates the 'sustainable livelihoods' approach and the 'theory of change' to assess 36 indicators for the five capitals and the vulnerability context using mixed method techniques. We conducted household surveys to evaluate the asset levels for the indicators between 45 certified and 45 non-certified smallholders. In addition, we performed in-depth interviews with several extension specialists and held two focus group discussions with non-certified society leaders and their smallholder members. The findings of the Wilcoxon signed rank test showed that a total of 16 of 36 indicators were statistically significant, indicating increased levels in these assets for certified smallholders. Of the 15 livelihood outcomes evaluated, certified smallholders had seven 'fully achieved' outcomes after certification compared to four before certification. In contrast, non-certified smallholders had three 'fully achieved' outcomes, while nine were 'not achieved'. Our findings support evidence that the certification programme has contributed to improving only some of the sustainable farming livelihood outcomes of the certified tea smallholder community.

1 INTRODUCTION

The rapid expansion of food and agricultural trade in recent decades has been associated with the proliferation of several new and progressive international voluntary sustainability standards, labels and regulations that have increasingly governed the way commodities are sourced, produced and consumed (Byerlee and Rueda, 2015; Oya et al., 2018). Trends for standard-compliant production have witnessed exponential growth between 2008 and 2012 for coffee (15–40%), cocoa (3–22%), tea (6–12%), palm oil (2–15%) and banana (2–3%) (Potts et al., 2014; DeFries et al., 2017). Sri Lanka currently ranks as the third largest tea exporter and the fourth largest producer worldwide (Tea Exporters Association Sri Lanka, 2017). The smallholdings sector is the country's highest contributor to national tea production, accounting for approximately 75% of the total production share (Tea Small Holdings Development Authority, 2022).

Civil society and private sector actors have increasingly adopted sustainability standards as key drivers in seeking to achieve positive socioeconomic and environmental outcomes across supply chains for several reasons. Some of the world's most ecologically rich areas are located in the Global South and are recognised as biodiversity hotspots for the conservation of ecosystems and habitats. Consumers have also been more aware of their ecological footprint in their overall consumption habits, while manufacturers continue to ensure uninterrupted long-term supply (Bray and Neilson, 2017).

Although smallholder farmer production accounts for more than 70% of global agricultural commodities, it plays an integral role in conserving crop diversity (FAO, 2014; Ricciardi et al., 2018). However, it is also reported that more than 50% of the world's largest food-insecure population consists of smallholders and rural farming communities (FAO, 2019; Bacon et al., 2021). Adverse climatic impacts, conflicts, price fluctuations, pandemics, unsustainable natural resource and land use have often exasperated rural livelihood vulnerabilities within these communities (Bacon et al., 2021). Most farmers are caught in a vicious circle between poor economies of scale, higher transaction costs, weaker bargaining power, and restricted market access (Blackmore et al., 2012). As such, governments and multilateral donors have been required urgently to understand the transformative potential of sustainable supply chains on their landscapes and livelihoods (Rueda and Lambin, 2013; DeFries et al., 2017).

While numerous sustainability standards have opened new export markets for farmers who adopted sustainable agricultural practices, there have been ongoing debates as to whether these standards actually lead to increased market accessibility while lifting poorer producers out of poverty (Loconto and Dankers, 2014; Meemken, 2020). Current empirical evidence, particularly from low and middle-income countries, has reported to show a considerable degree of variability (Blackman and Rivera, 2011; Bray and Neilson, 2017; Oya et al., 2018; Meemken, 2020). Studies conducted previously have often yielded mixed results, where some identifying sustainability standards continue to keep farmers in poverty (Valkila, 2009; Beuchelt and Zeller, 2011; Jena et al., 2017), while others suggest marginalised farmers benefiting through standards that have improved their production capacities and livelihoods (Jones and Gibbon, 2011; Kleemann et al., 2014; Qiao et al., 2016). As most value addition in the final product occurs further downstream, the distribution of power and governance is often asymmetric and results in unequal benefits across the value chain (Rueda and Lambin,

2013; Pinto et al., 2014). This has raised questions about the potential impacts these newer segmented markets could have on smallholders and whether they receive the appropriate support to develop their farming livelihoods (Ruben and Zuniga, 2011).

An approach taken by sustainability standards to improve economies of scale and incentivise responsible smallholder production practices is group certification. Some of the more prominent certification programmes for the global tea industry include Fairtrade, Forest Stewardship Council, Organic, Ethical Tea Partnership, UTZ and Rainforest Alliance (Rueda and Lambin, 2013; Meemken, 2020). Although certification, in general, can take numerous conceptualised meanings, often having multiple pathways that have specific impacts on different value chain actors, it has been best described as a 'bundle of interventions' that combines standard setting and compliance, capacity building and training, organisational and market integrations to achieve sustainability goals (Oya et al., 2018). As a subset of certification, group certification allows independent small-scale producers who are not organised into formal producer organisations to undertake certification as a group (Pinto et al., 2014; Potts et al., 2014). Therefore, the overall operational costs of each group member's certification is said to be considerably lower than if it were obtained as an individual certificate (FSC, 2020).

In theory, financial incentives for producers that meet specific sustainability criteria are usually in the form of price premiums and increased market accessibility (Blackman and Rivera, 2011). However, there has been an overall low level of understanding of how value is captured and assigned across certified supply chains. For the Global South in particular, previous studies have often failed to identify how certification interventions in smallholder communities have direct and indirect impacts on different immediate short-term outcomes (e.g, crop quality, soil fertility, health and safety, market information and farm revenues) and the broader long-term outcomes (e.g, biodiversity conservation, farm family well-being, farm productivity and profitability) (Oya et al., 2018).

Our comparative study aims to establish a foundational understanding of how certification initiatives logically impact different farming livelihood asset classes of smallholders who would combine and transform them to derive their desired livelihood outcomes at the farm and household levels. The study focuses on the Rainforest Alliance (RA) certification programme that is administered by the local consulting programme coordinator in Sri Lanka. Its central research question explores the transformative potential the certification programme may have in shaping the rural livelihoods and landscapes of certified tea smallholders in the country. We integrate the 'sustainable livelihoods' approach of the Department for International Development (DFID, 1999) with the 'theory of change' from RA to collect empirical data and evaluate the findings based on the research objectives.

1) Develop a research framework for assessing rural farming livelihoods.

2) Evaluate the pathways through which the group certification programme could impact the livelihood outcomes of certified tea smallholders.

2 ANALYTICAL FRAMEWORK

The theory of change was jointly developed by RA and the Sustainable Agriculture Network (SAN) to map and define the pathways taken by the targeted certification activities to achieve the intended outcomes and broader impacts (Milder and Newsom, 2015). This outcome-based approach allows critical reflection to the design, implementation, and evaluation of initiatives and programmes (Vogel, 2012; Wijaya et al., 2018). The basic cause and effect logic flow includes support strategies, outputs, direct results and intermediate results, which occur at both field level and the level of its enabling environment (Milder and Newsom, 2015). The combined activities at both levels are essential to achieve the desired outcomes of the theory and broader impacts of creating and maintaining sustainable and resilient rural landscapes (Milder and Newsom, 2015). Instead of being used as a prescribed methodology, the theory is reported to be most reliable when applied through pre-existing processes to support visions, ideas and conceptions throughout a programme cycle (Vogel, 2012). As it encourages ongoing questions, the theory's way of thinking inspires improvements that can be applied through more feasible and realistic institutional interventions (Vogel, 2012).

The Sustainable Livelihoods (SL) framework illustrates the assets (material and social), skills and approaches adopted by individuals and communities for ensuring their survival needs (Elizondo, 2017). It applies a people-centric approach that conceptualises: a) the goods or capital which people need, b) the ways in which asset bases are utilised to develop livelihood strategies essential for achieving desired livelihood outcomes, c) the vulnerability context that depicts the external environment in which people operate (including moments of stress and shock), and d) the roles played by institutions and processes that can strengthen subsistence resilience during times of crisis (GLOPP, 2008; Elizondo, 2017). As livelihood outcomes in this context involve both smallholder

livelihoods and their farming systems, we use the term *'sustainable farming livelihoods'* to combine both outcomes for this study. Table 1 presents the desired sustainable farming livelihood outcomes that are adapted from the intermediate outcomes given by the RA's theory of change. These outcomes fall under four broad categories: biodiversity conservation, natural resource conservation, farm family well-being and community welfare, and finally, farm productivity and profitability (Milder and Newsom, 2015). From a total of 40 indicators, only 36 indicators were tested for statistical significance, as the data for indicators representing crop diversification and type of energy (electricity, gas and wood) were either continuous or failed to fulfil the test assumptions.

Table 1
Analytical framework representing the corresponding indicators to be assessed against the five capitals, the vulnerability context and the sustainable farming livelihood outcomes.

Natural capital	Human capital	Social capital	Physical capital	Financial capital	Vulnerability context
Crop yield	Agro-farming skills	Gender equity for women	Access to safe water	Access to financial services	Trends Shocks
Crop quality	Personal protective equipment	Participation in farmer society and community	Access to sufficient food	Household income from tea cultivation	
Waste management	Health and safety levels	Transparency on market information	Structure of housing	Agricultural income from tea cultivation	
Water quality	Medical and health services	Grower-buyer business relations	Status of housing completion	Productivity of tea cultivation	
Water quantity	Training-Farm administration	Access to extension and support services	Access to clean energy	Profit margin from tea cultivation	
Soil conservation	Training-Good Agricultural Practices	-	Type of energy available- electricity	-	
Soil fertility	Training-Health and safety	-	Type of energy available- gas	-	Seasonal shifts
Vegetation density	Training-First aid	-	Type of energy available- wood	-	
Forest reserve	Awareness-child labour prevention	-	-	-	
Animal and insect prevalence	Awareness-family nutrition	-	-	-	
Crop diversification	Schooling of children	-	-	-	
Sustainable farming livelihood outcomes Biodiversity conservation 1. Growers are likely to protect forests and other natural ecosystems 2. Growers increase the amount and diversity of vegetation 3. Growers experience increased abundance and coexist better among beneficial animals and insect species Natural resource conservation 4. Soil fertility is likely to be maintained and improved 5. Soil conservation is performed to minimize erosion 6. Water pollution is minimized 7. Water is conserved efficiently and used within natural limits			Sustainable farming livelihood outcomes Farm family wellbeing and community welfare 8. Grower's family secure their farm health and safety 9. Grower's family essential needs are met: energy, clean water, food, health care, housing and education 10. Growers are likely to gain good farming knowledge and develop sustainable agricultural skills 11. Growers are supported through effective and transparent management systems 12. Growers actively participate within their societies and have good community involvement Farm productivity and profitability 13. Growers increase the productivity and quality of crops. 14. Growers receive higher margins and better income returns. 15. Growers are less vulnerable to shocks, trends and shifts		

Source: Author's own adaptation from COSA, 2013; Milder and Newsom, 2015.

2.1 The National Land Development and Extension Services Programme

The Tea Small Holdings Development Authority (TSHDA) is organised as a five-layered structure at the field level comprising of the tea inspectors at the lowest divisional level, sub-offices, district offices and the head office at the national level. A schematic representation of this structure is shown in Fig. 2. The main functions of the TSHDA at the field level can be broadly classified into land development activities and the provision of extension and advisory services. Land development activities are primarily aimed at improving the standard and productivity of tea land. Such activities include government subsidies for fertiliser, crop and soil rehabilitation, replanting, and new planting activities (tea inspector, February 2018, in-depth interview). Furthermore, accessibility to various support services, such as the provision of fertiliser and planting materials from maintained mother bush nurseries, has also been aimed at improving tea productivity (Tea Small Holdings Development Authority, 2016). Extension and advisory services, in contrast, have aimed to improve the level of knowledge and skills of smallholders. These are administered as training programmes, demonstrations and field trips on best practices for tea cultivation, leaf quality maintenance, resource management, nursery management and farm administration. In addition to the above extension services, soil tests and pH tests are also performed according to the annual action plan (Tea Small Holdings Development Authority, 2016).

The price of raw green leaves is determined primarily by the auction prices for the finished product. The volatility in prices in the world market significantly affects smallholder earnings and profit margins (Abeygunawardena, 2015). In most cases, smallholders sell their leaves to factories through privately operated leaf collectors who transport and supply the leaves. The current Tea Control Act No.51 of 1957 mandates the *'Reasonable Price Formula'*, which assures a 68% price share for a kilogram of processed tea from a particular factory to be given to the smallholder and 32% to be retained by the factory owner to cover processing and operational expenses (Sri Lanka Tea Board 2011; Abeygunawardena 2015). As an example, if a kilogram of processed low country black tea were sold at auctions for an average price of Rs 650/kg; under the current pricing formula, the smallholder would receive approximately Rs 442/kg to produce one kilogram of processed tea. As approximately 4.65 kilograms of green leaves are required to produce one kilogram of processed tea, the smallholder would receive a farm gate price of Rs 95/kg for a single kilogram (Rs.442/4.65 kg).

3 METHODS

The study was carried out during February and March 2018 within the Kahawatta Divisional Secretariat area in the Ratnapura district of Sri Lanka (Fig. 3). The Ratnapura district, which is one of the 25 districts in the country, is located in the south-western part of the island, also known as the wet zone (Hydrodynamics and Geophysical Survey-HGS Pvt. Ltd., 2016). The agricultural sector of the district is well developed, with 72.9% of the total land used for agricultural purposes and the remaining 27.1% as forested land. Home gardens, tea and rubber represent the highest share of agricultural land (20.51%, 13.31% and 12.23%, respectively) (HGS Pvt. Ltd, 2016). Other types of crops grown to a lesser extent include paddy, coconut, pepper, cinnamon, cardamom and fruits such as papaya, avocado and banana. The Ratnapura district has been an important region for the agricultural earnings of the country. It represents the highest national contributor to the tea sector in terms of total productivity and the total number of tea smallholdings present (Tea Small Holdings Development Authority, 2016). The total number of tea smallholders and the total extent of tea land for the district is 92,038 and 30,441 ha, respectively (Tea Small Holdings Development Authority, 2016). The total number of tea trees in the district varies between 10,000–12,500 trees/ha. The district encompasses several forest reservations within its region. One of them includes a section of the country's last viable primary tropical rainforests, the *Sinharaja Forest Reserve*, which spans partly across the district. The Sinharaja Forest Reserve, listed as a UNESCO world heritage site, is home to a rich diversity of flora and fauna species endemic to Sri Lanka (HGS Pvt. Ltd, 2016).

To evaluate the outcomes of the certification programme between the different smallholder groups, a mix of qualitative and quantitative methods was used for the study. Loconto and Dankers (2014), who reviewed large amounts of literature in which a wide range of qualitative and quantitative methods were used, emphasised the need to adopt more mixed method approaches. This allows a clearer understanding of the complex relationships between sustainability standards and their outcomes in value chains. The data collected as shown in Table 2, was triangulated using quantitative household surveys, qualitative interviews and focus group discussions, as well as secondary data from farm records, certification programme material and annual reports. The interviews, focus group discussions and surveys were conducted in Sinhalese as it was the preferred mode of communication with the participants.

The household survey questionnaires were self-administered and consisted of closed-ended questions with three-point Likert scales and a few open-ended questions to provide figures and simple answers. Identical questionnaires were administered to different groups of certified and non-certified smallholders with the exception that the certified group was questioned for outcomes both before and after certification and the non-certified group for their current outcomes. In-depth interviews and focus group discussions allowed for a deeper interpretation of the findings gathered by the household surveys. In-depth interviews allowed to explore past and

present experiences of participants and how they attribute meaning to perceived farming outcomes. Two interviews were held with two society leaders (chairman and secretary) who each represented their non-certified smallholders in their societies. Being smallholder growers themselves, they were considered key informants due to their authoritative roles played within the societies and their general knowledge regarding past significant events. Additionally, interviews were held with three certified smallholders who each supplied tea leaves to their respective certified factories. Interviews were also held with a TSHDA tea inspector and a management executive of a certified factory. The in-depth interviews were semi-structured in nature, following a series of predetermined open-ended questions, which were organised around their given set of indicators.

Table 2
Summary of the mixed method approaches used for data collection. *FGD-Focus group discussion.

Certified group (factory) Non-certified group (society)					
Factory 1 Factory 2 Factory 3 Society 4 Society 5 Society 6					
15 household surveys	15 household surveys	15 household surveys	15 household surveys	15 household surveys	15 household surveys
In-depth interview with grower	In-depth interview with grower	In-depth interview with grower	In-depth interview with chairman	*FGD with chairman and group members	FGD with chairman and group members
Certified group (factory)			**Non-certified group (society)**		
In-depth interview with management executive from plantation company.			In-depth interview with TSHDA tea inspector.		
			In-depth interview with secretary of Society B (non-certified).		
-Field data from record books of two certified farmers.			-Field data from non-certified growers (not available).		
-Programme material of RA certification activities, RA programme coordinator website.			- Tea inspector's records, TSHDA annual reports.		

Although the focus group discussions were less in-depth, they allowed gathering insight into some of the broader views, perceptions and suggestions collectively shared by some members of the smallholder community. Two focus group discussions were held with the chairman and their non-certified group members (6–8 participants) from two societies. Prior consent was received for participation and audio recording during interviews and focus group discussions from all participants.

The Wilcoxon signed rank test was carried out to identify significant differences in the distribution of asset level scores before and after the certification programme. Data analysis for the test was coded and analysed with Microsoft Excel and SPSS (Statistical Package for the Social Sciences) version 23. Data collected from in-depth interviews and focus group discussions were subjected to content analysis outlined by Elliott and Timulak (2005) where the audio recordings from the discussions in Sinhalese were translated and transcribed into English scripts using Microsoft Word and Excel packages. The verbal data was initially divided and condensed into distinctive meaning units with a unique code allowing them to be sorted into the principal domains of the analytical framework. The coded and labelled meaning units were then categorised and compared until all the data was completely sorted within each of their domains. In addition to uncovering the similarities and differences of already established categories, the process also allowed deciphering subcategories and delineating the relationships between them. Therefore, the description of thematic relationships and patterns identified during the interpretation process provided a clearer understanding of the quantitative data.

The final outcome achievement levels were derived from the proportions of smallholders who had access and availability to the highest asset levels for the indicators. Where multiple indicators were required to derive an outcome, the average proportion were calculated and represented on a three-point scale: (below 33% = not achieved), (33–66% = partially achieved) and (above 66% = fully achieved). The corresponding indicators used for deriving the achieved outcomes for the two groups of farmers have been shown in Appendix B.

4 RESULTS

4.1 Impacts of Group Certification on Smallholder Livelihood Outcomes

The results of the household survey (shown in Appendix A) were analysed using the Wilcoxon signed rank test (for paired data) to identify significant differences in the distribution of asset score levels for certified smallholders before and after they received certification. The findings of the analysis presented in Table 3 show a total of 16 of the 36 indicators tested to be statistically significant.

Table 3
Results of the Wilcoxon signed rank test for the corresponding assets for certified growers (before and after certification).

Capital	Indicators	Z score	p value	Significance	Effect size
Natural	Crop yield	-5.990	0.549	Not significant	-
Natural	Crop quality	-2.633	0.008	Significant	-0.277
Natural	Waste management	-3.164	0.002	Significant	-0.333
Natural	Water quality	-1.027	0.305	Not significant	-
Natural	Water quantity	-1.508	0.132	Not significant	-
Natural	Soil conservation	-0.366	0.714	Not significant	-
Natural	Soil fertility	-1.981	0.048	Significant	-1.981
Natural	Vegetation density	-1.000	0.317	Not significant	-
Natural	Forest reserve	0.000	1.000	Not significant	-
Natural	Animal and insects	-4.875	$1.0x10^{-6}$	Significant	-0.513
Human	Farming skills	-1.633	0.102	Not significant	-
Human	PPE*	-4.400	$1.1x10^{-5}$	Significant	-0.463
Human	Health and safety	-2.07	0.038	Significant	-0.218
Human	Medical services	-1.633	0.102	Not significant	-
Human	Training-farm administration	-3.873	$1.08x10^{-4}$	Significant	-0.408
Human	Training-GAP*	-3.606	$3.11x10^{-4}$	Significant	-0.380
Human	Training-OHS*	-3.317	0.001	Significant	-0.349
Human	Training-first aid	-3.162	0.002	Significant	-0.333
Human	Awareness-child labour	-3.162	0.002	Significant	-0.333
Human	Awareness-family nutrition	-2.449	0.014	Significant	-0.258
Human	Schooling of children	-1.342	0.180	Not significant	-
Physical	Access to energy	-2.309	0.021	Significant	-0.243
Physical	Access to water	-2.000	0.046	Significant	-0.210
Physical	Access to food	-0.447	0.655	Not significant	-
Physical	Housing structure	-2.07	0.038	Significant	-0.218
Physical	Housing status	-1.000	0.317	Not significant	-
Social	Gender equity for women	-1.000	0.317	Not significant	-
Social	Society participation	-1.000	0.317	Not significant	-
Social	Market information	-1.179	0.238	Not significant	-
Social	Business relations	-1.414	0.157	Not significant	-
Social	Extension services	-1.994	0.046	Significant	-0.210
Financial	Financial services	-1.342	0.180	Not significant	-
Financial	Household income share from tea	-1.000	0.317	Not significant	-
Financial	Agri-income share from tea	-0.707	0.480	Not significant	-

Capital	Indicators	Z score	p value	Significance	Effect size
Financial	Productivity	-0.334	0.739	Not significant	-
Financial	Profit margin	-1.660	0.097	Not significant	-

Indicators for the Wilcoxon signed rank test were tested for significance at the α level = 0.05. *PPE- Personal Protective Equipment. *GAP- Good Agricultural Practices. *OHS- Occupational Health and Safety.

The 15 sustainable farming livelihood outcomes evaluated for the study and their levels of achievement for the categories of the grower groups are presented in Table 4. The final calculated achievement levels show that out of fifteen outcomes, where one was inconclusive, certified smallholders had seven 'fully achieved' outcomes after certification compared to four before certification. In contrast, non-certified smallholders had three 'fully achieved' outcomes, while nine outcomes were 'not achieved.' It should also be mentioned that certified smallholders already had a higher number of six 'partially achieved' outcomes before certification, largely attributed to higher initial levels of existing assets compared to non-certified smallholders who had two 'partially achieved' outcomes.

Table 4
The results summary of the derived sustainable farming livelihood outcomes achieved for the certified and non-certified grower categories.

Sustainable Farming Livelihood Outcomes			
Biodiversity Conservation	**CG-B**	**CG-A**	**NC-G**
1. Growers are likely to protect forests and other natural ecosystems	Inconclusive	Inconclusive	Inconclusive
2. Growers increase the amount and diversity of vegetation	☒	☒	☒
3. Growers experience increased abundance and coexist better with beneficial animals and insect species	☒	✓	☒
Natural Resource Conservation	**CG-B**	**CG-A**	**NC-G**
4. Soil fertility is likely to be maintained and improved	☐	✓	☒
5. Soil conservation is performed to minimize erosion	✓	✓	✓
6. Water pollution is minimized	☐	☐	☒
7. Water is conserved efficiently and used within natural limits	☐	☒	☐
Farm Family Wellbeing and Community Welfare	**CG-B**	**CG-A**	**NC-G**
8. Grower's family secure their farm health and safety	☒	☐	☒
9. Grower's family essential needs are met: energy, clean water, food, health care, housing and education	✓	✓	✓
10. Growers are likely to gain good farming knowledge and develop sustainable agricultural skills	☐	✓	☒
11. Growers are supported through effective internal management systems	✓	✓	☐
12. Growers actively participate within their societies and have good community involvement	✓	✓	✓
Farm Productivity and Profitability	**CG-B**	**CG-A**	**NC-G**
13. Growers increase productivity and quality of crops	☐	☐	☒
14. Growers receive higher margins and better income returns	☐	☐	☒
15. *Growers are less vulnerable to shocks, trends and shifts	☒	☒	☒

CG-B (Certified growers- before certification), CG-A (Certified growers-after certification), NC- G (Non-certified growers). Key for the sustainable farming livelihood outcome levels achieved: (0-33.3% = ☒ not achieved), (33.3–66.7% = ☐ partially achieved), (66.7–100% = ✓ fully achieved) between certified growers (before and after certification) and non-certified growers. *Outcomes for vulnerability are based on the qualitative data from the interviews and focus group discussions.

4.1.1 Leaf Quality

Certified smallholders improved their leaf quality levels through stringent and standardised seven-day plucking cycles while adopting good handling practices. As the standard, the supply of plucked leaves had to be in the form of *'two leaves and a bud'.* The main quality criteria for hand-plucked leaves depend largely on the maturity of the leaf at the time of supply. The highest quality leaves had a plucking cycle of precisely seven days. As these leaves are of optimal maturity and size, they are selected, screened and processed as main-grade leaves by the factories. *'The best grades of leaves are usually plucked on the seventh day. But these days, due to drought, we are unable to do this'.* (In-depth interview, leader of non-certified society A, February 2018). The main-grade leaves with smaller surface areas have better rolling efficiencies in the machines and ultimately are processed into higher quality ready-made teas, which in turn are sold at higher prices at the auctions. Leaves plucked and supplied between the eighth and tenth day are more mature with larger surface areas and therefore considered lower in quality (In-depth interviews, certified growers of factory E and G- February 2018 and certified factory executive- March 2018). The improvement in leaf quality following the certification was also confirmed by the factory executive. *'A major improvement was that the amount of off-grades (matured or crushed leaves) arriving at the factory was significantly reduced. Earlier some growers used to supply leaves between the eighth and tenth day which were too mature and had four leaves on the stalk'* (In-depth interview, factory executive, March 2018). These views were also reflected in the results of the household survey, which showed an increased proportion of certified growers who believed their leaf quality levels became 'high' following the certification were 4.4% (before certification) and 31.1% (after certification) while non-certified farmers were 28.9%. The interviewees also mentioned that the ideal weight of the leaf collection bag should be between 20–22 kg. *'When the leaf matures, the flavor and quality of the tea is lost. The ideal weight of the tea collection bag is about 20 kg. If we pack more than this, the leaves can get pressed, bruised and heated against each other'.* (In-depth interview, leader of non-certified society A, February 2018). Avoiding excess weight was said to minimise leaf deterioration when subjected to crushing and high temperatures during storage and transport.

4.1.2 Leaf Yield

Interviews with both non-certified and certified growers confirmed a significant reduction of yield levels for the region. A non-certified society leader said: *'Earlier a harvesting cycle used to yield 450kg/month. Now it has dropped to 200 kg/month'* (in-depth interview, leader of society B, February 2018) and (farmer record books, secondary data). All interviewed growers shared similar sentiments attributing the low yield levels to several factors that included: drought conditions experienced, lack of fertiliser subsidies and poor quality fertiliser available in the markets. The factory executive said that it became difficult to attribute any direct changes in yield to the certification programme, as its effects occur over a gradual long-term period. As the factories received the RA certification in March 2017, the factory was unable to identify immediate changes in the yield levels.

4.1.3 Soil Fertility

Interviews with the tea inspector and the two non-certified society leaders of A and B revealed that there has been a steady declining trend in soil fertility over the years. For soil rehabilitation, the grass species *Tripsacum laxum* (up to one year) *and Cymbopogon confertiflorus (*up to one and a half years) are grown. Certified smallholders were trained on herbicide-free manual weeding techniques that require the manual removal of identified harmful hard weeds with stronger root systems, which competes aggressively for nutrients, water, space and sunlight. Beneficial soft herbs *(Desmodium triflorum, Desmodium heterophyllum, Drymaria cordata and Centella asiatica)* retained in the fields have weaker root systems and compete for fewer resources. Overgrown soft herbs were slashed and reused back as organic matter (mulched), which helps to enrich nutrients, protect the top soils, retain water, and increase the presence of beneficial natural predatory insects and animal species. (In-depth interviews, certified growers of factory E, F and G- February 2018 and certified factory executive, March 2018). The soil conservation practices adopted by both groups of growers included the growth of the grass species *Chrysopogon zizanioides* along slopy lands and the edges of drains.

4.1.4 Water Quality

Several non-certified society leaders and their members expressed concern over the quality levels of adjacent water bodies. Members of society C mentioned *'There is a river that runs through close to the lands of the inhabitants. As there are no designated forest reservations, farmers encroach these areas and grow crops near these water bodies and reservations. Another issue concerns the irresponsible use of water by inhabitants, as pipes are now being used to draw water from these springs and rivers. When this happens, the downstream water is dried up and there is not much left. The water drawn from these sources for farming is also dried if it is not stored properly'* (Members of society C, February 2018, focus group discussion). Water contamination prevention measures

by certified growers included vegetation growth in buffer zones along both sides of the river banks, the use of soakage pits and bioremedial plants (*Lasia spinosa* and *Colocasia esculenta)* as wastewater management systems (RA programme leaflets, secondary data).

4.1.5 Animal and Insect Prevalence

The most abundant forms of local wildlife common to all growers included: wild boars, porcupines, mongoose, giant squirrels, rabbits, peacocks, jungle fowls, coucals and a number of other smaller birds. Bird species (egrets, bulbuls, jungle fowls and coucals) and beneficial insects (dragonflies, damselflies, ladybird bugs and grasshoppers) are particularly important natural predators that control pest populations (mites, borers, moths and aphids) (RA programme leaflets, secondary data). Certified growers who were encouraged to use manual weeding practices instead of powerful weedicides experienced an increased prevalence of these beneficial animal species. The factory executive also stated that the growers understood how agrochemicals could disrupt the natural interaction between predators and their prey.

4.1.6 Training and Awareness Programmes

The certified growers who received training on farm administration from factories E, F and G had maintained formal field record books administered through the certification programme. Extracts of their formal records that were obtained included: list of plants and animal species, frequencies of fertiliser application, weeding, pruning, plucking, input costs, cost versus income and training topics received (farmer field record books, secondary data). As a part of the TSHDA extension programme, the tea inspector has a planned schedule for administering a number of training sessions which included: crop and soil rehabilitation, soil conservation, tea planting, pruning, weeding, plucking, shade management, nutrient management, nursery management, machinery use and leaf quality (tea inspector field records, secondary data).

4.1.7 Market Information

The tea inspector and the non-certified farmers strongly acknowledged the lack of existing mechanisms for growers and societies to receive up-to-date market information (changes in leaf pricing, buyer-grower transaction costs from leaf weight adjustments, transport and handling). Several non-certified leaders and farmers shared similar views. *'The level of information received is low for us because once we sell our leaves to private suppliers, they (suppliers) have direct dealings with factories. As different factories and suppliers have different unit prices at which they buy raw leaves, the information we receive is always poorly disseminated. The farmers in this society receive limited information only through their respective leaf suppliers'* (members of society D, February 2018, focus group discussion). *'If the factory owners in the region can provide a copy of the updated price listings to the societies or the tea inspector once every month, this will be very beneficial.* The views shared by some of the certified growers indicated better levels of information dissemination among them. Growers from factories E and G revealed that they receive written notifications from the factories when changes in pricing or market situations occur. They acknowledged that although there were still some shortfalls, the overall efficiency with which information was received had improved after the certification.

4.1.8 Profit Margins

There was insufficient evidence to support that certified smallholders for this study received higher leaf prices through premiums or a certification label. However, some indications showed that they were likely to receive increased price margins by providing higher quality leaf supplies. The factory executive explained that although a slightly higher price could be expected for RA certified tea, their margins as premiums for growers were often very small and not significant. *'So far, we have observed that brokers in auctions bid faster for RA certified tea and there is a small internal competition between them during the bidding process… So invariably due to this competition, there is a slight increase in the price for RA certified tea'* (factory executive, March 2018, in-depth interview). However, he further explained that the variations in pricing at the auctions could not be attributed to certification alone. *'We are unable to provide an absolute amount or proportion for this increase…the factory never records the auction prices between RA and non-RA tea…the price can increase or decrease due to many inter-relating factors…we cannot be certain that the difference in price was purely due to certification'* (factory executive, March 2018, in-depth interview). Factories that received higher quality leaves would incentivise their leaf suppliers to offer slightly higher margins (Rs 2–5 more) to growers. However, several growers believed that the current pricing was insufficient to cover their basic input costs (members of society C, growers of factories G and F).

4.1.9 Vulnerability Context: Shocks, Trends and Seasonal Shifts

Factors of vulnerability that had the most influence on growers' farming livelihood assets were discussed for shocks (floods and droughts), trends (hired labor) and seasonal shifts (pricing).Views shared by the tea inspector and the factory executive suggested that growers of both groups within the region were highly vulnerable to the effects of climate extremes that caused flooding, landslides, and prolonged periods of drought. The intervention strategies adopted by growers often focused on safeguarding their natural farm assets. Before periods of drought, growers were advised to perform additional pruning, weeding and shade management. Strategies adopted during floods often aimed to increase soil conservation efforts and minimise soil erosion. These included the use of cover crops, grasses, stone bunds, drainage lanes (lock and spill drains) and terracing to control surface runoff. However, the tea inspector mentioned, these strategies were often insufficient to prevent damage to crops and farmland during periods of intense flooding or extreme droughts. The declining trends of hired labour had significantly reduced productivity levels across the entire tea industry. The tea inspector accounted that, the labour shortages were mainly due to the preference of the younger generation to work in more rewarding industries. Seasonal shifts in pricing were also influenced by the prevailing weather patterns throughout the year. Supplied tea leaves that become wet during the monsoon season or become yellow during the drought are more likely to lower the quality of the final product and result in reduced prices at auctions.

5 DISCUSSION

Sustainable Livelihoods Approach and Outcomes from Group Certification

Previous studies that have assessed the impacts of the RA certification programme on smallholder farming systems have reported a greater mobilisation of farm-level livelihood assets after certification (Rueda and Lambin, 2013; Pinto et al., 2014; Fenger et al., 2016). Rueda and Lambin (2013) demonstrated that certified farmers prioritised their non-premium benefits and gained more access to stable markets, information, technology, social networks, and resources while enhancing their local agro-ecosystems. Fenger et al. (2016) identified that certified farmers experienced positive impacts on their natural and financial capitals for their yield, production and income, which were attributed by increased access to information and knowledge, technical assistance, farm inputs, financial support and credit. In addition to gaining access to more value-added markets, Pinto et al. (2014) found that group certification strengthened social connections and knowledge transfer networks by creating more avenues for engagement with various actors along the supply chain.

Studies investigating the broader sustainability outcomes of certification programmes have, however, reported to show a much greater degree of variability. DeFries et al. (2017), who conducted an extensive literature review of studies that evaluated the socio-economic and environmental outcomes of certified and non-certified small-scale producers, found that of a total of 347 response variables, certification was associated on average with 34% positive outcomes, 58% without significant differences and 8% negative outcomes. Moreover, Bray and Neilson (2017) who assessed the impacts of certification schemes on smallholder livelihoods by also reviewing existing empirical studies, identified that although certification, in general, was more likely to generate positive impacts rather than negative ones, the greater number of neutral or mixed findings indicate a considerable degree of uncertainty still persisted.

Integrating the elements of the SL approach with the RA's theory of change has demonstrated its usefulness in developing more insights onto the highly dynamic nature of the pathways taken by the certification programme to reach broader sustainability outcomes. In particular, the DFID identifies strong interdependences between a) the structures-processes and the vulnerability context; b) the livelihood assets and livelihood outcomes (DFID, 1999). The study framework provides an initial basis for more empirical studies to progressively build upon the SL approach and expand its scope using a broader range of potential outcomes for future analyses. Small (2007) underscored the importance of the SL approach on participatory approaches, multi-faceted livelihoods and their links with the environment, which have been common themes for impact pathways envisaged by advocates of certification programmes.

The study framework has a number of features that allow data collection across different contexts of rural livelihoods and agriculture. First, its systematic nature enables a more holistic assessment of a broader range of asset classes for diagnosing how their interactions could either enhance or deplete the capitals concerned. Second, its versatility allows for integration with a variety of quantitative, qualitative and participatory research techniques that should consider both the intended and unintended changes of sustainability interventions. Third, it is suited for assessments that require rigorous matching procedures and the construction of counterfactual control groups at landscape scales. Previous studies have rarely presented reliable baseline data or realistic control groups for comparison, ideally at the start of such programmes, making causation difficult to establish (Bray and Neilson, 2017; DeFries et al., 2017). Furthermore, Tscharntke et al. (2015) recommend a more robust evidence-based generation of certification

impacts by credible counterfactuals and the use of standardised indicators of sustainability. As the implementation of standards is gradual and continuous processes over long periods and since this analysis merely offers a snapshot of the situational period in a localised area of the district, it remains meaningful to assess the broader long-term impacts of the certification with longitudinal measurements (Loconto and Dankers 2014). Most studies have concentrated primarily on coffee, giving little attention to other export and biofuel crops. Given the predominance of studies on organic and fair trade, additional research is needed to evaluate the outcomes of RA and UTZ certification programmes that have a far greater reach, especially in the Global South (Bray and Neilson, 2017).

Organisational Structures and Management Systems

The establishment of farmer groups that are organised in the cultivation, supplying and administration processes becomes an important component towards the certification of smallholders and their engagement with buyer companies. The group structure and its management will vary according to the business model and are key factors for successful participation in certified value chains (Beall, 2012). The certified farmers in this study were organised jointly by the factories and the RA programme coordinator.

There is fair potential for implementing group certification with the involvement of the TSHDA at the farmer society levels. Preparation for group certification at farmer society levels could include an initial assessment to define, map out and classify different groups of smallholder profiles based on their capacity gaps. This can enable targeted training and capacity building objectives that best respond to their specific agronomic needs and practices (RSPO, 2017). By doing so, farmer groups can receive ongoing resources and derive value to their members through more effective outreach, coverage and participation that adopts best practices for improved quality, yields, social and environmental sustainability outcomes. Furthermore, economies of scale are expected to reduce individual upfront investments, indirect compliance and transaction costs shared among group members (Loconto and Dankers, 2014).

The training of society leaders and members on the guiding principles of the RA's Sustainable Agriculture Standard and their compliance requirements to meet the criteria of the standard are key objectives. Training can be administered by local RA trainers and the factory extension staff for all smallholders within a society to achieve certification as a group. The internal management system and internal auditing services could be managed by the respective certified factories receiving leaf supplies from the certified smallholder societies. Studies by Raynolds et al. (2004), Ruben et al. (2009), and Ruben and Fort (2012) have shown that smallholders and the functioning of their farmer cooperatives benefited from the impacts of fair trade and that the capacity building nature of the certification had important contributions to producer empowerment, which resulted in the gradual improvement of social capital. Certified societies that can run their own internal management systems could have the ability to operate independently of the leaf suppliers. They could be responsible for collecting and delivering the leaf supply of their members directly to factories to gain better bargaining positions and strengthen the relationships.

RA trained TSHDA tea inspectors and society leaders who are supported by the consulting programme coordinator and factories could also facilitate in the training, advisory services and conducting internal inspections at farm level. Utting (2009), Lyon et al. (2010), and Jena et al. (2012) found that good management and leadership capabilities in producer organisations facilitated the introduction and implementation of certification schemes more successfully. The TSHDA and its tea inspector have so far limited involvement in the RA certification programme. However, it is important to note that the certification of societies that have the capacity to do so should be supported by the relevant private and public institutions to participate in certified markets. Additionally, certification at the society level must ensure inclusion and compliance among all members to avoid introducing new market barriers against those who are unable or do not choose to become certified. Training at the society level is expected to allow more marginalised farmers to develop sustainable farming knowledge and skills that could potentially lead to greater innovation and empowerment of farming systems.

Farm Gate Prices and Certified Value Chain Factors

The evaluation of the complex financial calculations associated with the net benefits of certification has been reported to be challenging (Weber, 2011). Blackmore et al. (2012) argue further that, unlike certification initiatives that have dedicated price margins for premiums, it becomes difficult to attribute whether these price margins could result from the certification label or from higher quality produce. The factory executive explained that comparing auction prices between certified and non-certified ready-made teas was not indicative due to several variable factors. These included differences in origin mixes/grades of teas, processing methods by factories (variable production costs), final quality, bidding environments and global markets during the auctions (groups of brokers can differ). The factory placed greater importance on improving its quality levels and its environmental and social sustainability

outcomes through the certification programme. Loconto and Dankers (2014) suggested that these higher price margins could result from standard implementation itself, where improved training and skills in good agricultural practices could lead to higher quality crops. Several studies have reported revenue increases associated with improved yields (Barham and Weber, 2012; Jena et al., 2012) and lower input costs (Valkila, 2009) rather than from price premiums. Bolwig et al. (2009), Valkila and Nygren (2010) and Valkila (2014) identified producers who could supply higher yields and were already more resilient to socio-economic shocks were invariably more favoured to receive such premiums.

Most of the smallholders in the study acknowledged that they had limited interaction with the factories on business transactions and market information. This could be due to smallholders not having formal contractual agreements with factories and instead relying on their private suppliers to distribute their leaf supply. The negotiating position often impacts how value is passed and distributed across the supply chain and is largely influenced by internal and external actors responsible for driving the business model and the certification process (Beall, 2012). Furthermore, the organisation of farmer groups, supply and demand of crops, land tenure security and policy environments also have an impact on negotiations (Beall, 2012). The study identifies the information asymmetry of market information, and the lack of sufficient representation of smallholder interests has hindered them in making informed decisions surrounding several issues and their overall potential to receive adequate farming revenues.

As Jayasinghe (1984) explains, private leaf suppliers have the option to sell the best quality leaves at increased prices to factories that demand higher standards, and the balance unsold lot to other factories that pay a lower rate. This results in smallholders having limited control over which factory receives their leaf supply and often leaves them vulnerable to ambiguous pricing and transaction costs set by their leaf suppliers. It invariably places smallholders at poor bargaining positions within the value chains, as the leaf suppliers have closer direct dealings with the factories. Benarjee (2011) points out further that such smallholder systems *'are left to the vagaries of an unorganised imperfect market'* when there is no enforcement through regulation and institutions. Multi-stakeholder fair and transparent partnership models that could review and address issues with existing crop pricing mechanisms, sales contracting, transaction costs, access to finance and inputs would prove useful in closing loopholes across the value chain (RSPO, 2017). Additionally, a dedicated platform that would consist of a stronger representation of smallholder interests can be achieved through an adapted governance structure (Beall, 2012; RSPO, 2017). This would enable farmers to have stronger negotiation positions while minimising risk through improved decision-making and access to finance.

The government-mandated *'Reasonable Price Formula'* is only a share-based formula that determines the price ratio received between smallholders and manufacturers and does not represent a guaranteed minimum price. Abeygunawardena (2015) explains that implementing such a guaranteed minimum price scheme into the existing price formula is quite complex, as there will be both winners and losers. Therefore, it requires careful consideration in accordance with the due shares among all actors under the price formula and must have links to leaf quality. Although fair trade has been the only initiative to offer a base price, such premiums at the farm level have generally been witnessed to be absent when global prices have a greater tendency to be associated with improved quality and, as such, give the producers no guarantees that they can reap the benefits from fair trade markets (Raynolds et al., 2004; Sick, 2008; Valkila and Nygren, 2010).

Institutional Support for Sustained Participation

Although the institutional structures and processes from the SL approach were not covered within the scope of this study, they remain important components that can be decisive in smallholder participation in certified markets and in achieving livelihood outcomes. Loconto and Dankers (2014) recognised that both government policy and institutional frameworks that work synergistically create the most positive results for enabling an environment that allows greater inclusion of farmers in certified markets. The proper delivery and coverage of extension and support services for farmers requires greater efficiency to improve vital asset bases such as crop yield, crop quality, training and awareness, and agro-farming skills. Currently, the TSHDA tea inspector has to administer the land development programme (regulatory functions) in addition to the extension services (advisory/training). Jayasinghe (1984) explains that the role of the tea inspector in disseminating research findings and providing advice becomes less effective when they have to carry out additional regulatory functions. He further explains that the two conflicting roles make it difficult for the tea inspector to maintain a good relationship with smallholders and gain their confidence. Therefore, limiting the role of the tea inspector to provide only extension services while designating land development activities to another officer becomes meaningful. Most smallholders could not maximise their farming outcomes due to several vulnerabilities. The lack of fertiliser subsidies and the poor quality of commercially available fertiliser have further reduced productivity. Jayasinghe (1984) stresses that it might be a worthy option to use state and private sector estates as supply centres that could provide and distribute relevant farm inputs (such as fertiliser) on a credit

basis to smallholders to avoid large delays. The resulting costs and operational expenses can be deducted from the farmers on future leaf sales and reimbursements can be arranged through the TSHDA. This would also ensure that farmers receive good quality farm inputs for the correct application timings.

The study findings are in line with Bray and Neilson (2017), who agree that certification schemes are not implemented on a 'blank canvas' and often overlay complex sets of pre-existing institutional settings involving economic, social, cultural and political institutions. Furthermore, they note that the dynamics between these institutional settings and certification schemes determine which households and individuals within a community have positive outcomes and which are excluded. More knowledge in this area could improve our understanding of the inherent interactions between these settings and for certification initiatives to be more inclusive. Smallholders and their civil society organisations need to have a larger stake in the governance and activities of certification programmes. Blackmore et al. (2012) emphasise that while farmer organisational participation would facilitate the design of more inclusive and fairer standards for compliance, it would also ensure a more leveled playing field that brings greater accountability, transparency and a more balanced influence in the standard-setting process. Bose et al. (2016) share similar views for more farmer-friendly and flexible implementation designs of certification schemes that need to be sensitive and responsive to local effects if they are to sustain large numbers of producers. Sustainability standard-setting bodies, therefore, need to place more importance on developing commodity and region-specific standards taking into account the diversity and heterogeneity of different smallholder groups. In particular, they should consider the contextual and situational factors that affect local farming and trading systems to increase the transformative potential of certification programmes.

There was fair potential for implementing group certification programmes at farmer society levels where training objectives could be aligned to meet the RA's standard compliance requirements. Beyond the focus on yielding direct benefits, the long-term broader outcomes of sustainability certification initiatives should ultimately result in smallholders being able to safeguard their farming systems, which brings greater adaptive capacity and reduced vulnerability. Sustainability initiatives that build on existing efforts should maximise on past experiences so that they are scalable and have greater outreach among diverse smallholder farming communities with varying levels of livelihood assets. It also calls for reassessing and re-evaluating the current rural farming development goals and agendas that need to create more inclusive environments, transparent engagement and accountable commitment among all public/private sector and civil society actors so that smallholder communities could be ultimate recipients of more resilient and sustainable farming livelihoods.

6 CONCLUSION

We explore how certification interventions of the Rainforest Alliance programme in Sri Lanka impact various classes of farming livelihood assets of smallholder tea growers and identify how these assets are combined and transformed to achieve their desired livelihood outcomes. We developed a framework that integrates the elements of the 'sustainable livelihoods' approach and the 'theory of change'. A total of 36 indicators were assessed for the five capitals (natural, human, social, physical and financial) and the vulnerability context using mixed method techniques.

Our findings from the Wilcoxon signed rank test show that 16 of 36 indicators tested statistically significant, indicating increased levels in these assets for certified smallholders after certification. These improvements were found for crop quality, waste management, soil fertility, beneficial animal and insect species, usage of personal protective equipment, health and safety, access to training and awareness programmes, access to extension and support services, access to household energy, access to safe water and housing structure. Evidence gathered from in-depth interviews, focus group discussions and other secondary field data was consistent with these quantitative findings.

Of the 15 sustainable farming livelihood outcomes evaluated for the study, the certified smallholders had seven 'fully achieved' outcomes after certification compared to four before certification. In contrast, non-certified smallholders had three 'fully achieved' outcomes, while nine were 'not achieved'. A noteworthy observation was that certified smallholders had an already higher number of six 'partially achieved' outcomes prior to certification, largely attributed to the higher initial levels of existing assets compared to non-certified smallholders who had two 'partially achieved' outcomes. The findings support evidence that the certification programme has contributed to *improving only some* of the livelihood outcomes of the certified tea smallholder community. Although notable increases were observed for some assets, most smallholders were unable to achieve the expected financial returns due to reduced crop yields and productivity. Their vulnerabilities include periods of drought and flood, delays in receiving government subsidies, poor quality of commercial fertilizer, and shortages of hired labour. Although there was evidence to suggest that certified smallholders

enjoyed slightly higher tea leaf prices by supplying higher quality leaves, these vulnerabilities coupled with uncertain markets outweighed the overall economic benefits.

Our findings also indicate that the ability of smallholders to participate in certified value chains and their likelihood of achieving positive farming livelihood outcomes were dependent on several key preconditions and not just through standard compliance alone. Most of the non-certified smallholders in the study found it challenging to comply with the standards criteria and were excluded from certified markets. These were mainly attributed due to limited farm level assets that allow initial investments required for standard adoption, absence of formal organisational structures (either at factory or society levels) that supported their participation through internal management systems, absence of pre-existing relations and links with certified factories and leaf suppliers, limited access to extension and support services and inability to meet certified market requirements for crops such as quality.

Declarations

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. The authors have no competing interests to disclose.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available on request from the corresponding author.

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Figures

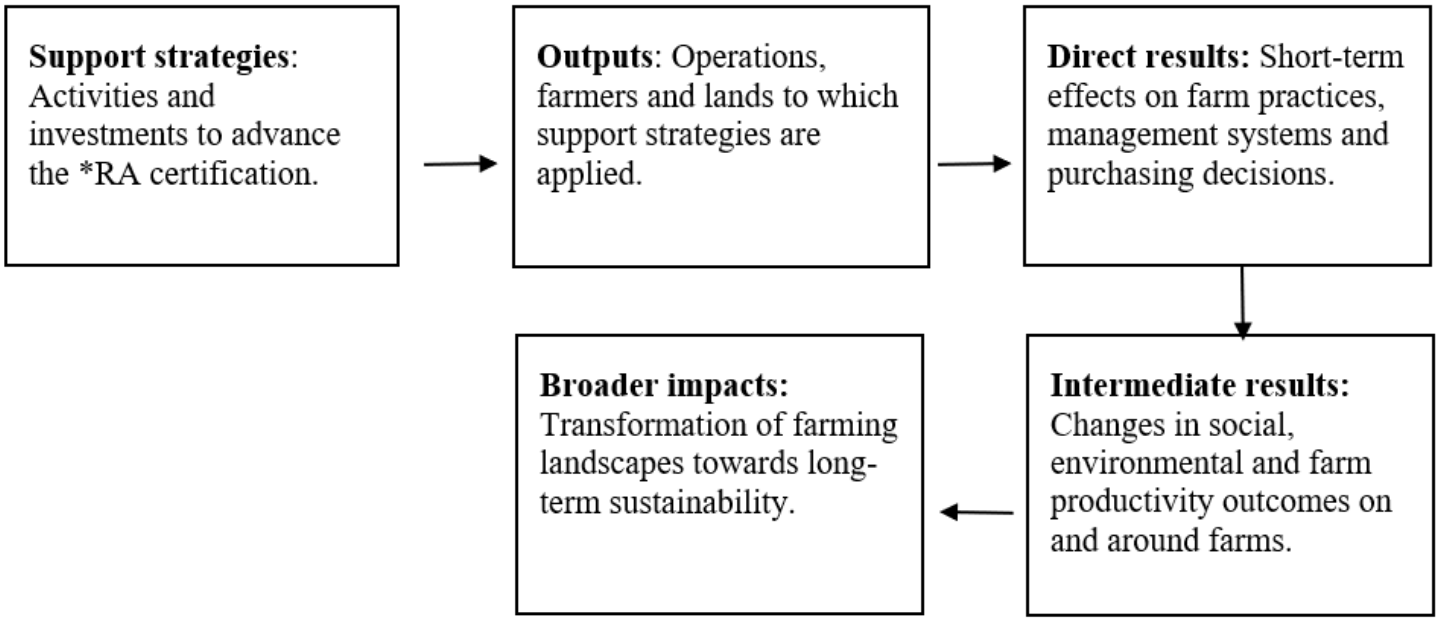

Figure 1

Logic flow diagram of the *Rainforest Alliance theory of change. Source: Adapted from Milder and Newsom, 2018.

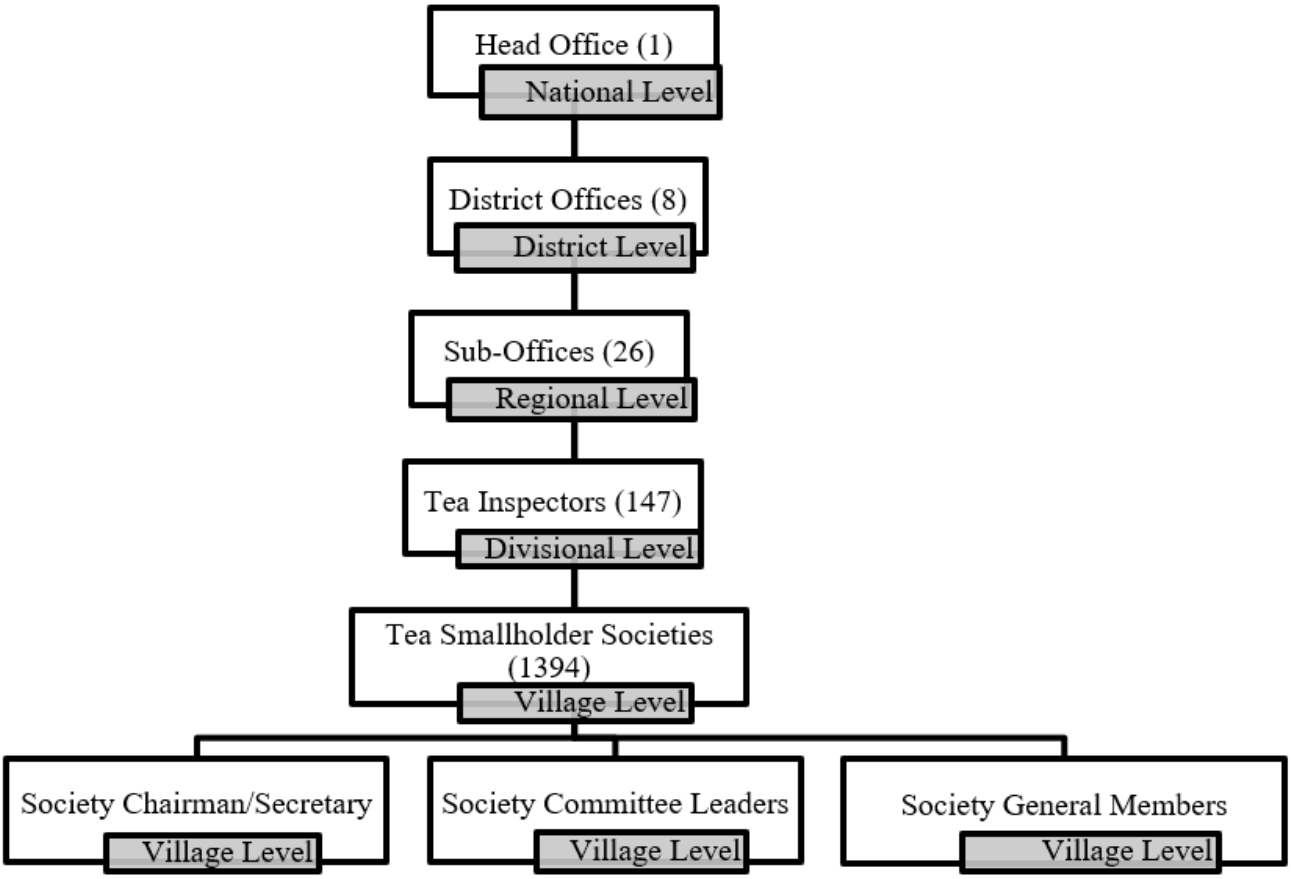

Figure 2

Schematic representation of the tea smallholdings structure at field level in Sri Lanka. Source: Author's own compilation based on in-depth interviews with the tea inspector. Figures from the Tea Small Holdings Development Authority, TSHDA annual report 2016.

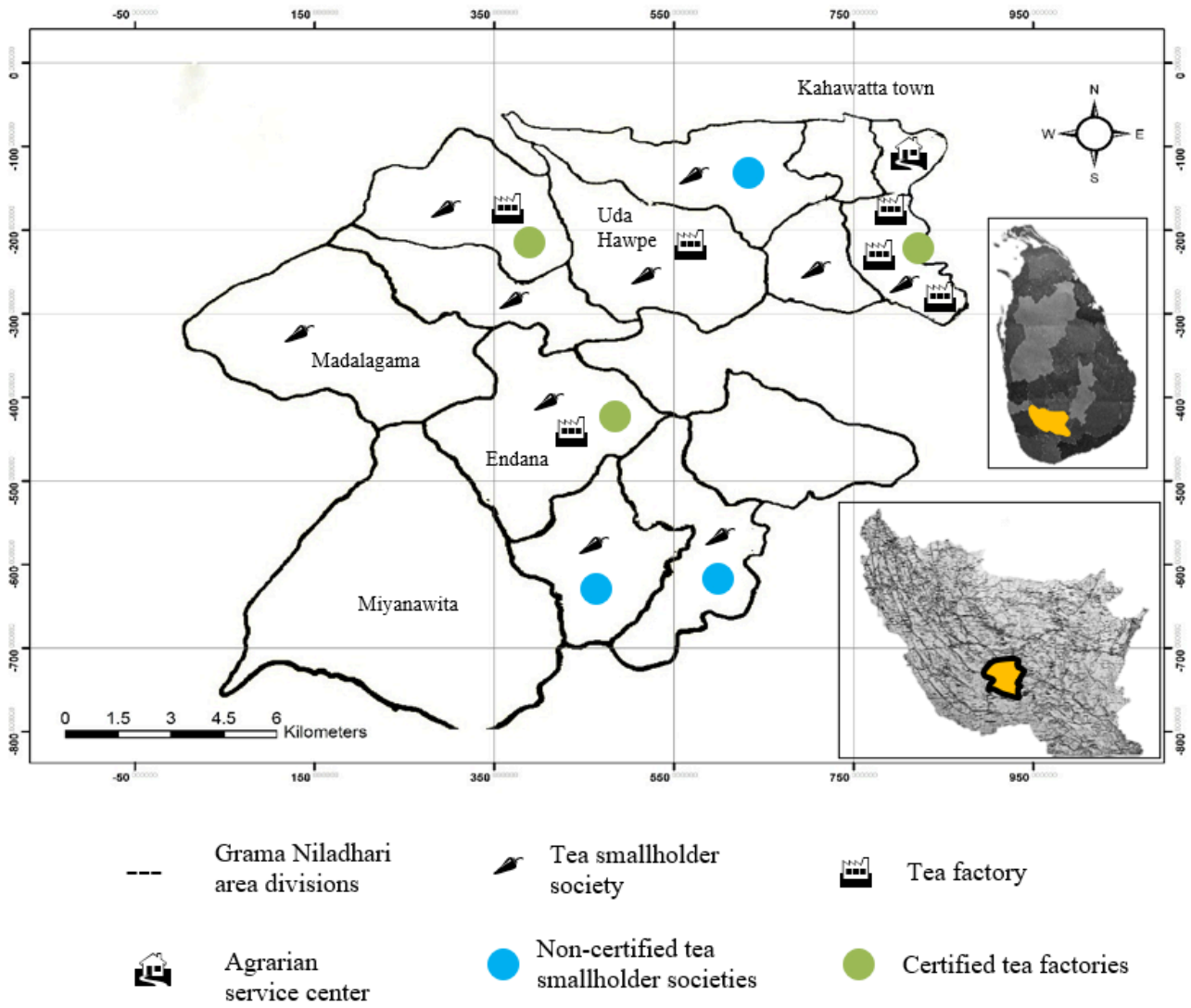

Figure 3

The Ratnapura district map and Kahawatta extension range area map demarcating the non-certified tea smallholder societies and certified factories for the study. Sources: Adapted and printed with permission from the TSHDA and the Survey Department of Sri Lanka.