



Rainforest Alliance Certification of Kenyan tea farms: a contribution to sustainability or tokenism?

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ABSTRACT

An Environmental Management System (EMS) refers to a set of guidelines that organisations can use to structure their management to prevent or minimise adverse environmental and social impacts. Rainforest Alliance Certification (RFC), one example of an EMS, was adopted by some Kenyan tea farms in 2007 to promote sustainable tea production. RFC addresses the three pillars of sustainable development (environmental, economic and social) and as such is suited to tea farming which has been characterised by environmental resource degradation, job insecurity, strenuous work conditions and child labour. To study the effect of certification, interviews with farm managers, and farm workers on certified and non-certified tea farms were carried out. Sets of agri-environmental and socio-economic indicators were then compared using these data. The results indicate that the RFC brings some important social and environmental benefits to certified tea farms. These benefits include improved work conditions and to a limited extent, natural resource conservation. However, there were no differences between certified and non-certified farms in a number of aspects, including access to health services and employee living conditions. Two main conclusions can be drawn. First, although there are important sustainability benefits from adopting the RFC, more efforts are still needed to achieve sustainability on certified farms. Secondly, there are sufficient benefits to indicate that all tea farms should be encouraged to become certified.

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1. Introduction

New means of increasing food production has resulted in a modern industrialised or conventional agriculture system that is highly specialised and capital intensive. It is now also heavily dependent on synthetic chemicals and other off-farm inputs (Rivera-Ferre, 2008; Schaller, 1993; Tischner et al., 2010). Attempts to increase agricultural production in a complex ecosystem have often led to a range of environmental, economic and social concerns including, degradation of natural resources, exclusion of small-scale farmers, consumer safety and public health (Foley et al., 2011; Gennaro et al., 2012; Kilian et al., 2005; Notarnicola et al., 2012; Rivera-Ferre, 2008; Rodriguez et al., 2008). Specific problems from conventional agriculture include, contamination of ground and surface water from agricultural chemicals and sediments, hazards to human and animal health from pesticides and feed additives, adverse effects of agricultural chemicals on food

safety and quality, loss of the genetic diversity in plants and animals, destruction of wildlife including bees and beneficial insects by pesticides, growing pest resistance to pesticides, reduced soil productivity due to soil erosion, over-reliance on non-renewable resources and, health and safety risks incurred by farm workers who apply potentially harmful chemicals (Aldy et al., 1998; Rivera-Ferre, 2008). Generally, Notarnicola et al. (2012) believe that the undesired environmental impacts from agriculture can be addressed through reduction, whereas Foley et al. (2011) observed that progress in the pursuit of sustainability can be realised by halting agricultural expansion among other measures.

As a response to the concerns about the negative effects associated with agriculture, more efforts are now being directed towards achieving agricultural sustainability (Gafsi et al., 2006). Broadly, sustainability is said to go beyond simply protecting the environment and encompasses social, economic and cultural change (Robinson, 2004; Pratt and Pratt, 2010; Hitchcock and Willard, 2006; Robèrt et al., 1997). Definitions of sustainability typically focus on questions related to values and fundamental changes in individual attitudes towards nature (Robinson, 2004), implying a transformational change of products, processes, work

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and living places, consumption mode and how our activities impact the world around us (Pratt and Pratt, 2010), and in effect, sustainability examines our world as a whole system (Hitchcock and Willard, 2006).

The descriptions advanced by Robèrt et al. (1997) portray sustainability as a goal which is about protecting our options. This means adjusting our economic and community development practices to levels necessary to ensure that the stocks and flows of nature can naturally regenerate themselves over time (Doppelt, 2010). Since sustainability is more like a goal, the term “sustainable development” has been used to describe means for protecting our options (Doppelt, 2010). Sustainable development was thus first coined and defined by the Brundtland Commission (WCED, 1987 as cited in Atkinson, 2000, p. 236) as:

“Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.”

The WCED definition takes a more pragmatic and collective approach than other definitions of sustainability, which typically aims to achieve efficiency gains and improvements in technology (Robinson, 2004). In this regard, sustainable agriculture is also viewed as a more pragmatic approach to pursuing sustainability in the agricultural sector. The popular definition of sustainable agriculture has been understood as involving processes that are environmentally sound, productive, economically viable, and socially desirable (Gafsi et al., 2006; Schaller, 1993). This definition implies the ability of farming systems to continue into the future without contributing to environmental deterioration, but promoting resource conservation, cultural diversity and satisfaction of basic needs. In other words, sustainable agriculture is a way of producing or raising food that is healthy for consumers, does not harm the environment, is humane to workers, respects animal welfare, provides fair wages to farmers and supports and enhances neighbouring communities (Nilson et al., 2004; Tischner et al., 2010).

Pressure has mounted on farmers to take actions to reverse the undesired trends in the agricultural sector and move towards sustainability. Kilian et al. (2005) and Monteiro and Rodrigues (2006) for example, report that farmers in some areas are now being required to move towards sustainable environmental management and best production practices. As a result of these pressures, and the need to manage complicated systems, farmers have increasingly been adopting Environmental Management Systems (EMSs) in order to help them identify and mitigate adverse impacts from their activities. EMSs are sustainability initiatives that are incorporated as part of the overall management system of an organisation. These initiatives include organisational structure, responsibilities, practices and resources for both determining and implementing an organisation's overall aims with respect to the environment (Kolk, 2000).

While EMSs in agriculture are more common in developed countries (Nilson and Leire, 2004), they are now being adopted in some developing countries, especially for crops such as coffee, tea and tobacco (Harrison, 1999; Gafsi et al., 2006). For example, Fair Trade was introduced to the coffee industry in 1989 (Kilian et al., 2005) and has expanded to include a range of developing countries (Raynolds et al., 2006). Another EMS that has been introduced to developing countries is the Rainforest Alliance Certification programme. Rainforest Alliance Certification (RFC) is an EMS that addresses the three pillars of sustainable development, i.e., social, economic and, environment. It aims to conserve ecosystems by creating and/or maintaining healthy soils, rivers and wildlife and by promoting dignified living conditions for farm workers and neighbouring communities (Tischner et al., 2010) while concurrently improving economic performance. As a certifying body,

Rainforest Alliance recognises achievements of farmers in terms of sound environmental practices by awarding them with certificates attesting that the farmers have achieved and maintained prescribed standards. RFC promotes sound environmental practices, and ensures economic and social considerations (Rainforest Alliance, 2009). In terms of agriculture, certification means that there is less water pollution, less soil erosion, reduced threats to the environment and human health, wildlife habitat is protected, less water use, more efficient farm management, improved conditions for farm workers, improved profitability and competitiveness for farmers and more collaboration between farmers and conservationists (Rainforest Alliance, 2011). These standards have been criticised as being non-specific (Adams and Ghaly, 2007), for example, how much is considered less water pollution?

Standards against which the RFC programme is operated are provided by a coalition of independent non-profit conservation organisations known as the Sustainable Agriculture Network (SAN). SAN promotes the social and environmental sustainability of agricultural activities by developing standards (Sustainable Agriculture Network, 2008). Rainforest Alliance as an organisation holds the standard and policy secretariat for SAN. The standard structure consists of ten principles each of which is composed of various criteria and indicators. These criteria and indicators form the standards to be met by companies for certification.

The ten principles cover the following areas:

1. Social and environmental management system
2. Ecosystem conservation
3. Wildlife protection
4. Water conservation
5. Fair treatment and good working conditions for workers
6. Occupational health and safety
7. Community relations
8. Integrated crop management
9. Soil management and conservation
10. Integrated waste management.

RFC is available to individual farms or groups of farms with an administration system, whose administrators apply voluntarily and have their farms evaluated for compliance with the Sustainable Agriculture Standard of SAN (Rainforest Alliance, 2007). The certification programme provides an option to the clients to choose the crops to which the certification seal will be applied, or those that will be presented as certified, at the time of certification audit request (Rainforest Alliance, 2007; Tischner et al., 2010). However, the certification requirement does not support the mixing of certified and non-certified products (Sustainable Agriculture Network, 2008). The certification cycle is three years and comprises a certification audit at the beginning and then annual audits. In the third year, the audit determines whether a farm maintains its certification status, while in other years the audits verify that progress is being made towards fulfilling the requirements of a corrective action plan. In addition, there may be investigation audits as a response to a complaint against a certified farm or a quality audit which helps the Rainforest Alliance to fulfil its obligations to control quality and supervision of monitoring (Adams and Ghaly, 2007; Rainforest Alliance, 2007).

In seeking certification, a farmer is not only committing to extra costs of improving the social, economic and environmental status of the farm but also meeting direct costs of audits including auditors' fees and logistics, and the annual fee. For farmers, a primary benefit from certification is labelling products or packaging with the certification seal or use of the seal in promotional materials. Certified products may also receive a price premium (Raynolds et al., 2006). The premium is meant to compensate farmers for

the added labour requirements and to encourage producers to adopt sustainable standards (Mutersbaugh, 2002).

A number of Kenyan tea farms adopted RFC in 2007 because tea production, like other agriculture-based industries, has continued to be associated with environmental and social problems, and these farms sought improvements in their practices to mitigate potential issues created by these problems. For example, studies have established that poor working conditions, inadequate basic facilities such as housing, and low income security are social issues common in tea farms (van der Wal, 2008; Kenya Human Rights Commission, 2008). As the Kenyan tea farms are adopting RFC, the question arises as to whether this brings about improvement in environmental, social and economic aspects of the farms and whether any such gains are significantly different to farms which do not adopt such systems. The purpose of this paper is to evaluate the performance of Rainforest Alliance certified farms relative to non-certified tea farms in Kenya.

2. Methods

2.1. Approach

In order to investigate contributions of the RFC to Kenyan tea farms, a Triple Bottom Line (TBL) approach, incorporating environmental, economic and social aspects (Nikolaou et al., in press) of sustainability (Asif et al., in press) was proposed. Fig. 1 shows the conceptual sustainability framework used in this paper. However, difficulties in obtaining economic information from farm managers, accentuated by the short period of time between RFC implementation and data collection, meant that the paper focuses on the environmental and social aspects of sustainability.

The common approach to studying sustainability is to select a range of indicators that capture what is included in the concept of sustainability. For each aspect of sustainability in Fig. 1, the broad range of factors that are incorporated in the concept of sustainability are indicated. There is a range of potential indicators that can be used to measure any particular component of sustainability. The indicators used in this study for the Environmental and Social components of sustainability are shown in Tables 1 and 2 respectively. The indicators are largely drawn from studies evaluating

environmental performance in OECD countries and are consistent with SAN standards version 2008.

2.2. Data collection

Identification of tea farms was done using a non-probability sampling method called convenience sampling (Kothari, 2005; Babbie, 2007). A report of the tea and coffee industry in Kenya by the Export Processing Zones Authority (2005) identified 18 tea companies operating in Kenya. Six tea companies were identified as having attained RFC for their farms. Five of the certified companies with tea farms in the study area were approached through a formal letter to participate in the research. In addition, five non-certified tea companies were also invited using the same procedure. Three certified and two non-certified companies consented to participate. One more non-certified company was then contacted in order to equalise the number of both groups. On each farm, the farm managers and farm employees were surveyed.

Farm employees were selected using random numbers to select the first participant. This introduced an element of randomness to the farm employee survey (Kothari, 2005; Babbie, 2007). Selection was done on the basis of the house that an employee lived in on the tea farm. In the tea estates, houses are clustered and each cluster has a uniform arrangement. The first house was chosen randomly and then every fifth house after that was surveyed until 10 houses were visited in each estate. The sample design resulted in 31 farm employee interviews from certified farms and 30 from non-certified farms. The farm employee survey involved a closed-end questionnaire that covered indicators of knowledge and training about environmental aspects of the tea farm, living conditions and income.

Another survey covering a range of questions relevant to indicators about the operation of the tea farm was prepared for farm managers. This survey was designed to be completed through an interview. Two farm managers from the non-certified farms did not have time for an interview, and as a result, only one non-certified and three certified farm managers were interviewed. To compensate for the lack of interview information from the two non-certified farms, secondary data (internal reports and company websites) were used to access relevant information for the study.

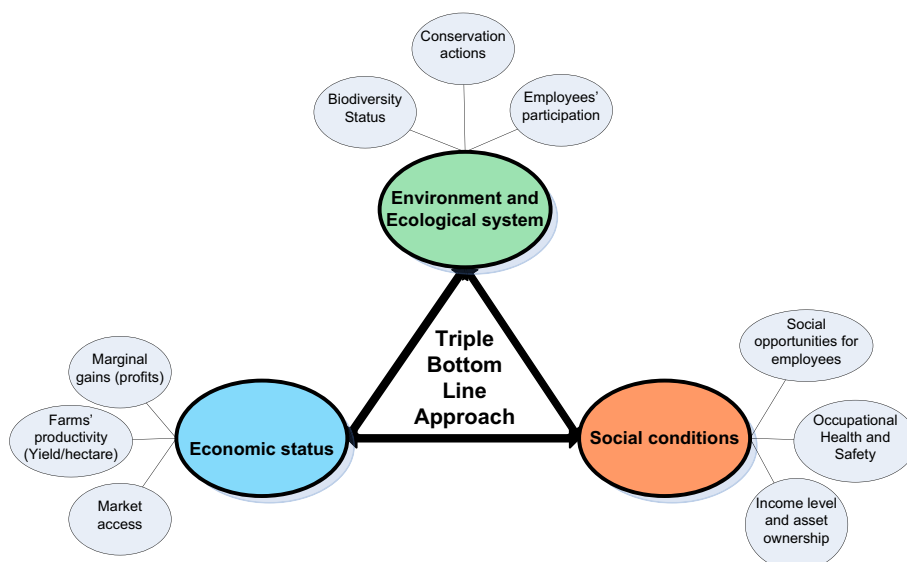


Fig. 1. Conceptual framework for measuring sustainability.

Table 1
Environment indicators.

RFC standard	Indicator and code	Data
Have and protect native tree species	Land under indigenous tree species (EN 1)	Yes or No
Establish and maintain vegetation zones between crops and areas of human activities	Presence of buffer zones (EN 2)	Yes or No
Hunting, capturing, extracting and trafficking wild animals must be prohibited on a farm	Existence of regulations such as bans on hunting (EN 3)	Yes or No
Use vegetative ground cover to reduce erosion and improve soil fertility, and minimise use of herbicides	Existence of soil conservation practices other than use of chemicals (EN 4)	Yes or No
Social and environmental management system that contains the necessary policies, programs and procedures for complying with the RFC standard	Existence of a written Environmental Management Policy (EN 5)	Yes or No
Implement a training and education program to guarantee effective execution of social and environmental management system and its programs	Employee training in environmental resource conservation (EN 6)	Yes or No
Integrated waste management program, which must be based on the 3 Rs concept	Employees' participation in environmental management activities (EN 7)	Yes or No
	Existence of an integrated waste management program (EN 8)	Yes or No

Source of indicators: Brouwer and Crabtree, 1999; Carruthers, 2003; Darnall et al., 2008; Hunt and Johnson, 1995; Nebel et al., 2005; OECD, 1999; Perron et al., 2006; Rondinelli and Berry, 2000; SAN Standard, 2008; Wagner, 1998.

3. Results

Table 3 presents key characteristics of the tea farms in the study. In order to maintain confidentiality, A, B and C are used to denote the three certified farms, and D, E and F the three non-certified farms. As can be seen in Table 3, the farms are large operations that have been in existence for a long time. They generally have more than 500 employees and more than 400 ha of tea plantations. As outlined in the methods, the approach is to evaluate sustainability in terms of the triple bottom line, using the indicators of environmental and social economic factors outlined in Tables 1 and 2. The results are presented by separately examining each of these components of sustainability.

3.1. Environmental sustainability

Indicators of environmental sustainability were measured in both the interviews with the farm managers and farm employees. The indicators from the farm manager survey are shown in Table 4 and indicators from the farm employee survey are shown in Table 5.

The first indicator in Table 4 concerns whether native trees have been maintained. Tea farming, as practised in Kenya, is a mono-culture practice which replaces the indigenous vegetation on a large piece of land over a long period. Kenyan tea farms were established on land that was once naturally forested, and therefore they have replaced a variety of indigenous tree species. Maintaining a proportion of the property in indigenous tree species is a key aspect in pursuing sustainable agriculture. All tea farms claimed to be maintaining indigenous tree species. However, on the ground, only one certified tea farm had a small piece of land (0.4 ha) set aside for planting indigenous tree species and the rest only had a few indigenous tree species scattered around the farms. In this respect, there is almost no difference between certified and non-certified farms. In both certified and non-certified tea farms, blue gum was the main tree species that was being grown. This is an introduced (exotic) species that is preferred because of its utility in the tea production process.

The second indicator is the maintenance of riparian strips (buffer zones) between natural resources and human activity areas. Conservation buffers have a number of benefits, including

Table 2
Social component indicators.

RFC standard	Indicator(s) and coding	Data
Housing provided by the farm for permanent or temporary workers must be well-designed, built and maintained to foster good hygienic, health and safety conditions, without leaks, and with appropriate ventilation and lighting	Employees living in a three-room house (SO 1)	Yes or No
All workers and their families must have access to medical services during working hours and in case of emergency	Health care services are provided to employees (SO 2)	Yes or No
All workers and persons living on a farm must have access to potable water	Perceive water quality as safe (SO 3)	Yes or No
Cooking areas comply with applicable laws	Access water within the compound (SO 4)	Yes or No
It is prohibited to directly or indirectly employ full or part-time workers under the age of 15	Main source of cooking energy is firewood (SO 5)	Yes or No
A farm must guarantee access to education for the school-age children that live on the farm, and schools established and administered by certified farms must have necessary resources, personnel and infrastructure	Existence of a policy against child labour (SO 6)	Yes or No
Workers must have the right to freely organise and voluntarily negotiate their working conditions in a collective manner as established in ILO Conventions 87 and 98	Tea farm ownership and/or support to schools (SO 7)	Yes or No
A farm must have a permanent and continuous training program to educate workers on how to carry out their work correctly and safely	Member of a workers union (SO 8)	Yes or No
All workers that come into contact with agrochemicals must use personal protection equipment	Employees trained in work safety and other duty-specific issues (SO 9)	Yes or No
Workers must receive pay in legal remuneration greater than or equal to the regional average or the legally established minimum wage.	Provision of personal protective equipment (PPE) (SO 10)	Yes or No
	Receive pay greater than or equal to minimum wage rate (SO 11)	Yes or No

Source of indicators: Nebel et al., 2005; SAN's Standard, 2008; Monteiro and Rodrigues, 2006; Beall and Kanji, 1999; Bhandari and Grant, 2007; Howard and Bartram, 2003; Masera et al., 2005; Sagar, 2005; Barham, 2002; Bebbington, 1999; DFID, 1999; Brown and Getz, 2007; Sinclair et al., 2009; Kelleher et al., 1999.

Table 3
Characteristics of tea farms in the sample.

	Certified			Non-certified		
	A	B	C	D	E	F
Year of establishment	1952	1920	1958	1928	—	1947
Number of employees	512	630	644	925	450	—
Area under tea (ha)	426.16	428.00	424.00	321.50	—	1015.00
Area under blue gum (ha)	150.66	135.10	104.50	90.00	—	390.00
Area under housing (ha)	28.00	30.00	175.00	—	—	184.00
Area of natural resources (ha)	108.00	88.50	6.00	—	—	201.00
Total size (ha)	712.82	681.60	709.50	498.00	320.00	1790.00

— Information not available.

mitigating the effects of agricultural run-off on water quality, and being a source of food, nesting cover, and shelter for wildlife. The farm managers were asked, “Are there buffers or operating restrictions around the environmentally sensitive areas, and if so, what are they”? There is a difference between certified and non-certified farms. Strategies reported in the certified farms involved keeping rivers free from pollution through restrictions on waste disposal into water sources and fencing (Farm C), maintaining a riparian strip of between 70 and 100 m in width (Farms A, B and C (although note that this self-reporting for C might conflict with their reported 6 ha area of natural resources, Table 3)) and imposing a ban on illegal logging. In addition to these measures, certified farm managers stated that river water quality was monitored through laboratory tests of biophysical and chemical properties on a monthly basis. One non-certified tea farm manager (Farm D) reported that they preserved natural resources such as streams by allowing them to exist naturally (i.e., without interference).

The next indicator concerns whether there is a ban on hunting. Although it was not possible to get data for two of the non-certified farms, it appears that this is a general practice on all farms. On certified tea farms bans on hunting were communicated to the public by use of signposts at strategic points.

For the soil conservation indicator, farm managers were asked, “How do you manage/conservate soil on your farm”? The results show that all tea farms took measures to conserve soil, such as ploughing across the contours, use of oat grass and planting wind breaks. Soil conservation measures used in the three certified farms were use of plant cover such as oat grass (Farms A and B), use of bunds and drainage system (Farms A and B), and ploughing across the slope and silt traps (Farm B). Artificial fertilisers were used in all the certified tea farms to increase productivity. One of the certified farm managers (Farm B) reported that they used aerial spray methods to apply fertilisers. The farm manager in a non-certified farm (Farm D) reported that they applied good agricultural

practice, which included ploughing across the slope and the use of plant cover. Although the non-certified farm manager did not mention chemical fertiliser, their annual environmental audit report in 2009 indicated its use. The RFC standards do not wholly prohibit use of chemicals but aim to control the types of chemicals applied on farms.

The final four indicators in Table 4 deal with farm strategies and activities to ensure that employees understand and follow guidelines dealing with environmental matters on the farm. For example, training offered at the right level enhances the spread of sustainable behaviours and to institutionalise the approaches (Adams and Ghaly, 2007). In this respect, there is a marked difference between certified and non-certified farms, with the non-certified farms not having written policies, training or systems dealing with environmental issues. The non-certified farm manager interviewed said that they had an EMP although not written down (Farm D). From secondary data, it was found that another non-certified tea farm did not have a written EMP because it was recommended in their 2009 environmental audit report (Farm E). Any company with an aim of improving environmental performance should start by establishing a realistic EMP to minimise negative impacts of its operations (Hunt and Johnson, 1995). Therefore, existence of written EMPs in certified farms is a positive indicator for management of natural resources.

As discussed earlier, employees were also asked questions about their knowledge of and engagement with environmental policies and activities on the tea farms where they worked. These questions were the same as the last four questions in, and survey results linked to, Table 4, and thus provide a cross-reference as can be seen in Table 5.

The certified farms had been effective in ensuring that their employees were aware of their environmental management policy. Training helps employees to understand an environmental management initiative, and the environmental impacts of their activities, and increases chances of employees' committing to the implementation of an environmental management initiative. Employee training is an essential element in the implementation of an EMS (Sammalisto and Brorson, 2008). Again, the results show that certified farms had generally been successful in providing environmental training, with 93.5% of employees receiving environmental management training. Surprisingly, about one-third of employees on non-certified farms particularly in Farm D thought that their employer had a written environmental policy and solid waste management system, and stated that they had participated in environmental management training. This suggests that the farm's management could be preparing grounds for certification. It was somewhat surprising that for certified tea farms only 58% of employees had participated in environmental management activities, suggesting the need for more concerted efforts to put environmental training into practice. Examples of environmental

Table 4
Environmental indicators from farm manager survey.

Environmental indicator (code)	Certified tea farms			Non-certified tea farms		
	A	B	C	D	E	F
Maintenance of native tree species (EN 1)	x	x	✓	x	x	x
Existence of buffer zones/a strip of riparian vegetation (EN 2)	✓	✓	✓	x	x	x
Existence of regulations against hunting (EN 3)	✓	✓	✓	✓	—	—
Use of soil conservation practices other than use of chemicals (EN 4)	✓	✓	✓	✓	✓	—
Written environmental management policy (EN 5)	✓	✓	✓	x	x	—
Employee training in environment and natural resource conservation (EN 6)	✓	✓	✓	—	x	—
Employee participation in environmental activities (EN 7)	✓	✓	✓	x	x	—
Existence of an integrated solid waste management system (EN 8)	✓	✓	✓	x	x	x

✓ = Yes, x = No, — = No information.

Table 5
Environmental indicators from farm employee survey.

Environmental indicator (code)	Certified tea farms (N = 31)			Non-certified tea farms (N = 30)		
	Yes (%)	No (%)	Don't know (%)	Yes (%)	No (%)	Don't know (%)
Aware of the existence of a written environmental management policy (EN 5)	100	0	0	33.3	6.7	60
Received training in environmental resource conservation (EN 6)	93.5	6.5	0	30	70	0
Participated in environmental activities (EN 7)	58.1	41.9	0	13.3	86.7	0
Solid waste collection system implemented on the farm (EN 8)	93.5	6.5	0	36.7	63.3	0

activities that the certified tea farms involved their employees in were solid waste management and tree planting, which could be either indigenous or exotic. There are uncertainties about sustainability initiatives and ecolabeled products regarding their claimed superior environmental performance (Nilson and Leire, 2004). This research study findings indicate that the certified tea farms had better environmental considerations despite falling short of the sustainability threshold.

3.2. Social sustainability

Certification systems place a large emphasis on social factors, largely in terms of employee and local community welfare and working conditions. In the case of large tea farms, where employees are also the local community, this means studying the working and living conditions of employees on farms. Table 6 shows the results from 11 questions asked of employees about indicators of living and working conditions.

In both certified and non-certified tea farms, employees were allocated permanent houses, but the house size and number of rooms were inadequate. Most households comprised of four occupants (i.e., father, mother and two children), and thus the indicator for housing was based on a family of four requiring at least a three-roomed house (a sitting room and two bedrooms). As the results show, there is no difference between certified and non-certified farms in terms of house size. In addition, housing conditions on all farms were poor in terms of cracked walls, leaking roofs and pot-holed floors. A good house should be adequate to accommodate its inhabitants, well ventilated, safe, and promote good health, and none of the farms met this requirement.

In order to improve employees' health, there is a need for easy access to health care services and to safe drinking water. As Table 6 indicates, both groups of farms provided employees with access to health care services, and roughly the same proportion of employees (83.9% in certified and 80% in non-certified) perceived their drinking water to be safe. The major difference between certified and non-certified farms was in terms of access to water within their compounds. Almost all employees of certified companies had

access to water in their compounds, but less than half did in the non-certified companies. The time spent on fetching water can impact negatively on the workers' productivity, especially when they have to travel long distances (DFID, 1999).

In most poor households in developing countries, firewood is heavily relied on as the main source of cooking energy. Although firewood is a renewable source of energy, it can be a problem if it is obtained from unsustainable sources. In addition, the low technological approach used by the poor households (open fire) makes it unhealthy. This is because smoke from the incompletely burnt wood fuel contains air pollutants that can cause respiratory infections, low birth weight, chronic obstructive pulmonary disease, cancer and eye infections (Anozie et al., 2007). Therefore, the use of firewood not only poses a threat to existing forests but is also a potential danger to the health of users, mostly women and children (Masera et al., 2005). It is common for people to shift from the use of firewood to other sources of energy such as kerosene and electricity as they experience improved income (Hosier and Kipondya, 1993). Also, Kituyi (2004) asserts that people resort to biomass as the main source of cooking energy when they cannot afford conventional commercial cooking alternatives such as kerosene. The expectation for the firewood indicator is that certified farms would have a higher proportion of employees using alternatives to firewood. As the results show, all tea farm employees relied on firewood. This is probably because it is cheap and easily available as the tea farms also depend on wood fuel to process tea, and have blue gum plantations providing a source of firewood.

Education is a key tool for achieving sustainable development. It has been described as the greatest resource to achieve a just and ecologically rich society, and for that reason, a series of major international reports have emphasised the critical role education can play in the search for sustainable living (Tilbury et al., 2002). There are two indicators in Table 6 that deal with education. One is the provision or support of a school by the farm, and the other is a policy against child labour. A policy against child labour provided further opportunities to employees' children of a school going age to attend school. Without a strictly enforced policy against child

Table 6
Access to social opportunities.

	Certified tea farms			Non-certified tea farms		
	Yes (%)	No (%)	Don't know (%)	Yes (%)	No (%)	Don't know (%)
Employee living in a three-roomed house (SO 1)	9.7	90.3	0.0	10.0	90.0	0.0
Employee provided with health care services (SO 2)	100.0	0.0	0.0	100.0	0.0	0.0
Employee perceiving drinking water quality as safe (SO 3)	83.9	16.1	0.0	80.0	20.0	0.0
Employee accessing water within the compound (SO 4)	96.8	3.2	0.0	46.7	43.3	0.0
Employee's main source of cooking energy is firewood (SO 5)	100.0	0.0	0.0	100.0	0.0	0.0
Employee reporting existence of a policy against child labour (SO 6)	100.0	0.0	0.0	36.7	3.3	60.0
Employees reporting that their farm owns and/or supports a school (SO 7)	100.0	0.0	0.0	100.0	0.0	0.0
Employee is a member of a worker's union (SO 8)	54.8	45.2	0.0	56.7	43.3	0.0
Employee trained in work safety and other duty-specific issues (SO 9)	100.0	0.0	0.0	36.7	63.3	0.0
Employee provided with PPE (SO 10)	96.8	3.2	0.0	26.7	23.3	50.0
Employee receives pay equal to or greater than the minimum wage (SO 11)	71.0	29.0	0.0	26.7	73.3	0.0

labour, it is possible that employees could involve their children in tea picking. As can be seen in Table 6, there is no difference between certified and non-certified tea farms in terms of ensuring that employees' children had access to primary education and all tea farms either owned or offered support to schools. There was a large difference between certified and non-certified farms in terms of knowledge about child labour policies on the farm, with many employees on non-certified farms being unsure of whether there was a policy.

One way of determining whether certification has made a difference to the working environment is to look at health and safety, and wages. By law, all employees can join a trade union. As can be seen in Table 6, the indicator for union membership shows that there was no difference between the rate of union membership between certified and non-certified tea farms. For other indicators though, there is a large difference. Almost all employees of certified tea farms were issued with personal protective equipment (PPE), while only 27% of non-certified farm employees were provided with PPE. The use of the PPE is important to minimise injuries, meaning that most of the non-certified farms employees were vulnerable to occupational health risks. In addition, on certified tea farms, all employees were trained in work safety or duty-specific issues, while only 36% of the non-certified tea farms' employees had been trained. In this respect, the RFC achieved a large benefit to the certified farm employees because all were trained in safety issues.

Another important indicator of employees' well-being is their wage rate (Adams and Ghaly, 2007). It is common to offer the same amount of pay to employees delivering similar services and in the same job group. The RFC standard demands that workers are paid at least a minimum wage or more, as established by the government according to the type of activity carried out. While Kenyan laws do not specify the exact amount of money that should be paid to tea farm employees, it requires that the lowest paid person should receive a monthly salary of Kenya shillings (Ksh.) 5400.00 (US \$72.00). The indicator for wages in Table 6 shows that employees of certified tea farms have done much better than those on non-certified farms. However, certified tea farms were yet to comply fully to the RFC standard, as 29% of their employees reported earning below the recommended minimum amount.

4. Discussion

The objective of this research was to assess the performance of Kenyan tea farms with RFC certification. To achieve this objective certified and non-certified farms were compared using sustainability indicators that reflected the requirements of the RFC standards. Information on the indicators was derived primarily from interviews with managers and surveys of employees. While certification standards cover the triple bottom line of environmental, social and economic factors (Asif et al., *in press*), difficulties in obtaining information on economic factors meant the study focused on environmental and social factors. The main conclusion is that the RFC programme has provided important benefits. This finding is consistent with Hokazono and Hayashi (2012) who used Life Cycle Analysis (LCA) to compare conventional and organic rice farming and found that organic farming can environmentally outperform conventional approach in the long term. However, results from the research reported here show that the benefits are not uniformly obvious across the range of environmental and social indicators used in the study.

The existence of Environmental Management Policies, integrated solid waste management systems (Adams and Ghaly, 2007; Nikolaou et al., *in press*), riparian buffer strips, water quality monitoring, and bans on hunting on certified farms are all positive environmental aspects reported for certified farms by management

and mostly reinforced by employees. Equally there are obvious social gains, such as, higher incomes for workers on certified farms. Many of the benefits of the RFC established by this research were also identified by Gómez Tovar et al. (2005) as social and economic advantage especially among large producers. Raynolds et al. (2006) observed that the RFC helps to attain acceptable social conditions in production, which is consistent with the findings of this research as more certified farm employees reported better conditions than non-certified farm employees.

However, the differences, although important, do not wholly result in sustainable agriculture. Sustainable agriculture is meant to ensure the environment is not harmed and that workers have humane conditions and fair wages. Native vegetation was scarce or poorly maintained on certified farms, employees still experienced inadequate housing, and 29% of employees still received pay below the recommended minimum wage rate. The absence of a difference between certified and non-certified farms with respect to housing quality is surprising given it should be something that would be reasonably easy to improve. A possible explanation is that RFC certification is still new to these farms, and it will take time and resourcing for indicators such as housing to respond.

Adoption of sustainability standards and implementation of the required changes can lead to some loss of income for farmers (Webster, 1997). Certification costs are also additional costs and can be expensive to undertake. The cost of certification was mentioned by a non-certified farm manager as the main reason why they did not seek certification. The certified farm managers also mentioned high costs as a reason why they had not conformed to all the RFC standards. Some areas of non-conformance were building adequate houses for employees and instituting an effective system to manage wastewater. Also, the RFC increased production costs in the sense that it requires employees to be paid either a minimum wage as legally stipulated by a government or more. In theory, the certification cost can be recovered from the increased financial gain associated with more stable markets and a price premium for certified product. Farm managers were not prepared to provide this type of information so this proposition was not able to be evaluated.

One benefit of the RFC reported by all certified farm managers is enhanced access to the global market. Private regulatory systems are often characterised as being "market-driven," meaning that participation is promoted via higher prices, market access, and positive publicity rather than legal requirements (Nikolaou et al., *in press*; Raynolds et al., 2006). All certified farm managers mentioned assured markets as one of the advantages of becoming certified. While all the non-certified farms depended on the Auction Centre in Mombasa as the main market outlet for their products, the certified farms in addition reported having direct links with customers from countries such as the United Kingdom, Pakistan and Egypt. Clients from these countries could make direct orders for certified tea from the certified tea companies, although the transaction still had to pass through the Auction Centre in Mombasa. In this context, certification would appear to provide benefits that were not available to non-certified farms. Producers are mostly motivated to adopt sustainability standards due to the assurance of consumer trust (Nilson and Leire, 2004). However, in this research farm managers were not prepared to provide financial details so it was not possible to evaluate this suggestion.

5. Conclusions

There has been little empirical research undertaken to compare certified versus non-certified agricultural management systems. In this study Rainforest Alliance Certification of Kenyan tea farms is demonstrated to be having a positive impact on a range of environmental and social aspects of certified farms, although with large

scope for improvement. This need for improvement is not surprising given that certification is still relatively new on Kenyan tea farms, and a number of changes to farming systems and infrastructure will take time to implement. The key to achieving these changes is the continuous auditing process that is integral to certification systems, linked to clear objectives to meet certification goals. In this respect, it is recommended that a formal assessment, similar to that undertaken in this study but also covering economic factors, occurs at regular intervals and preferably undertaken by independent third-party auditors. This will enhance trustworthiness and impartiality (Nilson and Leire, 2004). Finally, communicating findings of such assessments through annual reports, annual shareholder letters, non-financial reports and web pages (Asif et al., *in press*) can enhance accountability and hence performance. Based on the empirical research findings and the related conclusions it is recommended all tea farms be encouraged to become certified.

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