THE ROLE OF SCALING UPFARMER FIELD SCHOOLSAND RAINFOREST ALLIANCE CERTIFICATION ON SUSTAINABLE TEA PRODUCTION AMONG SMALL-SCALE TEA PRODUCERS WEST OF RIFT VALLEY, KENYA

BETTY CHELANG'AT BUSES

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DECLARATION AND RECOMMENDATION

Declaration

This MSc thesis is my original work and has not been presented for the award of certificate,diploma or degree in this or any other University

Signed---------- Date----------

Betty C. Buses (EM12/2275/08)

Recommendation

This thesis has been submitted for examination with our approval as University Supervisors

1. Signed ……. Date …….....

   Prof. John Gowland-Mwangi

   Department of Agricultural Education and Extension, Egerton University

2 Signed……Date …….

   Dr. Dave Boselie

   The Sustainable Trade Initiative (IDH),The Netherlands

DEDICATION

This thesis is dedicated to Tamoo, Clement,and JoshuaArap Buses and in loving memory of my revered mother the fountain of inspiration.

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ABSTRACT

Kenya Tea Development Agency (KTDA) has been encouraging adoption of sustainable tea production, through FFS and RA certification, among small-scale tea producers west of Kenya's Rift Valley since 2006 and 2010 respectively. FFS was a methodology of choice because of its experiential and practical learning approach. Those organisations that had used FFS approach had reported it to be successful, whereas RA certification guarantees sustainable use of agricultural and forestry resources and enhance market access. However, the challenge was how to up-scale FFS and RA certification to cover more KTDA factories. There was also inadequate information and documentation of FFS experiences and extension delivery mechanisms on tea production. This study sought to provide that missing information and contribute to the design of a cost-effective model for up-scaling RA certification and FFS in tea production so that small-scale tea producers can produce tea sustainably that fetches higher and profitable prices. This would ensure their sustainable livelihoods through improved incomes. The study utilized across-sectional survey design with stratified sampling to collect data from 260 randomly selected smallholder tea producers who delivered green leaf tea to KTDA factories West of Rift Valley, using a semi-structured questionnaire. The validity of the questionnaire was ascertained by a panel of ten extension experts. The instrument produced a Cronbach's alpha reliability coefficient of α=0.92 after a pilot test in Nandi County. Data collection was done after obtaining a research permit from the National Council for Science and Technology. Data collected was cleaned, coded and analyzed at a confidence level, set *a priori*, of 0.05α with the aid of the computer programme, Statistical Package for the Social Sciences (SPSS). Qualitative data was analyzed and presented in frequency and percentage distributions tables while quantitative data was analyzed along the objective areas. Pearson Product Moment Correlation and Chi-square were used to test the hypotheses. The study established that scalability of RA certification and FFS had a significant relationship with sustainable tea production among small-scale tea producers west of Rift Valley. It was also established that RA Certification and FFS trainings had positive correlation with small-scale tea producers' livelihoods. The study recommends a multi stakeholder financed scalability of RA certification and FFS and tailoring the trainings to enhance farmer livelihood in future. Thefunding has to be multi-stake holder because an individual organisation like KTDA cannot make this investment by itself because the recurrent and upfront costs are higher. If these recommendations are effected, they would go a long way in enhancing sustainable production of safe and high quality tea.

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ABBREVIATIONS AND ACRONYMS

AESA	Agro-Ecosystem Analysis
DFID	Department for International Development of the United Kingdom
FAO	Food and Agriculture Organization of the United Nation
FFS	Farmer Field Schools
FGD	Focus Group Discussions
GAPS	Good Agricultural Practices
IPM	Integrated Pest Management
KTDA	Kenya Tea Development Agency
NGOs	Non-Governmental Organizations
PPE	Personal Protective Equipments
RA	Rainforest Alliance
SAN	Sustainable Agricultural Network
TESA	Tea Extension Service Assistant
TOFT	Training of Farmer Trainers

CHAPTER ONE
INTRODUCTION

1.1 Background Information

Globally, tea (C*amellia sinensis*) is mainly produced in large plantations but smallholder production is increasingly becoming important (Unilever, 2010).Tea is one of the 21 crops certified by Rainforest Alliance. In Kenya and Sri Lanka, for example, smallholder tea producers account for about 62% and 65% of total production respectively (De Jageret al., 2009). Kenya is the world's top exporter of black tea and the worlds' third largest producer, with around 320,000 tonnes of tea produced annually(Gesimba *et al.,* 2005; Obulutsa, 2010; Ombok, 2010; Unilever,2010). Tea cultivation attracts smallholders because it provides work and income throughout the year, requires relatively little investment and the risks of complete crop failure are relatively small (De Jager *et al.,* 2009).

In 2006-2008, Kenya Tea Development Agency (KTDA) in cooperation with Lipton under the KTDA/Lipton Sustainable Agriculture Project launched four pilot Farmer Field Schools spread equally over four KTDA factories through the Department for International Development (DFID) funding. Farmer Field Schools according to KTDA (2004) was used as an extension methodology in order to empower small-scale farmers to achieve higher sustainability parameters on all areas (Hiller *et al.,* 2009). An impact assessment pilot phase, of the four participating FFSs, that ended in 2008 indicated a positive impact. Chain actors in the project expressed the need to roll-out the FFSs approach and by 2008/2009, 24 FFSs involving 500-600 smallholder tea producers were practicing the methodology (Hiller *et al.,* 2009).

While implementing the pilot phase, the necessity of attaining Rainforest Alliance (RA) certification became apparent with Lipton, the main buyer of KTDA tea looking for tea produced from sustainable sources. Rainforest Alliance (RA) certification - built on the three pillars of sustainability (environmental protection, social equity, and economic viability) - is a process that promotes and guarantees sustainable use of agricultural and forestry resources (Rainforest Alliance, 2010). To achieve RA certification, strict health and safety principles such as working hours, rest periods, provision of safety equipment and sanitary facilities must be adhered to. The successful attainment of RA certification by the four KTDA factories participating in the pilot phase created an interest in other KTDA factories to undergo RA certification, and since Lipton wanted to buy tea from sustainable sources, a need arose to

prepare, on demand, other KTDA factories for RA certification. Dominant industry player will use certification as an extra differentiating feature on their branded product, leading to extra sales.

In 2009, key partners (KTDA, RA, Unilever/Lipton, Wageningen University Research Centre LEI, Africa Now, and ETC East Africa) initiated a second phase, this aimed at up-scaling FFS activities and RA certification work through the Scalability of Sustainable Tea Value Chain in Kenya in the framework of KTDA Sustainable Agriculture Project, launched in January 2010. This project sought to scale-up FFS activities to cover 51 more KTDA factories besides the four in the pilot phase and roll-out the FFS extension to gradually cover 50,000 smallholder tea producers. KTDA has over 500,000 smallholder producers. Similarly, RA certification is being scaled up from four to twenty more KTDA factories in the pilot phase over a two-year period. The match-funding for this phase of accelerating and up-scaling was provided by the Initiative Sustainable Trade (IDH) from the Netherlands. This organisation specifically co-invests with private sector companies to aim for mainstreaming sustainability in multiple commodity markets.

Scaling-up refers to the diffusion and dissemination of locally successful innovations to a wider stakeholder group (Gordijn, 2005).Active collaboration with, and involvement of, stakeholders in all FFS activities improve the efficiency and effectiveness of up-scaling (Braun *et al.,* 2006). Certification enables a factory affiliated to KTDA to sell its processed tea at a premium internationally and to channel the increased earnings to smallholder producers who supply it with tea. FFSs can be expensive or low-cost, depending on who implements them and how they are conducted but costs per FFS decline as activities become routine, prices become lower due to bulk purchase of materials, and trainer and facilitator skills and experience increase (Braun & Duveskog, 2010).

1.2 Statement of the Problem

Low or non-adoption of sustainable agricultural practices has led to production of low value tea that cannot fetch higher and profitable prices. KTDA extension officers have, through FFS, been encouraging small scale tea producers west of Kenya's Rift Valley to practise sustainable agriculture since 2006. Also, KTDA factories have been undergoing Rainforest Alliance certification since 2010 in order to promote sustainable tea production that would enable the farmers to access some niche markets, which would lead to sustainable

livelihoods. However, many of the tea producer have not yet benefited from FFS and RA certification where scalability is still a challenge. Furthermore, most of the tea production stakeholders still lack adequate understanding on; how the FFSs up-scaling process works; costs, benefits and opportunities of FFSs and RA certification and their impact in-terms of dimensions of up-scaling FFS producer organizations; and how FFS and RA training interventions contribute to observed changes in farmers' livelihoods. They also lack adequate information on systematic documentation of FFS experiences comprising thematic knowledge components and extension delivery; on the costs, benefits and opportunity costs of FFS and RA certification and their impact in-terms of cost effectiveness; on the dimensions of up-scaling FFS producer organizations in terms of governance, stakeholder participation and broadening extension service provision. It is hypothesized that the FFS extension system, which is a hands-on, participatory training methodology, can be used to eliminate or minimize many of these challenges. Better needs-based FFS training of tea producers is likely to improve tea production and quality leading to higher prices, good governance or management of tea regulating bodies, management of tea factories minimizing corruption and collusion along the supply chain. This study was designed to provide the missing information to some of these aspects.

1.3 Purpose of the Study

The main objective was to investigate the role of scaling Rainforest Alliance certification and Farmer Field Schools on sustainable tea production among small-scale tea producers in West of Rift Valley.

1.4 Specific Objectives of the Study

This study was guided by the following specific objectives;

1. To examine and describe the scaling-up of Rainforest Alliance certification on sustainable tea production among small-scale tea producers in West of Rift Valley.
2. To assess the scaling-up of FFS on sustainable tea production among small-scale tea producers in West of Rift Valley.
3. To identify and describe the effects of Rainforest Alliance certification trainings on small-scale tea producers livelihoods' west of Rift Valley.
4. To determine the effects of FFS trainings on small-scale tea producers livelihoods' in West of Rift Valley.

5. To determine and describe the critical factors that explain how RA certification and FFS up-scaling processes work among small-scale tea producers in West of Rift Valley.
6. To determine the costs, benefits and opportunity costs of RA certification and FFS trainings on sustainable tea production among small-scale tea producers in West of Rift Valley.

1.5 Research Questions of the Study

Objective 5 and 6 were translated into the following research questions:

1. What are the critical factors that explain how RA certification and FFS up-scaling processes work among small-scale tea producers west of Rift Valley?
2. What are the costs, benefits and opportunity costs of RA certification and FFS trainings on sustainable tea production among small-scale tea producers west of Rift Valley

1.6 Hypotheses of the Study

Objectives 1, 2, 3 and 4 were translated into the following hypotheses:

H_{01} Scalability of Rainforest Alliance certification has no statistically significant relationship with sustainable tea production among small-scale tea producers in West of Rift Valley.

H_{02} Scalability of FFS has no statistically significant relationship with sustainable tea production among small-scale tea producers in West of Rift Valley.

H_{03} Training on Rainforest Alliance certification has no statistically significant effect on small-scale tea producers' livelihoods' in West of Rift Valley.

H_{04} FFS training has no statistically significant effect on small-scale tea producer's livelihoods' in West of Rift Valley.

1.7Significance of the Study

This study has explained how existing models of scaling-up particularly those using participatory approaches may be utilized to benefit small-scale tea producers while helping consumers to access safe products of high quality. The study has further developed alternative scenarios and contributed in the design of a cost-effective system of scaling up RA certification and FFS in the project. The study has determined and described the critical factors that explain how up -scaling processes work in small scale tea producers.

1.8 Scope and Limitations of the Study

The study focused on tea production. It was limited to scalability of FFS and RA Alliance certification involving tea producers delivering tea to KTDA factories west of Rift Valley in Kenya. These factories west of Rift Valley fall under Kisii, Nyamira, Bomet, Kericho , Nandi and Vihiga counties.

1.9 Assumptions of the Study

The study assumed that farmers' involvement in RA and FFSs training translates to increased knowledge and skills on sustainable agriculture and results in yield increase in good agricultural practices leading to sustainable tea production. Farmers could isolate the benefits as a result of FFs and RA certification trainings. Further assumption was that any positive correlation between the various livelihood changes is a direct indication of the effectiveness of the RA and FFs trainings.

1.10Definition of Terms

Empowerment is defined as people's ability to act on their own in order to reach their self-defined goals and involves development of people's capacities to manage their own projects better and have a voice in existing delivery systems (World Bank 2004, Namvong & Bacognguis, 2010).

Rainforest Alliance. The Rainforest Alliance is an international NGO that works to conserve biodiversity and to ensure sustainable livelihoods via the transformation of land-use practices, business practices and consumer behaviour. Rainforest Alliance is the owner of the "Rainforest Alliance Certified™" seal (Rainforest Alliance, 2010).

Scaling-up or up-scaling refers to the diffusion and dissemination of locally successful innovations to a wider stakeholder group while scalability of the FFS system may involve creating awareness of the FFSs among potential users and spreading their acceptance, adoption and sustainable application in problem-solving by increasingly more users in a geographical area or among members of a community, or members of different communities (Answers.com, 2011; Gordijn, 2005). The terms scalability, up-scaling and scaling-up will be used interchangeably in this study to mean the diffusion and dissemination of locally successful innovations to a wider stakeholder group; or to mean creating awareness of FFSs among potential users and spreading their acceptance, adoption and sustainable application in problem-solving by increasingly more users in a geographical area or among members of a community, or members of different communities. Scalability of RA was operationalized to be the number of RA Certification trainings attended by the FFS members whereas scalability of FFS was operationalized to be their experience in months.

Sustainable Agriculture (SA) is farming in a responsible manner while enhancing profitability, well-being of the people and the environment for now and the future (KTDA, 2004). Sustainable Agriculture Initiative platform (SAIP) defined it as a productive, competitive and efficient way to produce safe agricultural products, while at the same time protecting and improving the natural environment and social/economic conditions of local communities (SAIP,2011). Sustainable agriculture in this study is measured using indicators that include soil fertility, emissions to air, water and soil; resource use efficiency; water quality; biodiversity; economic viability and working conditions.

Sustainable Agriculture Network (SAN). The Sustainable Agriculture Network (SAN) is a coalition of independent non-profit conservation organizations that promote the social and environmental sustainability of agricultural activities by developing standards. It fosters best practices for the agricultural value chains, provides incentives to producers to comply with the standards and encourages traders and consumers to support sustainability. SAN is the owner of the "Sustainable Agriculture Standard" (Rainforest Alliance, 2010).

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter covers the five basic components of an FFS System, the scaling up of innovations and interventions, scaling up the FFSs system and strategies for scaling-up of the farmer field school extension system.It also covers the costs, benefits and opportunity costs of FFS, factors that influence scalability, costs of scaling-up FFS and Rainforest Alliance certification. It ends with the theoretical framework and conceptual framework.

2.2 A Farmer Field School's Five Basic Components

Farmer Field School (FFS) is a group-based learning process that has been used by governments, NGOs and international agencies to promote Integrated Pest Management (IPM). The first FFS were designed and managed by the Food and Agriculture Organisation of the United Nations in Indonesia in 1989. The Farmer Field School involve concepts and methods in agro-ecology, experiential education and community development. In agricultural extension, the FFS may be considered as an extension model, method or system because it has a well-organized structure with clearly defined operational procedures. Each FFS system has five basic components (Groeneweg, *et al.,* 2006) as follows:

i. Agro-ecosystem Analysis (AESA) is the cornerstone of the FFS approach and is based on the ecosystem concept in which each element in the field has its unique role. It involves field observations, data collection and analysis, and recommendations. In FFS, AESA framework is used in monitoring the progress of comparative experiments (PTD).

ii. Field comparative experiments - known in Kenya as participatory technology development (PTD) - is a collective investigation process to solve local problems. Simple experiments are conducted to enhance farmers' observational and analytical skills to investigate the cause and effect of major production problems. The experiments enable farmers to become experts capable of designing simple and practical experiments that they can use to test and select the best solutions to their problems. Experiments encourage validation and adoption of new technologies or practices.

iii. Facilitation of special topics in FFS: Though adults learn best through a learning-by-doing approach, where new knowledge and skills are acquired from experience, basic technical information is usually needed before any hands-on activity can be

implemented. FFSs provide an opportunity for the facilitator to give theoretical inputs needed for a general understanding of the subject before any activities are carried out; enhance farmers' technical knowledge and present them with the information they need when they need it; ensure a demand-driven learning process; and level of knowledge among participants.

iv. Participatory monitoring and evaluation (PM&E) enable participants to determine whether objectives are being achieved as planned, what adjustments are needed, and which activities should be terminated or continued.

v. Group dynamics/ team building exercises ensure activities at the community level are successful by enabling farmers to apply effective leadership skills and to share their experiences and findings with others.

2.3 How Farmer Field School is Organized and Works

Farmer Field Schools are just one way in which a program can engage the community to take charge and play an active role in their own development. By giving them the resources and means, community members can be empowered to make their own decisions. The FFS took on an adult participatory educational approach that emphasized analytical methods such as experiential learning, action research and critical thinking, to enable farmers to take the lead in local adaptation of practices. Many of the technologies transmitted in an FFS are from research and members themselves, sharing information and developing new locally appropriate solutions to local problems by building on their learning. FFS has been found to work best in the context of a progressive demand-driven extension policy process, in which accountability among extension staff is towards farmers rather their superiors and when there is a policy environment that encourages organizational growth and favourable market conditions for smallholders (Gallagher *et al.*, 2006).FFS is one element of up-scaling an appropriate response within demand-driven systems – not up-scaling of FFS for their own sake. FFS can be a "stepping stone" to self-sustained groups in some situations. The FFS builds sustainable human and social capital needed for next step actions among farmers such as collective marketing of produce and lobbying through farmer networks, savings groups and other associations that are sustained as independent groups and associations. There are six essential bases to successful FFS implementation;

a) **Financing-** FFSs can be expensive or low-cost, depending on who implements them and how they are conducted. When carried out within a World Bank-type programme, they

are usually expensive; due to high allowances, transportation costs and several layers of supervision (about US$30-50 per farmer).Transport is one of the biggest costs in any extension programme.

b) **The curriculum-** follows the natural cycle of its subject, be it crop, animal, soil, or handicrafts. Other activities in the curriculum include 30-120 minutes for specific topics, icebreakers, energisers, and team/organisation building exercises are also included in each session. The curriculum of many FFSs is combined with other topics. In Kenya, the FFSs follow a one-year cycle including cash crops, food crops, chickens or goats and special topics on nutrition, HIV/AIDS, water sanitation and marketing.

c) The facilitator-a technically competent facilitator to lead members through the hands-on exercises. There is no lecturing involved, so the facilitator can be an extension officer or a Farmer Field School graduate. Farmer Field School graduates are usually given special Farmer facilitator training (10-14 days) to improve technical, facilitation and organisational skills.

d) **The field-** FFSs are about practical, hands-on topics. There are no lectures – all activities are based on experiential (learning-by -doing), participatory, hands-on work. Activities are sometimes season-long experiments carried out in the field.

e) The group. A group of people with a common interest form the core of the FFS, which may be mixed with men and women together, or **s**eparated, depending on culture and topic. The group could bean established one, such as a self-help, women's, or youth group.

f) **The programme leader-** Most FFS programmes exist within a larger programme, run by government or a civil society organisation. It is essential to have a good programme leader who can support the training in FFSs.

FFSs therefore depends on farmers' and facilitators' ability to learn locally and apply Learning to local problems themselves (Gallagher,2003; 2006)

2.4The Scaling up of Innovations and Interventions

Scaling up leads to more quality benefits to people, quickly, equitably and increases the impact of an innovation and intervention over a wider geographic area (Boselie *et al.*, 2009). Scaling-up interventions to spread benefits ensure that the required materials are available and accessible. Investments and activities that improve prospects for scaling-up include: (1) Effective management of technology adaptation; (2) Proactive strategic research to

accommodate bottlenecks created by success; (3) Deliberate cultivation of relevant strategic partnerships', emphasizing crucial operational partners; (4) Deliberate development of new markets that are sensitive to consumer tastes, and (5) Careful monitoring and assessment of impacts (New Growth International, 2009).

Scaling-up also refers to the diffusion and dissemination of locally successful innovations to a wider stakeholder group (Gordijn, 2005). The attributes of innovations that affect their ease and speed of diffusion include visibility, lack of complexity, divisibility, relative advantage (Rogers, 1995). Scaling-up requires mobilization of adequate human and material resources to replicate a model and also additional organization and finance to facilitate, channel and control the flow of information, goods and services efficiently and effectively (Davis, 2006). Farmer-led FFS have been a common strategy for scaling-up FFS interventions and for cost reduction in Asia and Africa (Asian Productivity Organization, 2006;Braun & Duveskog, 2010).Scaling-up is driven by market forces, informal social structures, or other organizations and may increase the number of tea producers or area under tea production. It may also improve governance of FFS groups, stakeholder participation, and extension service provision (Eicher, 2007). The emergence and expansion of FFS Networks has been attributed to the "foci model" that was used to establish FFSs in East Africa, in which successive FFSs are established in the immediate neighborhood of existing ones in order to form a cluster. This enhances the frequency of interaction, experience sharing and horizontal flow of information among the different groups and reduces the cost of implementing collective activities because the different FFSs are able to procure inputs and market their produce in bulk (Braun & Duveskog, 2010).

As a result of FFS up-scaling, hundreds of thousands of rice farmers in China, Indonesia, Philippines and Vietnam have been able to reduce the use of pesticides and improve the sustainability of crop yields. The FFS has also produced developmental benefits that are broadly described as 'empowerment (Braun, 2006, Gallagher *et al.,* 2006: Here FFS alumni are involved in a wide-range of self-directed activities including research, training, marketing and advocacy in a number of countries (Bartlett, 2005).

For example, in Western Kenya in 2000, over 85% of the FFSs graduates continued to meet with self-financing thereby enhancing the development of autonomous networks of the FFS graduates (World Bank, 2004). The objectives of these networks were (1) to facilitate a

linkage of field schools to relevant stakeholders; (2) promote the FFS extension concept that promotes farmer exchange visits and on-farm experimentation; (3) promote self-reliance of FFSs and individuals through income generating activities, marketing, and encouraging group and individual farming; (4) monitor and regulate FFS practitioners and stakeholders through recruitment of potential field schools; and (5) provide a forum for member farmers' field schools for exchanging their experiences on farming (seed quality, diseases and insect pests outbreaks, storage, and prices of produce and inputs). It is possible to scale- up the FFS approach to many farmers by deploying FFS-trained farmers to train other farmers (Bunyatta *et al.,* 2006). Active collaboration with, and involvement of, stakeholders in all FFS activities improve the efficiency and effectiveness of up-scaling (Braun *et al.,* 2006).

2.5Strategies for Scaling up

There are three models or strategies for scaling-up technology innovations, which include (1) Spontaneous scaling-up and out; (2) Scaling-up and out after achieving initial local success; and (3) Development of scaling plans at project inception. Scaling-out is horizontal spread while scaling-up and out implies adaptation, modification and improvement - not just replication - of particular technologies and techniques but more importantly of principles and processes. Scaling-down involves replication of whole programs not just technologies or principles or processes by breaking them down into smaller programs or projects to facilitate planning, implementation and accountability at lower levels (Eicher, 2007). The availability of external funds or the capacity of the organization to access external funding has an influence on the choice of strategy. If core and unrestricted funding is available then it can plan to scale up from the start. If funding is contingent to demonstration of impact, then the initiative is scaled up once successful. If funding is not expected after the initial support for one reason or another, the tendency is to let the innovation scale up on its own in spontaneous diffusion (World Bank, 1999).

2.6 Benefits, Costs and Opportunity Costs of FFSs

The benefits of FFSs include facilitating collective action, leadership, organization, increased income and productivity, knowledge gain among farmers, empowerment and improved problem-solving skills (Glendenning, 2010).Through the FFS, farmers experience the benefits of better farm husbandry like increased yields and discuss social issues such as gender, empowerment or prevention and control of HIV/AIDS. This system, add, has effectively been used in Kenya to teach farmers how to minimize the problems of land

degradation - characterized by bare ground, gullies, wanton destruction of vegetation, and poor farming practices. Mwangi *et al.* (2010) these problems still threaten food production where poverty and farmers' inability to generate income impact negatively on the population. The FFS system is known to be more expensive than the traditional extension model in which one extension provider serves farmers via radio and newspapers. However, it is unclear whether the FFS yields higher returns to pay for its added cost and whether it can be financed locally after foreign aid is phased out. Studies involving over 610 FFS projects in Sri Lanka (Tripp, *et al.,* 2005) show that FFS is an attractive model for learning. FFS-trained farmers in the study sites reduced the number of insecticide applications by 81%, FFS is practical, widely applicable, follows a well-defined curriculum and can capacitate smallholders to become experts in applying farm technologies through practical, field-based learning (Van den Berg & Jiggins, 2007). Furthermore, courses taught can be counted and enthusiastic participants can be relied on to justify the method. But its cost effectiveness is not yet well established.

Empowerment - an essential feature of the system - is aimed at high and sustained production as well as environmental conservation and it is this component rather than adoption of specific techniques that produces many of its developmental benefits. During the learning process farmers observe and reflect on the merits and demerits of a technology before making informed decisions on whether or not to adopt it (Muller *et al.,* 2010). Van den Berg and Jiggins (2007) indicate that most FFS impact studies concentrate on measuring immediate impacts such as the effects of insecticide use on crop yields but not on estimating medium- and long-term impacts such as developing social capital to build producer organizations. The opportunity cost (income forgone) of farmers attending weekly or bi-weekly or monthly FFS meetings, they say, should be considered as a cost issue. But this is not easy because participants' socio-economic status is not always the same. According to their research work in Mali, a farmer's opportunity cost of attending (the classical FFS for annual crops)14-20 weekly sessions on cotton was US$20, which should be included in cost-benefit calculations. The FFS costs between US$ 16 and US$ 47 per farmer served for each cycle or season (Eicher, 2007).

According to Van den Berg and Jiggins (2007) the cost of conducting a season-long field school for 25 farmers has ranged from U$150 to U$1,000 depending on the country and the organization. In some cases, the graduates of FFS have saved U$40 per hectare per season by

eliminating pesticides without any loss of yield. In other cases, graduates did not experience any savings because they were not previously using any pesticides, but yields increased by as much as 25% as a result of adopting other practices learnt during the FFS, such as improved varieties, better water management and enhanced plant nutrition. In Kenya, the achievement of FFS on tea producers is yet to be established.

2.7Factors Influencing Scalability

Participation in FFSs can make farmers more efficient and self-reliant managers of their scarce agricultural resources because of FFSs' potential to give farmers the practical knowledge and skills they need to operate more effectively in a market-oriented agricultural system (Muller, Guenat & Fromm, 2010). FFSs are becoming increasingly popular for out-scaling technologies in Kenya. Farmers are influenced to join FFS by factors such as group structure, lifespan and organization, fears and expectations, group size, technology type and side activities and networking / linkages with other partners (Wanyama *et al.,* 2007). They are also influenced to join, say Wanyama *et al.*(2007), by a group's social capital, facilitators' expertise, land tenure system, ethnicity, a farmer's wealth status and membership to a farmer group and type of technology, income generating activities and benefits accruing from FFS activities and networking. Scaling up strategies should be included in the technology development process or at project proposals stage (De Jager, 2009).

2.8Costs of Up-scaling Farmer Field Schools

Sustainability of the FFS networks can be enhanced by reducing the costs of scaling-up FFS which include training expenses for extension workers and lead farmers and input expenses for running the FFS. According to Braun and Duveskog (2010), reduction may be achieved by:

(1) Encouraging FFS graduates to undertake training of farmer-trainers (TOFT) and subsequently having them train other farmers, which would reduce FFS dependence on official funding. Farmer-to-farmer field school training is a suitable alternative for multiplying FFS coverage, with the sustainability of the overall field-school approach resting on the spread and effectiveness of farmer-led schools training of farmers as facilitators of new FFS. (2) Relying on informal farmer-to-farmer diffusion of the knowledge gained from FFS. (3) Financially supporting operations of FFS Networks through monthly or annual subscription fees. (4) Charging interest on revolving funds, commissions on bulk network sales, registration fees, fines or penalties, donations and grants, shares from FFS members

and profit from sales of farm inputs. (5) Operating a revolving loan that would generate more funds to cover operations and fund more activities. (6) Operating commercial and production plots alongside FFS learning plots as done by FFS women groups in Western Kenya. Such commercial plots allow the groups to raise funds and become self-financing in their activities and can be institutionalized in the FFS so that FFS are largely self-financed from the outset of programs. (7) Strengthening and promoting careful pre-FFS selection of sites and participants and post-FFS support.

2.9Sustainable Tea Production

Sustainable agriculture, according to KTDA(2004)**,** is farming in a responsible manner while enhancing profitability, well-being of the people and the environment for now and the future.Therefore sustainable agriculture addresses environmental and social concerns, but also offers innovative and economically viable opportunities for growers, labourers, consumers, policymakers and many others in the entire value chain. Concerns about sustainability focus on the necessity to adopt technologies and practices that do not have adverse effects on the environment, are easily accessible to and effective for farmers, can lead to improvements in food productivity and have positive side-effects on environmental goods and services (Pretty *et al.,* 2008). Going "sustainable" will transform the tea industry, which has been suffering for many years from oversupply and underperformance.

There has been a growing consumer demand for ethical consumption of food products and most consumers in the West are looking for a guarantee that the tea they take has been ethically produced-under good working conditions for workers, support for the most vulnerable producers and adherence to environmental conservation among other ethical standards of production and marketing. Ethical considerations increasingly dictate food purchases with consumers increasingly prepared to pay more for guarantees of fair labour practices and sustainable sourcing. Growing consumer awareness has been the engine of this change with food companies, beginning to realise that tapping into ethical consumerism makes good business sense. This has led to adoption of certification schemes through third party bodies that guarantee quality based on set standards in the tea value chain.

2.10Quality Assurance and Certification Initiatives through Rainforest Alliance

Many manufacturers are looking into certifications that have some communication value to the end consumer, such as Rainforest Alliance and other schemes. Rainforest Alliance is one

of the quality assurance and certification initiatives started in the tea sector to guarantee quality to consumers and to ensure corporate social responsibility. Other initiatives are, Ethical Tea Partnership (ETP), UTZ certified and Fair Trade (FLO and IFAT) among others (De Jager *et al.*, 2009). Rainforest Alliance, launched in the USA in 1987, distinguishes itself by explicitly focusing on the Sustainable Agriculture Network (SAN) principles. Issues addressed range from water pollution biodiversity, soil and waste management, wildlife protection to pesticide use.Rainforest Alliance (RA) certification - built on the three pillars of sustainability (environmental protection, social equity, and economic viability) - promotes and guarantees sustainable use of agricultural and forestry resources. But because no single pillar can support long-term success on its own, farmers are assisted to succeed in all the three pillars, ranging from protecting wildlife to providing a safe working environment.

The RA independent seal of approval ensures that the goods and services are produced in compliance with strict guidelines that protect the environment, wildlife, workers and local communities. To achieve RA certification strict health and safety principles such as working hours, rest periods, provision of safety equipment and sanitary facilities must be adhered to (Clement, 2011).By announcing its commitment to procure all its tea from Rainforest Alliance Certified farms by 2015, Lipton gave farmers a clear incentive to learn about sustainability and the certification process. Tea from KTDA factories, with RA certification, usually meets the required consumer taste and standards. The certification process enhances factory improvements in terms of improved safety, waste management, chemical storage and protective clothing.

The Rainforest Alliance according to Farming Matters (2009), plans to work with the 218,000 members of the KTDA - an association of small tea farmers - to ensure that large estates are not the only beneficiaries of RA certification. The RA programs targets to certify 3-18% of the World's tea, coffee and bananas, among other commodities (Clement,2011). The Alliance requires farmers to protect the natural forests within their jurisdiction and to plant indigenous trees to boost forest cover. It obligates farmers and factories to produce tea ethically by avoiding child labour and protecting the health of farm workers at farm and factory levels.

In order to meet the rapidly growing interest in Rainforest Alliance Certified tea, farms in Kenya, Tanzania, Indonesia, India and Argentina have started to implement the Sustainable

Agriculture Network (SAN) Standards, which have the potential to improve the livelihoods of nearly one million tea workers in Africa and of up to two million people around the world (Rainforest Alliance, 2010).RA Certification enables a factory affiliated to KTDA access some niche market, to sell its processed tea at a premium internationally and to channel the increased earnings to smallholder producers who supply it with tea. Rainforest Alliance according to Ommen (2009) provides certification to both large-scale plantations and small farmers and also offers a market-based premium for farmers.

2.11Theoretical Framework

The educational theory guiding this study is drawn from the farmer-empowering, non-formal; adult education concepts that constitute the four elements or stages of Kolb's Learning Cycle. The stages include (1) Concrete Experience, (2) Observation and Reflection, (3) Generalization and Abstract Conceptualization, and (4) Active Experimentation (Opondo *et al.,* 2005).Kolb's theory integrates individual learners' approaches to perceiving and processing information. Learners' perceptual modes range from feeling to thinking (A concrete experience versus abstract conceptualization) while internalization range from doing to watching, (active experimentation versus reflective observation. A learner in the concrete experience mode is an activist who perceives by intuition, focusing on personal feelings in the immediacy of the moment. FFS members with concrete experience tend to make decisions based on personal responses to the facilitator and their fellow group members. Firsthand observations or experience in group work may necessitate FFS members to become familiar with each other. Individual problem-solving situations may need training in translating problems into concrete terms, in order to make applications to real life. The learners at abstract conceptualisation stage use logical analysis and can solve problems systematically (Kolb, 1985). In group work, abstract conceptualization focuses on how practical exercises and experiments connect to problem solving. Learners in FFS often categorize problems into groups and derive systematic solutions.

Through active experimentation, they process information, appreciate opportunities to work actively on well-defined tasks and value getting things done. In FFSs, these learners prefer hands-on activities and discussions over traditional lectures. In the trial group work, they prefer to be assigned active tasks and to accomplish visible results. In individual problem solving, active experimenters enjoy the risk-taking component if it is connected to problems that have a practical focus and real-life situations. In reflective observation, learners use

watching and listening to create ideas that integrate their observations into logically sound theories. These learners see the validity of different perspectives (Kolb, 1985). In FFSs, they prefer lectures where they can listen to theoretical information without direct involvement. In experimental group work, they tend to consider the opinions of other group members and to integrate these concepts with their own perceptions. In individual problem solving, these learners are prone to devise structured plans of action based on theoretical formulae and previous experience, grouping the problems by type (Manuel London Review, 2011).

In this study, all the exercises performed in an FFS apply Kolb's learning cycle in the way that farmers use concrete observations to reflect on experiences and from there conceptualise the learning points on which actions are defined. Action learning which is based on the notion that people learn most effectively when working on real-life problems occurring in their day-to-day work setting as is case in FFS when farmers engage in action oriented group experimentation brings experiential learning a step further with its focus on actions as outcome of the learning process (Duveskog, 2006).But as FFS implementation is being up-scaled in Africa, stakeholders including donors are increasingly concerned about the system's applicability, targeting, cost-effectiveness, and impact (Davis *et al.*, 2010).

2.12Conceptual Framework

Kolb's theory was used toinform the process of scalability of FFS and RA certification on sustainable tea production among small-scale farmers in KTDA factories west of the Rift Valley as shown in Figure 1.The up-scaling in FFS and RA certification together with the trainings therein are a continuous learning as it relates to technological, economic, and organizational changes for the small-scale farmers and for the stakeholders in the tea value chain. This study had four independent variables, which included the scalability of RA certification and FFS, trainings in RA certification and FFS, factors explaining RA certification and FFS up-scaling processes' and costs, benefits and opportunity costs of FFS trainings.

The study had one dependent variable namely the sustainable tea production among small-scale farmers in KTDA factories measured in terms of increased yields, soil, water and environmental conservation practices and pesticide user protection (Unilever, 2010). Figure 1 shows the interaction of the independent variables in association with other (moderator) variables influencing and affecting the dependent variable. As the scalability of RA

certification and FFS continues and the trainings are intensified the small-scale producers are expected to adopt GAPS leading to sustainable agriculture in tea production.

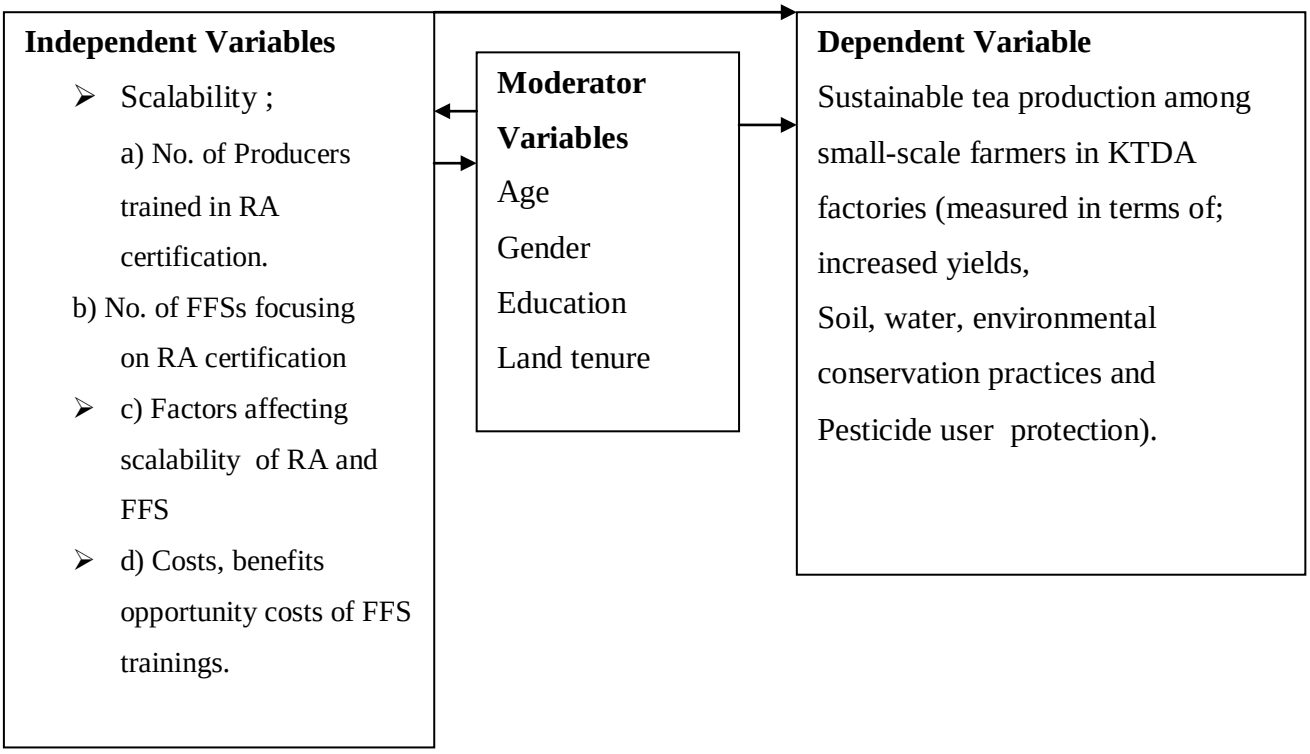

Figure1.A conceptual framework for sustainable tea production in KTDA factories.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research design, the study location, population, sampling procedure and sample size. It also covers instrumentation, data collection and data analysis.

3.2 Research Design

A research design is a plan for obtaining required information with sufficient precision or for testing hypotheses. According to Dictionary.com (2009) it aims to reduce ambiguity in a particular study. A Cross-Sectional Survey Design, which Mosby's Dental Dictionary (2008) says, is the scientific method for collecting and analyzing data was used to collect both qualitative and quantitative data from smallholder tea producers. This design was relatively faster and inexpensive compared to other designs because it allowed for hypotheses testing and provided self-reported facts about respondents, their inner feelings, attitudes, opinions and habits (Kombo & Tromp, 2007; Kothari, 2008). The design enabled the researcher to make accurate assessment, inferences and relationships of phenomenon, events and issues (Kasomo, 2006). Collecting data from a specific population at one point in time minimized chances for attrition.

3.3 The Study Area

The study covered KTDA factories located west of Kenya's Rift Valley. The factories were spread across Kericho, Bomet, Nandi, Nyamira and Kisii counties.These areas are characterized by a cool, wet climate with tropical red loam to volcanic soils. The altitude range between 1500 and 2250m above sea level and rainfall ranges between 1200 to 2500mm annually. Temperatures range from 12^{o}C to 25^{o}C. The main clones of tea grown is *Camellia sinensis* TN/14/3, 31/8, 51/10, SFS/150, 6/8, 303/577, BB35, 15/10 (KTDA, 2004).

3.4 Target Population

The target population comprised of all KTDA smallholder tea producers who deliver green leaf tea to KTDA factories who had participated in the FFS pilot projects that were implemented between 2006 and 2010. The study targeted factories west of the Rift Valley among 54KTDA factories and focused on FFS and RA certification**.**

3.5 Sampling Procedure and Sample Size

Stratified random sampling method based on administrative regions, factories and the category of scalability (FFS and RA or FFS only) was used to sample 260 tea growers. Stratified random sampling provided greater precision, guarded against an "unrepresentative" sample and was less costly (Kothari, 2008).Data were collected from FFS-trained farmers and farmers who were RA trained. An effort was made to ensure gender parity among the respondents.

3.6 Instrumentation

A semi-structured questionnaire developed by the researcher was used to collect data from FFS-trained and RA certified farmers and farmers who delivered tea to the 19 factories. The closed-ended questionnaire was chosen because of its potential to facilitate consistency of responses across respondents. The items on the questionnaires were based on the objectives of the study and covered issues related to up-scaling both FFSs and RA certification.

3.6.1 Validity

Validity is the accuracy, soundness or effectiveness with which an instrument measures what it is intended to measure. It refers to the appropriateness of the interpretation of the results of a test or inventory and is specific to the intended use. The findings of a study are valid if they are based on facts or evidence that can be justified (Wiersma, 1999). Validity is the degree to which results obtained from the analysis of data actually represent the phenomenon under study (Fraenkel &Wallen, 2000). Content validity refers to how representative the items on the instrument are in relation to the content being measured (Kathuri & Pals, 1993). Face validity refers to the appeal and appearance of the instrument. In this study the items in the instrument were first discussed between the researcher and the supervisors, who provided their expertise and ensured that the instruments measured what they were intended to measure as recommended by Kumar (2005). This was further ascertained by a panel of extension experts or scientists drawn from ETC-East Africa as well as Egerton and Wageningen Universities. The panel ensured that the items adequately represented concepts that covered all relevant issues under investigation, which complied with the recommendations of Mugenda (2008).

3.6.2 Reliability

Pilot-testing of the instrument was done in Kapsabet Division of Nandi County because it was within the tea growing zone and fell in the same region as the study area. The farmers' characteristics in this area were similar to those in the study area. Thirty respondents were used in the pilot-test. Pilot-testing procedures were the same as those used during the actual data collection as recommended by Mugenda (2008). The pilot-test data produced a Cronbach's reliability coefficient of Alpha(α) = 0.92,which was way above the minimum acceptable $\alpha = 0.7$as recommended by Fraenkel and Wallen (2002) and Mugenda (2008).

3.7 Data Collection

Authority was sought from the Board of Graduate School of Egerton University to carry out the study. This was followed by securing of a research permit from the National Council of Science and Technology. Available and useful information relevant to the study was obtained through document analysis. The researcher used a self-administered questionnaire to collect data from well-educated smallholder tea producers and face-to-face interviews from respondents with inadequate writing skills.

3.8 Data Analysis

Data collected was cleaned by checking the filled questionnaires for completeness, sorting and filtering, and developing a coding system in relation to the objective areas of the study. Coded data was then entered into the computer and analyzed with the aid of a computer programme, the Statistical Package for Social Sciences (SPSS). Analysis was done at significance level α=0.05.Objective 1, 2,3and 4 were analyzed statistically using Pearson Product Moment Correlation (PPMC) (Table 1) while data from objective 5 and 6 were analyzed by determining the percentages of farmers who consider the factors described in the questionnaire being critical to up-scaling and expressed in frequency and percentage distribution tables.

Table 1.
Summary of Data Analysis

Hypotheses	**Independent Variable**	**Dependent Variable**	**Statistical procedures and tests**
H_{01} Scalability of RA certification has no statistically significant relationship with sustainable tea production among small-scale tea producers west of Rift Valley.	Scalability of Rainforest Alliance certification	Sustainable tea production among small-scale tea producers	PPMC, Chi Square
H_{02}Scalability of FFS has no statistically significant relationship with sustainable tea production among small-scale tea producers west of Rift Valley.	Scalability of FFS	Sustainable tea production among small-scale tea producers	PPMC
H_{03}Training on RA certification has no statistically significant effects on small-scale tea producers' livelihoods' west of Rift Valley.	RA certification training	Small-scale tea producers' livelihoods'	PPMC
H_{04}Training on FFS has no statistically significant effects on small-scale tea producers' livelihoods' West of Rift Valley.	FFS training	Small-scale tea producer's livelihoods'	PPMC

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the findings, interpretation and discussion of the findings of the study. The study sought to assess the role of up-scaling Rainforest Alliance certification and Farmer Field Schools on sustainable tea production among small-scale tea producers west of Rift Valley. The chapter is discussed under sub- headings; questionnaire return rate, background of the respondents; scaling-up of Rainforest Alliance certification and FFS; effects of RA certification trainings and FFS on small-scale tea producers livelihoods; critical factors explaining how RA certification and FFS up-scaling processes work and the costs, benefits and opportunity costs of RA certification and FFS trainings on sustainable tea production. Then finally the challenges faced by Farmer Field School members in the process of Rainforest Certification

4.2 Questionnaire Return Rate

Two hundred and sixty questionnaires were administered. There was 100% return rate due to the fact that the questionnaires were administered by the researcher in person who, after administering the questionnaire, waited for the respondent to complete and collected immediately.

4.3 Background of the Respondents

Under this section, the respondents' age, gender, level of education, marital status and land tenure are discussed. These personal variables were relevant to the study since they have an influence on the respondent's ability to effectively apply knowledge of sustainable tea production.

4.3.1 Distribution of Respondents by Age

Age as a moderator variable was investigated as it influences farm level decisions that underlie empowerment such as membership to farmer groups and leadership roles and participation in social networks (Taiy, 2009). Sustainable tea production is also a knowledge demanding business and essentially requires modern knowledge of management as well as flexibility on the part of the farmer. The respondents were asked to state their year of birth. Their responses were used to calculate their age and categorized into age classes to facilitate easy classification and analysis of the information. The findings (Figure 2) show that 9%

were 20-30 years old while31% of the FFS members were aged 41-50; 24% were 31-40 years of age; 21% were aged between 52-60 years; 15% were over 60 years. The mean age was found to be 42 years with a standard deviation of 18. This indicates that a combined majority of the FFS members (71%) were in their middle ages and therefore suitable as labourers in tea production and capable of effective decision making with respect to sustainable production criteria and options.

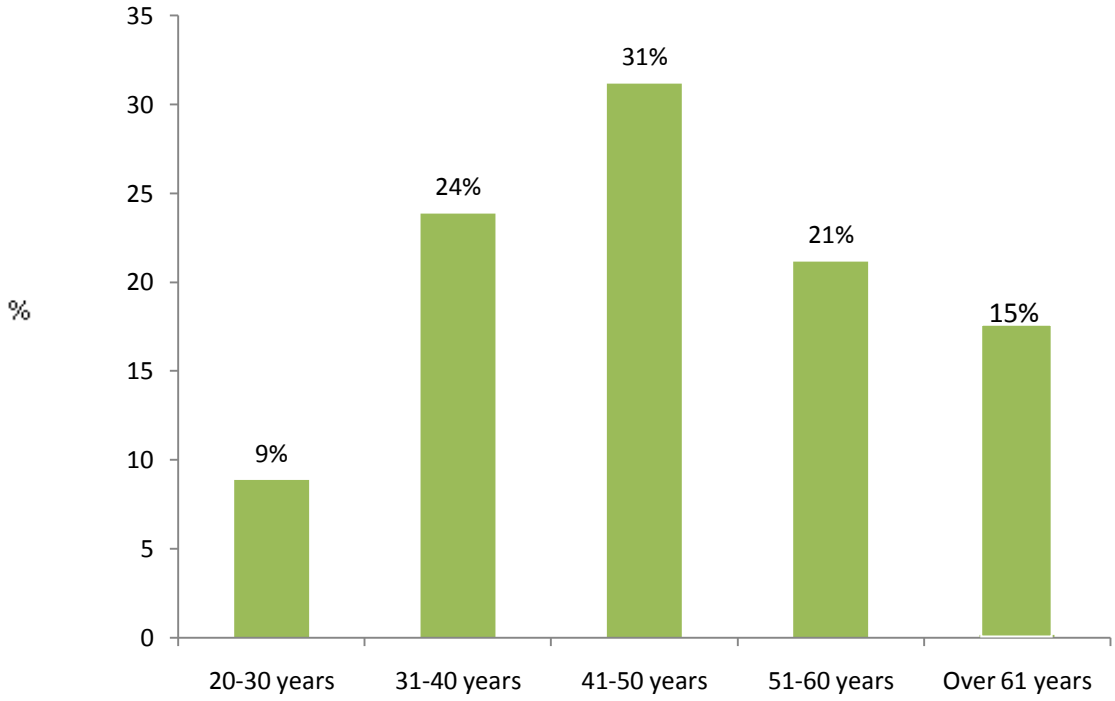

Figure 2. Respondent age distribution

4.3.2 Distribution of Respondents by Gender

Farmers require access to infrastructure services, information, credit, and other business development services in order to capitalize on new market opportunities along changing or Emerging value chains but, Agricultural policies need to support especially women's involvement in innovations systems and to revitalize women's groups and networks to be competitive, visible, and recognized. New and revitalized technology and management practices, social and organizational innovations are required to explicitly engage women to unleash their potential as critical actors in shaping innovation system (Riisgaard *et al.*, 2010). Over 76% male smallholders and 24% females (Table 2) were interviewed. The high percentage of male respondents is a reflection of their control of land as a production

resource as well as control of farm enterprises that involve cash crops such as tea as is generally the case in the African context. As household heads, men have a bigger stake in decision making and therefore dominate access to and utilization of land hence there greater access to extension services.

Table 2.

Distribution of Respondents by Gender

Gender	Frequency	Percentage
Male	199	76.5
Female	61	23.5
Total	260	100.0

4.3.3 The Respondents' Education Level

Education level of the respondent represented the level of formal schooling completed by the respondent at the time of the study. Education enables an individual to receive and utilize new ideas and approaches without any difficulty and to rationally apply the knowledge gained to improve productivity. The education level of the respondent would influence the effectiveness of RA certification training and knowledge gained from FFS on sustainable tea production. The respondents were therefore asked to indicate their highest level of education at the time of the study, Figure 3shows the results. The findings showed that the literacy level was very high, with 28% had primary; 55% of the respondents having secondary school education; 12% had college and 1% had University education.

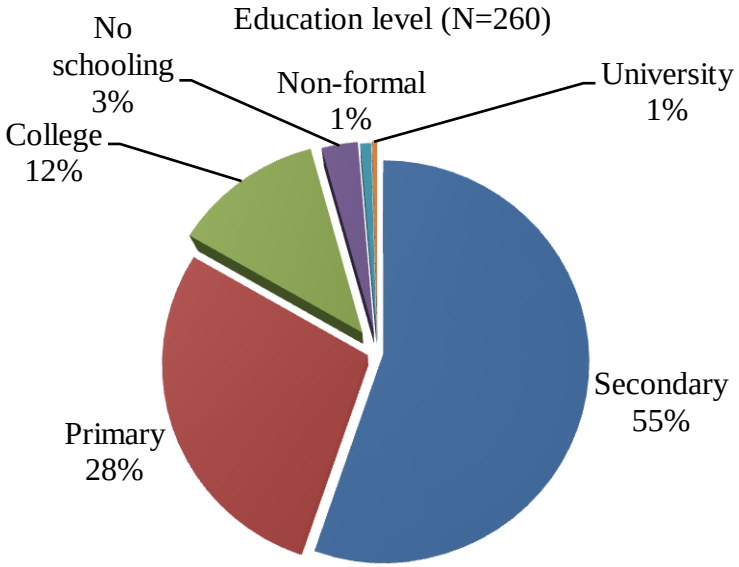

Figure2. The respondents' education level

4.3.4 Respondents' Marital Status

The respondents were asked to indicate their marital status. Marital status has an influence on decision making over land use and participation in socio-economic networks.Figure 4 shows the distribution of respondents by marital status.The findings indicate that 88%were married, while 6% in each case were either single or widowed. Marital status was found to be significant with scalability of FFS and RA certification. Marriage ascribes familial responsibilities to farmers and therefore farmers become more serious in terms of their participation in social-economic networks that would give them access to more income to meet these responsibilities.

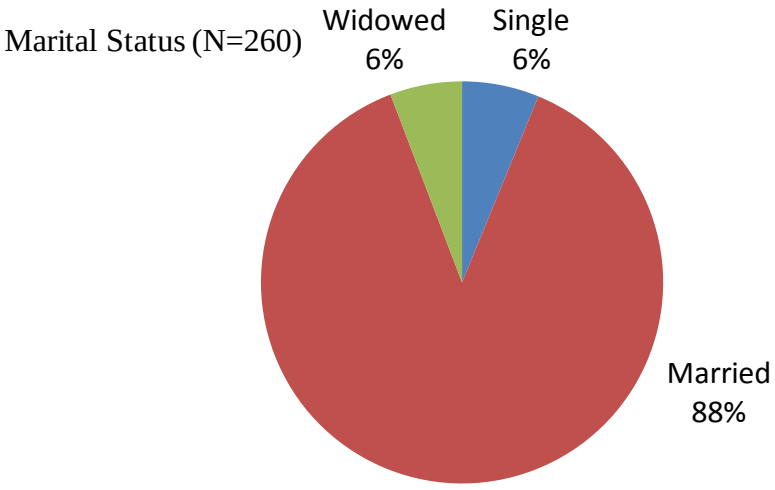

Figure 3.Respondents' marital status

4.3.5Distribution of Respondents by Land Tenure System

Land tenure system was classified as individual, family or hired. Table 3shows the results. The findings indicate that majority of the respondents were operating under either individual land tenure (52%) or on family land (42%). Only 7% were producing on hired land. Land tenure determined the level of investment into land by the farmer and therefore the farmers' willingness to undertake conservation measures especially those attributable to RA certification. Absolute ownership guarantees and acted as an incentive for farmers to participate in processes that had long time bearing on production processes such as RA certification and FFS trainings. Land tenure was found to have a significant relationship with sustainable tea development. Investments such as planting of indigenous trees and construction of conservation structures in the farm and those RA principles require that the farm belongs to the individual or family.

Table 3**.**

Distribution of Respondents by Land Tenure System

Land Tenure System	Frequency	Percentage
Individual	133	51.2
Hired	18	6.9
Family	109	41.9
Total	260	100.0

4.4 How Kenya Tea Development Agency Factories Attain Rainforest Alliance Certification

KTDA used the concept of lead farmers as a parallel system to hasten RA certification outside the Farmer Field Schools, though they were entry points for training tea growers on sustainable farming and RA certification, since RA certification deals with all the farms. One lead farmer trains 300 tea growers. Lead farmers are trained for only three days as TOTs. They sometimes give some conflicting recommendations yet farmers must understand, implement and comply 100% with the critical criteria of SAN standards. There is no curriculum for training lead farmers. Lead farmers also lack a training guide for training tea growers. The use of tea buying centres as training venues for RA certification by lead farmers is limiting because only 30% of tea farmers visit the buying centres.

First, a client or a factory company contacts a member of the SAN or a regional Rainforest Alliance office. The RA staff/office arranges a pre-assessment of the farming activities, identifies the strengths and weaknesses of the operation and outlines the corrective actions needed to ensure compliance of production and management practices with SAN standards. An audit report is prepared by an independent and voluntary committee of experts; on which basis the SAN International Assessor Committee makes a decision whether or not to award the certificate of compliance. Applicants whose farming activities fail to meet RA certification requirements are encouraged to reapply for certification after implementing corrective actions. Once the standard requirements are met and the certificate has been delivered, the Rainforest Alliance Certified seal may be used on the final products at the point of sale (Sustainable Agriculture Network, 2011).

In order to obtain and maintain the certification status during SAN group audits, the group administrator must comply with all critical criteria of the SAN Group Certification Standard. These standards are identified with the text “Critical Criterion” at the beginning of the

criterion. Any group administrator who fails to comply with a critical criterion cannot be certified even if he or she has met other certification requirements. To be audited and certified during the second certification cycle onwards, farmers must meet at least 50% of the criteria of each principle, at least 80% of all criteria of this standard at the first certification audit (Year 1); at least 85% of all criteria of this standard at the second (first annual) audit (Year 2); and at least 90% of all criteria of this standard at the third (second annual) audit (Year 3). In order to obtain and maintain certification during member farms' compliance, the group administrator must ensure that all member farmers comply with the SAN certification requirements (including the scoring system) defined in the Sustainable Agriculture Standard.

The group administrator must create an annual risk identification and assessment for compliance with Sustainable Agriculture Network standards aiming for continuous improvement considering no less than internal inspections, external audits, new group members, farm production, chain-of-custody, compliance costs and performance of the internal management system. The group administrator must implement measures to prevent or minimize risks identified in the assessment. The group must have a system for avoiding the mixing of certified products with non-certified products in its facilities, including harvesting, handling, processing and packaging of products, as well as transportation. All transactions involving certified products must be recorded. Products leaving the group as certified must be identified and accompanied with the relevant documentation. The group administrator must establish procedures to ensure that non-certified production is not brought into the group's certified production. Group members must not individually sell their products as certified, however their product can be segregated as a certified product for sale by the group administrator (Sustainable Agriculture Network, 2011).

The SAN's sustainable agriculture standard is represented by the ten guiding principles outlined as:

i. **Management System**- Social and environmental management systems (according to the complexity of the operation)
ii. **Ecosystem Conservation**-Farmers must conserve existing ecosystems and aid in the ecological restoration of critical areas.
iii. **Wildlife Protection**- Certified farms serve as refuge for wildlife, and therefore farmers should monitor wildlife species on their farms. This is particularly important

for endangered species and their habitats on the land, which farmers should take specific steps to protect.

iv. **Water Conservation**-The SAN standard requires that farmers conserve water by keeping track of water sources and consumption. Farmers should have the proper permits for water use, treat wastewater and monitor water quality.

v. **Working Conditions**- Farmers must ensure good working conditions for all employees, as defined by such international bodies as the United Nations and the International Labour Organization. The SAN standards prohibit forced and child labour and all forms of discrimination and abuse.

vi. **Occupational Health**- Certified farms must have occupational health and safety programs to reduce the risk of accidents. This requires that workers receive safety training — especially regarding the use of agrochemicals — and that farmers provide the necessary protective gear and ensure that farm infrastructure, machinery and other equipment is in good condition and poses no danger to human health.

vii. **Community Relations** -The SAN standard requires farmers to be good neighbours and inform surrounding communities and local interest groups about their activities and plans.

viii. **Integrated Crop Management**. The SAN encourages the elimination of chemical products that pose dangers to people and the environment and use every possible opportunity to safeguard to protect human health and the environment.

ix. **Soil Conservation**-A goal of SAN's sustainable agriculture approach is the long-term improvement of soils, which is why certified farms take steps to prevent erosion, base fertilization on crop requirements and soil characteristics and use organic matter to enrich soil. Vegetative ground cover and mechanical weeding are used to reduce agrochemical use whenever possible.

x. **Integrated Waste Management**-Certified farms are clean and orderly with programs for managing waste through recycling, reducing consumption and reuse. Waste is segregated, treated and disposed of in ways that minimize environmental and health impacts. Workers are educated about properly managing waste on the farms and in their communities.

At the factory level, the RA team briefs the factory board on what RA certification is, what it involves and its benefits. The board must make or endorse a resolution to go for RA certification. The RA team carries out a diagnostic audit to assess whether the factories are

complying with the ten RA principles and make a wrap up. The factory extension officers choose the lead farmers who are then trained for a period of three days. Awareness creation and sensitization on RA certification is made to farmers. The RA lead farmers train the farmers for a period of 3-4 days. Through the group administrator, internal farm inspection is carried out to all the farms by visiting each farmer and checking the gap in compliance. Recruitment for PPE is done and internal management system documented. The second internal audit is also done and recommends changes. When the changes are made, the factory applies for certification and Farm auditing by independent auditors is done, the RA team reviews the audit report while the factory confirms the report. The RA team issues the certification and the RA considers the factory as a client.

Rainforest Alliance certification up-scaling is based on a request by the factory company or the buyer can also make a request for a specific factory to be RA certified. There are two types of audits-: compliance and diagnostic audits. A factory applies to the stakeholder that offers RA certification depending on the location of the factory and the number of farmers (factory logistics). The RA trainers organize trainings based on SAN standards to prepare the factory within a period of 6 months. The factory is then audited by a third party and if they pass the audit, they get a certificate.

4.5 The Level of Sustainable Tea Production among the Farmer Field Schools Members

Sustainable agriculture production i1s built on three pillars of sustainability namely environmental protection, social and economic aspects. Therefore social indicators, biophysical and economic measures, represent the broader sustainability picture (Copus & Crabtree, 1996).Rainforest Alliancecertification requires and emphasizes on three levels of sustainability: worker welfare, farm management and environmental protection for sound agricultural practices for key crops. Indicators cover the three aspects of the "people, profit and planet" view of sustainability – such as water, energy, and pesticide use, and biodiversity, social capital, working conditions, workers livelihoods and animal welfare(Millard,2010).

In this regard, sustainable tea production practices were assessed among the respondents, whether they adopted or not the various sustainable tea production practices. This was done to determine and describe the scaling-up of Rainforest Alliance certification and Farmer Field School on sustainable tea production among small-scale tea producers with reference to the

first objective of the study. Sustainable tea production was evaluated based on 40 point index consisting of environmental protection, social aspects and economic viability.

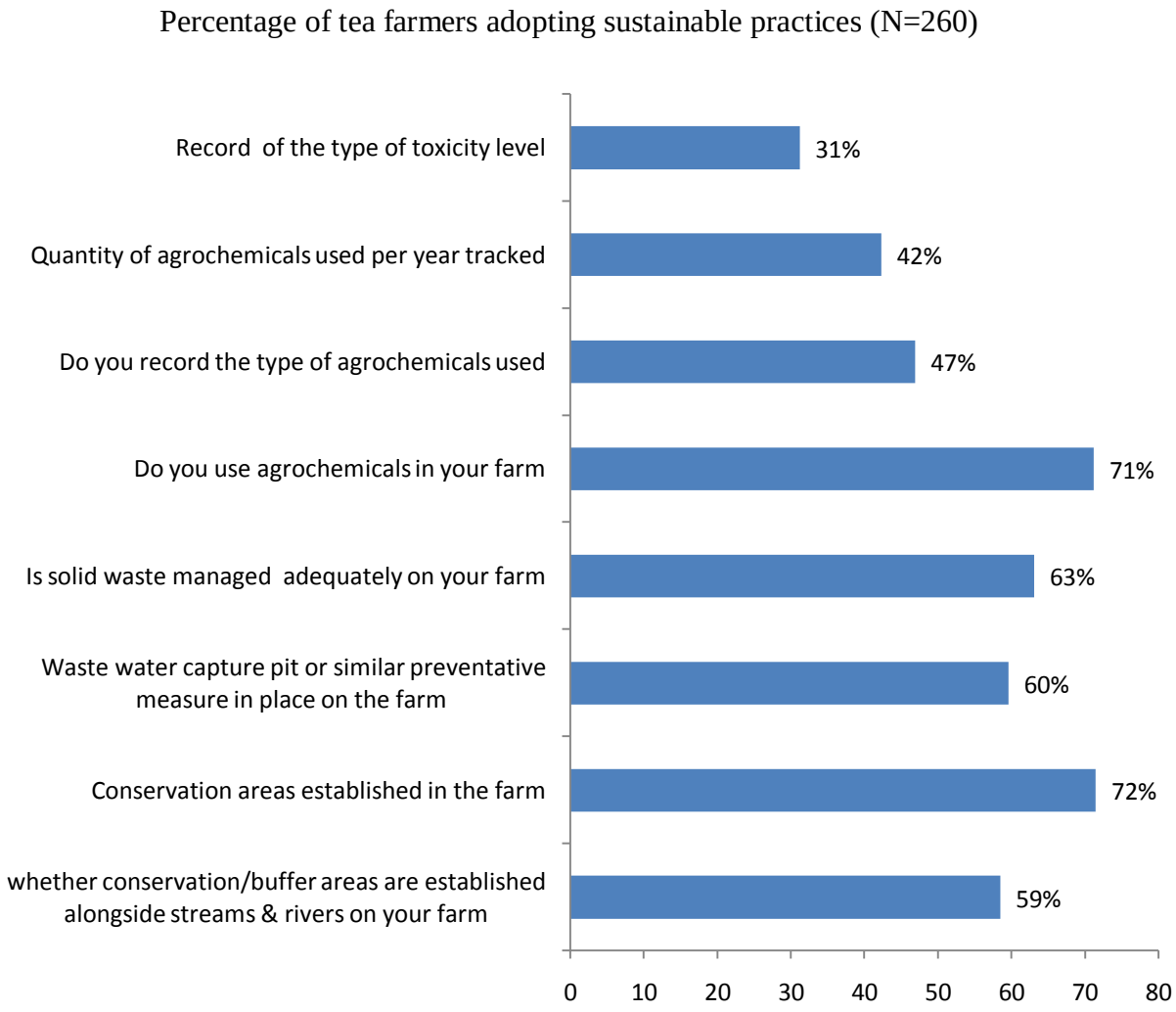

Figure 4. Adoption of sustainable agriculture practices

4.5.1 Environmental Protection

Environmental protection was evaluated as the practical application of sound environmental protection practices by the respondent farmers. To assess the application of these practices, an index with 10 environmental protection practices was adopted. Scores were assigned as per the responses received where 1 was for adopted practice and zero score for non-adopted practices. For descriptive analysis, three categories, i.e., low, medium and high were adopted. Since the total score for each respondent ranged from 0-10, the respondents were categorized into Low (0-4), Medium (5-7), and High (8-10). The total score was used for further correlation analyses. A significantly larger proportion of farmers who were RA certification trained (53%) scored highly in environmental protection compared to only 5.1% of those who

had not been trained in RA certification. Similarly, majority of those who were not RA trained 89.7% had low score in environmental protection compared to 12.2% of RA certification trained farmer. The finding suggests that RA certification training confers knowledge and skills on environmental protection.

Table 4.

Rainforest Alliance Certification Training and Environmental Protection (N=260)

			Environmental Protection			Total
			Low	**Medium**	**High**	**(n)**
No. trained on RA certification	Yes	Frequency	(27)	(76)	(118)	(221)
		%?	12.2	34.4	53.4	100.0
	No	Frequency	(35)	(2)	(2)	(39)
		%?	89.7	5.1	5.1	100.0
Total		Frequency	(62)	(78)	(120)	(260)
		% No. trained on RA certification	23.8	30.0	46.2	100.0

The results in Table 5 revealed that there was significant relationship between RA certification and environmental protection (Chi-square value = 109.7, df = 2, $p < .001$).The p value (.000) which is <001indicates that there is a relationship between RA certification and environmental protection.

Table 5.

Chi-Square Tests for Rainforest Alliance Certification Trained and Environmental Protection (N=260)

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	109.7	2	.000
Likelihood Ratio	95.9	2	.000
Linear-by-Linear Association	80.4	1	.000
N of Valid Cases	260.0		

4.5.2 Social Aspectsas a Pillar of Sustainability

Measurements of sustainability include considerations of social issues. The significance of social sustainability as a component of the sustainability equation has been recognised in the agricultural sector in particular. An understanding of social sustainability can assist planning and policy development as the human and physical environment is interconnected (Afrous & Abdollahzadeh, 2011).Social sustainability was evaluated as the social benefits/gains and linkages that accrued to the farmer as a result of RA Certification training. To assess these

benefits, 5 indicators (empowerment, public health, and linkage, networking with other groups, membership to a federation and access to water)were adopted with an index of 15 points. Scores were assigned depending on whether the respondents selected Poor (1 point), Good (2 points) or Very Good to Excellent (3 points) for the indicators and depending on whether the farmer was trained on RA certification. For descriptive analysis, three categories, that is., Low, Medium and High were adopted. Since the total score for each respondent ranged from 0-15, the respondents were categorized into Low (0-5), Medium (6-10), and High (11-15). The total score was used for further correlation analyses. Table 6 shows the results. The findings indicate that majority of the respondents trained in RA Certification (96%) recorded high scores in social equity compared to 3% and 1% who recorded medium and low scores respectively.

Table 6.
Rainforest Alliance Certification Training and Social Aspects (N=260)

			Social Equity			Total
			Low	Medium	High	
No. trained on RA certification	Yes	Frequency	(1)	(7)	(213)	221
		%	.5	3.2	96.4	100%
	Not	Frequency	(39)	-	-	39
		%	100%	-	-	100%
Total		Frequency	(40)	(7)	(213)	(260)
		%	15.4%	2.7%	81.9%	100%

The results in Table7 indicate a statistically significant relationship between RA certification and social equity (Chi Square value = 252.4, df = 2, $p < .001$).at 99% confidence implying that the differences between the scores are real differences and not due to chance. RA trainings promoted social equity amongst the participating farmers.

Table 7.
Chi-Square Tests for Rainforest Alliance Certification Training and Social Aspects

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	252.4	2	.000
Likelihood Ratio	210.5	2	.000
Linear-by-Linear Association	239.0	1	.000
N of Valid Cases	260.0		

4.5.3 Economic Aspects

Economic dimension usually has an important role in explanation of phenomenon cases, therefore; as was the case with social aspects, economic aspects was equally evaluated as the economic benefits realized by the farmer as a result of RA Certification training. To assess

these benefits, 5 indicators (increased yields, increased savings, marketing of produce, ability to acquire affordable credit and increased ability to pay operation costs) were adopted with an index of 15 points. Scores were assigned depending on whether the respondents selected Poor (1 point), Good (2 points) or Very Good to Excellent (3 points) for the indicators and depending on whether the farmer was trained on RA certification. For descriptive analysis, three categories, That is, low, medium and high were adopted. Since the total score for each respondent ranged from 0-15, the respondents were categorized into Low (0-5), Medium (6-10), and High (11-15) the total score was used for further correlation analyses.Table 8 shows the results, where 99% of RA Certification trained respondents had high economic returns from participation in the trainings compared to only 1% who recorded a medium score.

Table 8.

Rainforest Alliance Certification Training and Economic Aspects (N=260)

			Economic Viability			Total
RA certification			Low	Medium	High	
No. trained	yes	Frequency	-	(2)	(219)	(221)
		%	-	.9%	99.1%	100%
	N0	Frequency	(39)	-	-	(39)
		%	100%	.-	-	100%
Total		Frequency	39	2	219	260
		%Within No. trained on RA certification	15.0%	.8%	84.2%	100%

Table 9 shows The Chi-square test of the relationship between RA Certification training and economic viability. There was a significant relationship between RA certification and economic viability (Chi Square value = 260, df = 2, $p < .001$).

Table 9

Chi-square Tests for Rainforest Alliance Certification Training and Economic Viability

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	260.0	2	.000
Likelihood Ratio	219.8	2	.000
Linear-by-Linear Association	255.1	1	.000
N of Valid Cases	260		

4.5.4 Rainforest AllianceCertification Training and Sustainable Tea Development

Test of H_{01}: *stated that* '*Scalability of Rainforest Alliance certification has no statistically significant relationship with sustainable tea production among small-scale tea producers west of Rift Valley'***

The testing of $Ho_1$was based on the assumption that farmers' involvement in RA certification training gives them skills on sustainable agriculture and increases farm yield. The total scores for all the three components i.e., environmental protection, social aspects and economic viability were added to obtain an index for sustainable tea production. These scores varied from 0 to 40. Using these scores and the number of RA Certification trainings attended by the respondents, PPMC test was conducted to examine whether there was a relationship between RA certification and sustainable tea production. Table 10 shows results

Table 9.
The Relationship between Rainforest Alliance Certification Training and Sustainable Tea Development(N=260)

		Sustainable Tea Production	Number of RA Certification Trainings
Sustainable Tea Production	Pearson Correlation	1	.174(**)
	Sig. (2-tailed)	.	.005
	N	260	260

*** Correlation is significant at the 0.01 level (2-tailed).*

The results in Table 10 indicate a significant and positive relationship (r = .17 N=260, *p*=.005). Implying that sustainable tea production was associated with RA certification training. Therefore, we reject the null hypothesis and conclude that a significant relationship exists between scalability of RA Certification and sustainable tea production amongst small-scale tea producers. The weak relationship can be explained by the fact that the trainings had just been done whereas a time lapse is required before the practices are adopted.

4.4.5 Farmer Field School and sustainable tea development

Test of H_{02}: Stated that '***Scalability of FFS has no statistically significant relationship with sustainable tea production among small-scale tea producers west of Rift Valley'***

The total scores for sustainable tea production and the respondents' experience (in months) in FFS were used to conduct a Pearson Product Moment Correlation test to determine whether there was a relationship between FFS and sustainable tea production. Table11indicate a significant, though weak, positive relationship (r = .22 N=260, *p*=.000) between FFS

experience and sustainable tea production. Therefore, the null hypothesis Ho_2 was rejected implying that there was a significant relationship between scalability of FFS training and sustainable tea production among small-scale tea producers.

Table 10.
Relationship between Farmer Field School and Sustainable Tea Development

		Sustainable Tea Production	FFS Experience in Months
Sustainable Tea production	Pearson Correlation	1	.223(**)
	Sig. (2-tailed)	.	.000
	N	260	260

4.6 Effects of Rainforest Alliance Certification Trainings and Farmer Field School on Small-Scale Tea Producers Livelihoods

Staff members were trained together with all farmers who delivered their tea to KTDA affiliated factories that were undergoing RA certification. FFS members required constant contact with extension services to improve their condition sustainably. This explains the laxity seen from FFS groups that had graduated and their contact with TESAS is reduced substantially. The effects of the RA certification and scheduled FFS fortnightly trainings on the participants' livelihoods were established by testing the Ho_3 and Ho_4 based on the assumption that any positive correlation between the various livelihood changes is a direct indication of the effectiveness of RA and FFS trainings respectively.

To test the null hypothesesH_o3**:** and H_o4, total scores for social equity and economic viability, were added to obtain an index for livelihoods of the respondents. The livelihood index scores ranged from 0-30.Ascore of 0 meant no change while a score of 30 means a change of livelihood was tremendous and positive in relation to the variables for measuring that change in this study.

4.6.1 Effects of Rainforest Alliance Certification Trainings on Small-scale Tea Producers Livelihoods

Test of Ho_3: *Training on Rainforest Alliance certification has no statistically significanteffect on small-scale tea producers' livelihoods' west of Rift Valley.*

A Pearson Product Moment Correlation test was conducted to examine whether there was a significant relationship between RA Certification Trainings and Small-Scale Tea Producers Livelihoods. Table 12 shows the result.

Table 11.

Relationship between Rainforest Alliance Certification Training and Small-Scale Tea Producers Livelihoods(N=260)

		Livelihood	No. of RA Certification trainings
Livelihood	Pearson Correlation	1	.166(**)
	Sig. (2-tailed)	.	.007
	N	260	260

The findings in the Table 12 indicate a significant, though weak positive relationship (r = .17 N=260, *p*=.007). The *p* value (.007) which is < .05 indicates that there is a relationship between RA Certification training and small-scale tea producers' livelihoods at 99% level of confidence that the differences between the scores are real differences and not due to chance. Higher levels of livelihoods were associated with high numbers of RA Certification trainings. The null hypothesis Ho_3 was, therefore, rejected implying a significant relationship between RA Certification training and small-scale tea producers' livelihoods. We conclude that RA Certification training had an effect on small-scale tea producers' livelihoods.

RA certification has potential benefits that could be realized by adopting its requirements and standards. These benefits included: i) provision of binding and verifiable agreements between key actors; ii) strengthening or clarifying of user rights; iii) provision of value-addition and market premium prices for certified products; iv) empowerment of normally disadvantaged stakeholders, especially local communities; v) acting as a catalyst of social reform processes through stakeholder participation and consultation; vi) provision of market niches for specific products or services and vii) encouragement of the establishment of collaborative partnerships and/or global alliances between producers and consumers for the responsible use of forest resources.

From the foregoing findings, RA certification has improved the participants' socio-economic livelihoods through various ways, including increased yields; improvements in marketing of produce; lobbying through farmer networks for better produce prices; improved public health and increased empowerment among other notable benefits.

These findings are consistent with organic cocoa Certification in São Tomé (PAPAFPA.2011), which has been working effectively with large numbers of producers;

effective partnerships: funding, roles and scaling and continuing the development of the organic cocoa chain and developing other agricultural value chains. By the start of this Kaoka case, the certified organic cocoa was selling at 2.5 times the price of common cocoa leading to increased and more secure income through sales and price setting agreements, access to right quantity and quality organic cocoa. Sven *et al.*, (2003) found that certification of non-wood forest products (Organic certification of Brazil nuts in Bolivia, Fair trade certification of sheabutter in Ghana and Organic certification of devil's claw in Namibia) contributed to the empowerment of farmers who are the most disadvantaged stakeholders. They established that certification improved rural livelihoods for Bolivian organic exporters where a farmer's cooperative shared all the extra money received for the organic Brazil nuts exported among all members in equal parts. In Namibia, a high demand for the devil's claw existed, which went hand-in-hand with premium prices, while certification had the potential to reduce poverty and improve livelihoods if consumers and companies would be motivated to pay higher prices for the products in Ghana (Sven *et al.*, 2003).

4.6.2 Effects of Farmer Field Schools on Small-Scale Tea Producers Livelihoods

Test of H_{04}*FFS training has no statistically significant effect on small-scale tea producer's livelihoods' West of Rift Valley.*

A Pearson Product Moment Correlation test was conducted to determine whether there was a significant relationship between FFS experience and small-scale tea producers' livelihoods. Table 13 shows the results.

Table 12.
Relationship between Farmer Field School Experience and Small-Scale Tea Producers Livelihoods (N=260)

		FFS Experience in Months	Livelihood
FFS Experience in Months	Pearson Correlation	1	.200(**)
	Sig. (2-tailed)	.	.001
	N	260	260

The findings in Table 13 indicate a significant, positive relationship (r = 0.2, N=260, *p*=.001).Between FFS experience and small-scale tea producers livelihoods. The null hypothesis Ho_4, that FFS training had no statistically significant effect on small-scale tea producer's livelihoodsWest of Rift Valley was thus rejected implying that higher livelihood levels were associated with long FFS experience.

As earlier discussed, improved livelihood is reflected by a number of indicators ranging from financial to social gains that have potential for elevating the farmers' socio-economic status. These findings supports the work of Tripp *et.al*, (2005) who carried out a survey of FFS in southern Sri Lanka and found that FFS farmers growing rice who adopted FFS knowledge derived from IPM practices were able to reduce the number of applications of insecticides by 81 percent. The reduction in pesticide use not only had a positive contribution to environmental conservation but also reduced the production costs resulting in higher economic benefits.

Formation of farmer networks is both a social and an economic gain. An FAO commissioned study (Braun,*et al.*,2006) reports that Farmer Field School networks emerged in Western Kenya during 2000 as a result of exchange visits and communication between farmers, facilitators, trainers and project staff. These FFS Networks were formed by farmers who graduated from an FFS. FFS farmers' networks, in Western Kenya have been able to build bottom-up producer organizations during and after completion of the donor projects. This self-emergence of FFS networks depicts FFS as an effective approach to organize and empower farmers socially and economically translating to improved livelihoods as reported by Damtie(2009).

In countries across the world, FFS alumni have successfully taken greater control over their lives (Damtie, 2009). In Kenya, Farmer networks and associations have emerged as a follow-up effect of FFS and these units have been successful in breaking manipulative relationships with middle men and there by gained access more lucrative markets for sale of their produce (Global IMP, 2003). FFS graduates are thus able to profitably market their produce and use the proceeds to sustainably improve their livelihoods.

Generally, it is important to note that FFS graduates accrue much more additional benefits that are difficult to quantify in monetary forms. Mwangi and Murgai (2003) reported that FFS graduates gained superior leadership skills and became more cohesive as a group than non-FFS farmers. Leewis and Bruin (1998) reported that FFS offers opportunities for developing effective farmer organizations which are key in developing local opportunities like exploring for markets and value adding of their farm produce, an attribute that is difficult to quantify in financial terms but positively influences the farmers' livelihoods.

4.7 Critical Factors Explaining How Rainforest Alliance Certification and Farmer Field School Up-Scaling Processes Work

The study sought to establish the critical factors that show how the up-scaling process works. These factors were identified through document content analysis and their validity ratified by the respondents. Above87% of respondents (Table 14) indicated that farmers' adapting available technology effectively for tea improvement is the most critical factor in the up-scaling process (These include new varieties, husbandry issues, plucking machines, among others).

Table 13.
Critical Factors that Explain How Rainforest Alliance Certification and Farmer Field School Up-Scaling Processes Work (N=260)

	Freq.	%
Farmers adapting available technology effectively for tea improvement	204	87.5
Developing new markets that are responsive to consumer tastes.	199	76.5
Improving networking with stakeholders who are involved in FFS up-scaling	171	65.8
Reducing success-related challenges through proactive strategic research	166	63.8
Engaging in strategic partnerships with relevant stakeholders	123	47.3
Careful monitoring and assessment of impacts	47	18.1

The findings show that the process should follow the order offarmers adapting available technology effectively for tea improvement (87.5%)followed by developing new markets that are responsive (76.5%) to consumer tastes to careful monitoring and assessment of impacts (18%). Technology development and dissemination is a product of research. Innovatively developed technologies should therefore be communicated to the beneficiaries effectively if they are to have any commercial value. There exist a gap between the farmers' practices and developed technologies and recommendations this normally is the reason why extension services are designed to bridge this gap from widening. These findings agree well with the findings of Opondo *et al.* (2005) who also found that the uncoordinated and inadequate stakeholder involvement was an impediment to successful attainments of postulated expectations. Unilever had learnt for the first time that their excellent partnership with RA was impacting positively on the entire commodity value chain. Such is the experience that is expected from these initiatives (Millard, 2010). According to Benkler (2006), increased use of a networked information helps to achieve competitiveness. It provides new avenues that

offer a more attractive cultural production system, apart from tapping economic opportunity; sharing and disseminating scientific outputs and innovations.

Munyua (2008) points that one of the strategies for alleviating Africa's challenges to increasing agricultural production is by paying increased attention to new markets and marketing strategies together with increasing use of agricultural biotechnology. Paying increased attention to new markets and marketing strategies means complying with standards, requirements and certification procedures. When they have complied, they will have been linked with the market. Certification on its own does not assure market access but when the consumers demand certification credentials and the same is communicated to them, and then it does. Careful monitoring and assessment of impacts was considered as less critical factor by majority of the respondents compared to other factors. This could be attributed to the fact that the farmers considered the certification initiatives as buyer driven and relegated it to them to monitor. This is a typical scenario where smallholders do not get involved even when they are key to the interventions; otherwise they risk being excluded as the rest mainstream their activities for enhanced and effective value chains (Riisgaard *et al.*, 2010).

Reducing success related challenge through strategic research is also critical simply because the contribution of research in development cannot be overemphasized in this study because of its current mandate of addressing the problem of up scaling of sound initiatives for sustainable tea value chains as the prime movers in the industry are followed.

4.8 Costs, Benefits and Opportunity Costs of Farmer Field School Trainings and Rainforest Certification

It has been argued that FFS benefits include facilitating collective action, leadership, organization, increased income and productivity, knowledge gain among farmers, empowerment and improved problem-solving skills (Glendenning, 2010). This system is however known to be more expensive than the traditional extension model in which one extension provider serves farmers via radio and newspapers and it is still unclear whether the FFS yields higher returns to pay for its added cost. This study investigated the costs of FFS trainings, benefits that farmers accrue as a result and the opportunity costs of the farmers attending these sessions. The findings are discussed under this section.

4.8.1 Estimated Cost of Farmer Field School Trainings for 12months

The fixed costs for the FFS include administering the national level program such as paying consultants and administrators' salaries and conducting research on the field school program. Materials, food, and renting venues in the villages for the training are all variable costs associated with FFS. The FFS facilitators' salaries are also considered variable because, unlike an extension agent, FFS facilitators are paid a wage for each FFS session they conduct. There is also an opportunity cost of the facilitators' time because these KTDA or government agents are also paid a salary in addition to their stipend for conducting FFS. If the facilitators are not engaged in FFS, they could presumably be undertaking another productive activity. The marginal cost of the farmer field schools are also high because the FFS curriculum is designed to train no more than 25-30 farmers at a time. Farmers who participate in tea FFS training also incur costs. Costs to farmers for participating in the training can be measured by the opportunity cost of their time spent in the training.

Table 15 indicates the actual cost of conducting a tea-based FFS for a period of twelve months in 2010 and was derived from KTDA field staff and smallholder farmer respondents. All the items used to run an FFS, the unit cost and the number per year were listed and the mean cost calculated for each item. The costs of hiring a meeting place or venue per year was 17,100/= Kenya shillings, paying for stationery (e.g., flip charts 400/= Kenya shillings, exercise books 675/= Kenya shillings, pens 675/= Kenya shillings, file folder 675/= Kenya shillings, felt pens 180/= Kenya shillings), flip chart tri-pond stand 600/= Kenya shillings, cost for paying researcher led facilitator four times per year 8,674/= Kenya shillings, paying extension-led facilitators 32,268 Kenya shillings, paying farmer-led Facilitator 2,715/= Kenya shillings, estimated cost of refreshment 41,592/= Kenya shillings and fertilizer cost 2,639/= Kenya shillings. Other costs were on purchasing pruning saws, watering cans, meeting FFS members, tour costs to the factory, FFS members tour of a research station, compensation for the opportunity cost for the experimental plot (90 tea bushes x 5 groups x 1kg/bush/year), hospitality costs (tea & snack) when members of FFS attend meetings at the factory, TESA's fuel for the motorbike, TESA facilitation for lunch and cost for the TESA salary based on the time he/she spend in an FFS. It costs an average of 219 462/= Kenya shillings to run one Farmer Field school per year and 1,316,772/= Kenya shillings to run six FFSs in a factory for one year. To reach all the 324 electoral zones with FFS cost 71.1/= million Kenya shillings. To reach all the 3900 buying centres would cost 856/= million Kenya shillings while reaching all the 560,000 tea growers in 18,667 FFS would cost

approximately 4,096.7/= million Kenya shillings. Comparing this with other FFS's, Barbut (2011) indicated the costs of establishing a new FFS to be $800 and that of training a new FFS facilitator was $1350.

Table 14.
Estimated Cost of Conducting a Farmer Field School for 12 Months

Item	Unit cost from the farmers	Unit cost from the Factory	Mean cost	No	Total cost in KSHS
Hiring a venue	1,125	300	712.5	24	17,100
Flip chart	400	400	400	1	400
Exercise books	30	15	22.5	300	675
Pen	30	15	22.5	300	675
File Folder	30	15	22.5	300	675
3 felt pens	180	180	180	1	180
Flip chard/tripod stand	600	600	600	1	600
Paying researcher-led facilitator	3,337	1,000	2168.5	4	8674
Paying extension-led facilitators	1,689	1,000	1344.5	24	32,268
Paying farmer-led Facilitator	1,310	500	905	3	2,715
estimated cost of refreshment	1,733	1,733	1733	24	41,592
Fertilizer,	2,639	2,639	2639	1	2,639
Pruning saws	558	558	558	5	2,790
Watering cans	487	487	487	5	2,435
FFS members tour costs to the factory	-	20,000	20,000	1	20,000
FFS members tour to a research station	-	20,000	20,000	1	20,000
Compensation for 90 tea bushes x 5 groups x 1kg/bush/yr	-	450	450	40	18,000
Hospitality costs (tea & snack)	-	3000	3,000	2	6,000
TESAs fuel for the motorbike	-	500	500	24	12,000
TESA facilitation for lunch	-	280	265	24	6,360
Cost for the TESA salary based on the time he/she spend in an FFS	-	28,000	3733	1	3733
10% contingency					19,951
Total costs					219, 462

The cost analysis used to create a measurement of cost-effectiveness incorporates the variable field costs of running the FFS training programs, the opportunity costs of the trainers' time

and the opportunity cost to the farmers who participate in the training programs. Field costs include the cost of running an FFS or maintaining an extension agent in a particular place. The overall cost-effectiveness analysis captures the FFS method's ability to reach the greatest number of farmers within a given budget, the method's ability to influence farmers to adopt tea-based practices and the methods ability to influence farmers to use the practices appropriately. FFSs can be expensive or low-cost, depending on who implements them and how they are conducted but costs per FFS decline as activities become routine, prices become lower due to bulk purchase of materials, and trainer and facilitator skills and experience increase (Braun & Duveskog, 2010). The cost of high allowances, transportation and supervision may range from $30 to $50 per farmer and the greater the distance facilitators have to travel to the field, the higher the transport cost. The costs of up-scaling FFS include training expenses for extension workers and lead farmers and input expenses for running the FFS. The higher costs for extension agent-led FFS noted Rusike *et al.* (2004) are mostly due to higher costs for travel, staff allowances, and stationery because these constitute the largest share of the total cost. Successful reduction of these costs may enhance sustainability of the FFS networks. Braun and Duveskog (2010) have indicated that reduction can be achieved by encouraging FFS graduates to undertake training of farmer-trainers (TOFT); relying on informal farmer-to-farmer diffusion of the knowledge gained from FFS. The high training costs, which take up a large portion of the FFS recurrent budget, make the viability of the FFS dependent on the effectiveness of knowledge diffusion from trained farmers to other farmers in their neighbourhood (Bunyatta *et al.*, 2006). Though FFSs are more costly to implement say Rusike *et al.* (2004), they provide more opportunities for experimentation, and collective learning-by-doing. This according to the authors improves farmers' understanding of new technologies, their capacity to effectively use the technologies and to make better decisions, and improves adoption rates.

Table 16 shows that the average costs of conducting FFS training for 30 farmers annually vary considerably, depending on whether all the itemized costs are cumulated or not. Generally, the average total cost of conducting FFS when the process is led by both the researcher, extension staff and farmer range from to US$ 2380.72 less the cost of hiring venue to US$ 2581.90 when the cost of hiring a venue are included. The average annual cost for a researcher led FFS training range from 2574.61to US$ 2776.79 with or without venue cost respectively; Extension-led training costs between US$ 2380.72 US$2580,72 while a Farmer-led process varies from US$ 2195.61 to US$ 2396, when venue costs are included or

excluded respectively. The finding implies that the average annual costs of FFS progressively decrease as the facilitation process moves from researcher-led to a farmer-led process.

Table 15.
Costs of Farmer Field School Trainings Based on the Facilitator

	Average Total Annual Cost(US $)
Cumulative Costs of FFS plus cost of hiring venue	2581.90
Cumulative Costs of FFS less cost of hiring venue	2380.73
Cost of Researcher-led FFS plus venue costs	2775.79
Cost of Extension-led FFS plus venue costs	2581.90
Cost of Farmer-led FFS plus venue costs	2396.79
Cost of Researcher-led FFS less venue costs	2574.61
Cost of Extension-led FFS less venue costs	2380.73
Cost of Farmer-led FFS less venue costs	2195.61

(US $ =Kshs85)

4.8.2 Estimated Costs of Conducting the Rainforest Alliance Certification

Currently, the RA certification costs are paid for by the sponsor while the factories pay for the preparation of RA certification. The inspection fees costs (US$ 85.88)7300 Kenya shillings with the average cost per farmer inspected being 50 Kenya shillings while the auditors are paid 400,000 Kenya shillings. The factories pay the auditor's fees while other RA certification costs are paid by the sponsor (IDH). The costs paid depend on the size of the factory (whether big or smaller) but ranges from 0.8million to 1.5million Kenya shillings excluding audit fees. The audit fees range from 12,000 to 19,000 US$ while auditing 30,000 farmers cost a maximum of 43,000 US$. It costs 1.5 US$- 2.5 US per farmer depending on factory size. During the pilot phase in 2008 the lowest paid audit fees amount was 15,000 US$. Initially, the factory companies used to pay annual RA certification fees but the arrangement was stopped in 2010.

According to Rainforest Alliance, the charges for RA certification are 5 US$ per hectare per year with a maximum of 5,000 US$. The compliance costs also vary from factory to factory but every farmer meet the cost of buying Personal Protective Equipments (PPE) at 1,800 Kenya shillings. Other costs incurred during RA certification are waste water treatment cost of nine million Kenya shillings and the costs of sensitization and training farmers. At the factory level, the training expenses are incurred for buying stationery, posters and paying

trainers which according to Rainforest Alliance costs approximately 2.5 US$ per farmer. There are also costs of continuous monitoring at farm level, internal inspection and recurrent expenditures for the RA implementing team/co-coordinators at KTDA head office and the two regional offices. On average, a factory spends approximately one million Kenya shillings including the cost of stationery and hospitality.

4.8.3 Benefits of Farmer Field School and Rainforest Alliance Certification Trainings

Farmers benefited by gaining knowledge on tea plucking table, increased tea production due to improved plucking intervals, it enhances leadership, and knowledge gained has helped improve quality tea produced, knowledge of tea diseases and their control among others (Table 17). They also benefited in RA certification trainings by enhanced use of the PPE when using agrochemicals, knowledge on safe use of agrochemicals, knowledge on waste management and health, networking and learning from one another and improved environmental conservation.

Table 16.
Benefits of Farmer Field School and Rainforest Alliance Certification Trainings

Benefits of FFS	Benefits of RA Certification Training
-Gained knowledge on tea plucking table	-Enhanced use of the PPE when using agrochemicals
-Increased tea production due to improved plucking intervals	-Knowledge on safe use of agrochemicals
-Improved knowledge on tea plucking and plucking intervals	-Knowledge on waste management and health
It enhances leadership	-Networking and learning from one another
-Knowledge gained has helped improve quality of tea produced	-Improved environmental conservation
-Knowledge of tea diseases and their control	Protection of water catchment areas
-Networking and learning from one another	Safe use of agrochemicals
-Improved tea husbandry practices	Improved marketing of produce
-Gained knowledge on record keeping	-Improved demand and market price of tea
-Improved time management	-Reduce expenditure on inputs
-Getting soft loans	-Networking with extension agents and factory management
-Learning of new technology	-Knowledge of soil and water conservation
-Knowledge of current and emerging issues	
-Improved personality	

The benefits of FFS varied from economic to social benefits as indicated in the Table16. These findings are also in agreement with Glendenning's (2010) findings that the benefits of

FFS and RA trainingincluded facilitating collective action, leadership, organization, increased income and productivity, knowledge gain among farmers, empowerment and improved problem-solving skills. Through the FFS, farmers benefit from improved farm husbandry in the form of increased yields thus increased income and socially link up with other farmers to discuss issues of mutual interest, leading to mutual action and empowerment.

4.8.4 Opportunity Costs

The minimum income forgone annually by a farmer attending FFS/RA Certification trainings was Ksh. 343 (US$ 4) while the maximum income forgone was Ksh. 24,000 (US $ 279). The mean income foregone was found to be Ksh. 2,305 (US$ 26).The wide range between the minimum and maximum income foregone was due to the differences in socio-economic status as conferred by the differences in the land sizes as well as scale of production. However, the mean income foregone of US $ 26 was above the US $ 20 income forgone in attending similar sessions on cotton in Mali (Eicher, 2007).

4.9Challenges Faced by Farmer Field School Members in the Process of Rainforest Certification

To establish the challenges faced by farmers during FFS and RA certification trainings, respondents were asked to state the challenges they had faced during the trainings. The information provided was analyzed qualitatively based on the most common. Table 18 summarizes the findings.

Table 17.
Challenges Faced by Farmer Field School Members in the Process of Rainforest Certification.

Challenges of FFS	Challenges of RA Certification
a. Irregular and late attendance by members due to limited time	Lack of tangible impact after certification
b. Low/poor group cohesion wanting and hard to for members to speak with one voice	It is tedious to go through the entire process
c. Takes a lot of time to understand the concepts	Lack of PPE materials
d. Lack of facilities such as chairs	Lack of adequate land to plant indigenous trees
e. Lack of materials for spraying cows	Adhering to occupational health and safety principles
f. Lack of government support	Difficulty in adhering to management principles
g. Disruption at the venues	Low income after much efforts
	Farmer is required to me*et all* requirements before being certified
h. Lack of designated venues for meetings	RA terminologies in English yet majority of farmers don't understand very well.
i. Conflicts in the family	Recommended practices have been researched on but people still are not practicing them
j. Scheduled time for FFS programs in conflict with other personal programs/activities	Members are not willing to work with RA
k. Negative attitude due to long period of time taken in FFS	Hard to implement due to high compliance requirements
l. Facilitators don't take FFS serious thus mostly arrive late	Sustainability of the RA standards not possible
m. Promises by KTDA that are never fulfilled e.g. tours ,stationery ,uniforms	Uncertain preparation for RA certification
n. Lack of proper materials for demonstrations like iron sheets, chicken wire, timber, nails	Low academic levels of farmers (illiteracy)
o. Discouragement by non-group members and	Lack of assessment of farmers by the factory
p. Not following regulations e.g. picking of phone calls during meetings	Link between farmers and the factory

4.10 Suggestions for Up-Scaling Farmer Field School or Rainforest Alliance Certification

The respondents were asked to suggest how FFS and/or RA certification in KTDA factories could be up-scaled. The responses received were organized into thematic areas and analyzed qualitatively. Table18 shows the results. 25% of FFS participant respondents were willing to run schools adjacent to the former schools but this require that the skills imparted on them are refreshed once more as reported by Bunyatta *et al.,* (2006) and Mwangi and Murgai,, (2003).

There is a disparity between the fact FFS members requiring more training and those have also reporting that the trainings are taking long. From this scenario it can be deduced that sometime they are not learning that which meet their desires or alternatively they only want to dedicate a short time but get a lot of information and skills. The implication is that the facilitator has got to be skilled and take this fact into considerations as they plan their trainings and other capacity building activities. A further 25% suggests that motivation of FFS participants is one of critical attributes. Motivation, in monetary terms if considered would increase the cost of running (operations) and poses a challenge to sustainability of the FFS institution. The researcher suggest that FFS members may be motivated occasionally by giving them subsidized packets of made tea for top performers.

Table 18.
Suggestions for Up-Scaling Farmer Field School or Rainforest Alliance Certification

Suggestion	Frequency	Percentage
Motivation(finance)	66	25.4
FFS trained farmers training others	64	24.6
Provide materials for training	48	18.5
Increase funding	47	18.1
Touring other farmers farms'	29	11.2
Reduce costs involved in certification	28	10.8
Reduce time	24	9.2
Visiting success stories	22	8.5
More trainings	20	7.7

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This study had six objectives. This chapter gives a summary of the study conclusions and its recommendations on areas for further studies and how to improve scalability of FFS and RA certification.

5.2 Summary

Kenya Tea Development Agency extension officers have, through FFS, been encouraging small scale tea producers west of Kenya's Rift Valley to practise sustainable agriculture since 2006. Non-adoption of sustainable agricultural practices has led to production of low value tea that cannot fetch higher and profitable prices. Also, KTDA factories promote Rainforest Alliance certification that enhances sustainable tea production and sustainable livelihoods. However, many of the tea producers do not yet benefit from FFS and RA certification because scalability is a challenge. The study investigated the scaling-up of Rainforest Alliance certification and Farmer Field Schools and their contribution to sustainable tea production among small-scale tea producers. The findings showed that the factories sampled were in the second roll of FFS up-scaling and for FFS participants sampled their sustainable agriculture practice was generally slightly above average with regard to the selected principles and criteria (mean sustainable agriculture index of 27.5 out of the possible of 40 of all the criteria as per this study). Capacity exists to enhance the uptake of all the principles in order to improve sustainable tea value chain through the certification principle of continuous improvement. FFS and RA, therefore, represent a real opportunity for the long-term sustainability of tea industry.

The study found out that a majority of the FFS members were not linked to any agricultural network or partnership. There is, therefore, scope for FFSs members' to be involved in Farmer associations, networks and federations. This is because commercial and social partnership, can offer farmers the choices they need to survive and, ultimately to thrive. Linkages with associations, network or partnership and federations can enhance scalability of FFS and RA certification. The study established that RA certification improved farmer livelihood by improving market and stakeholder involvement, while FFS empowered them to demand services that were not being provided within the operating framework. RA

certification process was being fast tracked in the factories and proper training for farmers was not conducted by the lead farmers leading to poor conceptualisation and internalisation of SA principles' by the client farmers.

A successful scalability strategy to achieve and sustain high coverage that is consistent with the KTDA targets must address the issues of: a) rapidly achieving high and equitable coverage b) assuring that all new FFS participants have access to education on a continuous basis c) assuring that GAPS are properly and consistently used d) ensuring access to sustainable agricultural education for the rest of the farmer population at an affordable cost. e)Improving networking with stakeholders who are involved in FFS and RA up-scalingf) mainstreaming and institutionalization of sustainability

This is a considerable challenge, that had not yet been achieved as of 2011.The study confirmed that no single approach was likely to bring the perfect solution to such a complex problem. The best way to achieve sustainable tea production along the value chain is to mobilize all available resources and partners through a coordinated strategy based on the local context. Learning more about large-scale program experience involving smallholder growers elsewhere and debating the findings is important. But to get the most benefits from both FFS and RA certification, KTDA should integrate such a program within its business model and be supported with co-investments from partners.

5.3 Conclusions

From this study the following conclusions were made

a. Scalability of FFS significantly promotes sustainable tea production among small-scale tea producers

5.4 Recommendations

Based on the conclusions of the study, the researcher made the following recommendations for up-scaling FFS and RA certification.

a) FFS linkages to other stakeholders should be strengthened by KTDA to expand and enhance choices of extension menu and demands for other services. Tea growers have varied issues that require various stakeholders in order to address those issues effectively.
b) To upscale FFS and RA certification to reach all farmers affiliated to KTDA requires financial and material support. Therefore, they can be cost effectively run when there is a

co-investment from stakeholders and facilitated by researchers, extension and farmers in a combination that is convenient to the three stakeholders. The costs are overwhelming to one partner even with concerted efforts. IDH and other development partners and stakeholders along the tea value chain should provide this support.

c) FFS and RA certification trainings should be tailor by KTDA extension staff to enhance farmer livelihood in future. This is because trainings that do notaddress famers' needs are bound to bog farmers who already have too many issues to address.
d) Rainforest Alliance, KTDA, and RA certification auditors should increase the periods for preparing factories for RA certification, harness the diverse socio-economic needs and priorities of tea growers, reduce RA fees, source sponsors for RA certification, naturalize SAN standards, support farmers to acquire PPE and should up-scale RA certification.

5.5 Recommendations for Further Research

A Sustainability of FFSs to include factors affecting attraction and retention of FFS participants.

a) Carry out a longitudinal study of formation, growth and maturation of tea FFS
b) Investigate how much a farmer field schools in tea increase yields that result in a sustainable agro ecosystem.
c) Study how an e-learning platformcan be built to train farmers (in the East African Context)on grades, standards, compliance, and pesticide residues.
d) Mainstreaming and institutionalization of FFS and RA certification.

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APPENDIX A

Questionnaire for Participants Trained in Farmer Field School (FFS) and Rainforest Alliance (RA) Certification

Instructions:Please respond to all items.

1. Factory name:_____County:_____
2. KTDA administrative region:_____
3. Name (Optional): _____
4. Gender (Tick one): a) [ ] Male b) [ ] Female
5. Marital status (Tick one): Single __ Married _ Divorced __ Separated ___ Widowed _____ others (specify) _____
6. Year of birth: _____
7. Education level (Tick one) a) [ ] Non-formal, b) [ ] Primary, c) [ ] Secondary d) [ ] College e) [ ] University, f) [ ] Others (specify) _____
8. Number of household members: Males _____ Females _____
9. Average earnings per day in Ksh: _____ Hours worked per day: _____
10. Currently, are you trained in Rainforest Alliance (RA) Certification?
    a) [ ] Yes b) [ ] No (Skip to 28)
11. If Yes, are conservation/buffer areas (distance from the river that should not be cultivated) established alongside streams and rivers on your farm?
    a) [ ] Yes b) [ ] No (Skip to 13)
12. If Yes, indicate: a) Width of buffer area in meters _____
    b) Type of vegetation _____
13. Are conservation areas established in your farm? a) [ ] Yes b) [ ] No **(**Skip to 16**)**
14. If Yes, indicate: a) Estimated size of conservation area _____ (ha).

b) Estimated % of total area _____(ha).

15. Number of native (indigenous) trees planted on your farm _____
16. Is waste water capture pit or similar preventative measure in place on your farm?
    a) [ ] Yes b) [ ] No
17. Is solid waste managed (recycled/or removed from farm) adequately on your farm?
    a) [ ] Yes b) [ ] No

18. Do you record the type of agrochemicals used?

a) [ ] Yes b) [ ] No

19. If Yes, name the agrochemicals used _____

20. Do you track quantity of agrochemicals used per year? a) [ ] Yes b) [ ] No

21. If Yes, specify litres of agrochemical used _____

22. Do you record the type of toxicity level? a) [ ] Yes b) [ ] No

23. Do you use appropriate personal protective equipment where required?

a) [ ] Yes b) [ ] No

24. Number of FFS or RA Certification trainings I participated during the last one year_____

25. Number of workers employed on my farm:

a. Permanent, _____
b. Temporary _____
c. Foreign/migrant _____

26. What I pay my employees per day in Ksh:_____

27. Workers have access to portable water a) [ ] Yes b) [ ] No

28. Currently, are you an active FFS member (Tick one): a) [ ] Yes b) [ ] No (Skip to Q31)

29. If Yes, what is your experience in months _____

30. If you are an FFS member, how many hours do you meet in a month?

_____

31. Sources of information about Farmer Field Schools (Tick all that apply):

a) [ ] Radio d) [ ] Newspaper/magazine g) [ ] Church group
b) [ ] Farmer's group e) [ ] Farmer teacher h) [ ] Farmer Field School
c) [ ] Neighbour f) [ ] Extension officer i) [ ] KTDA/NGO/CB
j) [ ] Other source (Specify) _____

32. Sources of information about RA Certification(Tick all that apply):

d) [ ] Radio d) [ ] Newspaper/magazine g) [ ] Church group
e) [ ] Farmer's group e) [ ] Farmer teacher h) [ ] Farmer Field School
f) [ ] Neighbours f) [ ] Extension agent i) [ ] KTDA/NGO/CBO
g) Number of FFS Members: _____ a) Registered: _____
b) Active: _____

33. In which year was your FFS formed? _____

34. What is the main language used in your FFS? _____

35. Was the language used in the FFS appropriate? [ ] Yes (Skip to 38) [ ] No.

If No, please explain:_____

36. Do you have an established leadership structure in your FFS? [ ] Yes

[ ] No.

37. If yes, which of the following officials do you have? (Tick all that apply)

a) [ ] Chairman, b) [ ] Secretary c) [ ] Treasurer d) [ ] Committee Members

38. What is your role (duties) in the FFS?

_____

_____

39. The land you use falls under what type of land tenure system? (Tick all responses that apply) a) [ ] Individual b) [ ] Family c) [ ] Hired d) [ ] Others (specify)

_____

40. Name two activities your FFS or RA group is involved in:

a) _____

b) _____

41. Does your FFS have income-generating activities? a) [ ] Yes b) [ ] No. (Skip to 48)

42. IF Yes, which ones?_____

43. How are the proceeds from income generating activities used? (Tick all that apply)

a) [ ] To pay facilitators
b) [ ] To buy training materials
c) [ ] To buy farm inputs
d) [ ] To buy food
e) [ ] To hire farm labour
f) [ ] To buy seedlings for gaping (infilling)
g) [ ] To save in a Sacco
h) [ ] Others (please specify): _____

44. How do you benefit from participating in the FFS

_____

_____

45. How do you benefit in participating in RA Certification trainings_____

_____

_____

46. Who Facilitates your FFS (Tick one)? a) [ ] None-farmer expert b) [ ] FFS-trained farmer c) [ ] KTDA extension agent. d) [ ] Others (Specify)

_____

47. How do you rate the facilitator's expertise in guiding the FFS activities (Tick one)?
a) [ ] High b) [ ] Moderate c) [ ] Low

48. Is your FFS linked to other networks, groups or partners (Tick one)? a) [ ] Yes b) [ ] No

49. If yes, name the network(s)_____
_____

50. If the linkage or network is useful to you, please explain how.
_____
_____

51. As an FFS group member, have you been involved in collective tea marketing?
a) [ ] Yes b) [ ] No

52. If Yes, for what benefits?
_____
_____
_____

53. As a tea grower, how did FFS and RA Certification trainings affect your livelihood (Please tick one of the three responses provided: poor, good, or very good to excellent)?

Observed changes in farmers' livelihood.	***Poor***	***Good***	***Very Good to Excellent***
Increase yields			
Increased savings			
Plucking interval			
Linkage and networking with other groups			
Ability to lobby through farmer networks (e.g. for better tea prices)			
Marketing of produce			
Ability to acquire affordable credit			
Increased chances for membership to a federation			
Improved public health			
Increased empowerment			
Increased ability to fund own activities			
Increased ability to pay operation costs			
Increased ability to pay facilitators' costs			

54. Which of the following factors explain how tea-related FFS up-scaling processes work? (Tick all that apply)
a) [ ] Farmers adapting available technology effectively for tea improvement.
(b) [ ] Reducing success-related challenges through proactive strategic research.

(c) [ ] Engaging in strategic partnerships with relevant stakeholders.

(d) [ ] Developing new markets that are responsive to consumer tastes.

(e) [ ] Improving networking with stakeholders who are involved in FFS up-scaling.

(f) [ ] Careful monitoring and assessment of impacts.

(g) [ ] Other factors (Specify) _____

55. Give two suggestions on how to up-scale FFSs or RA Certification in KTDA factories
    a) _____
    b) _____

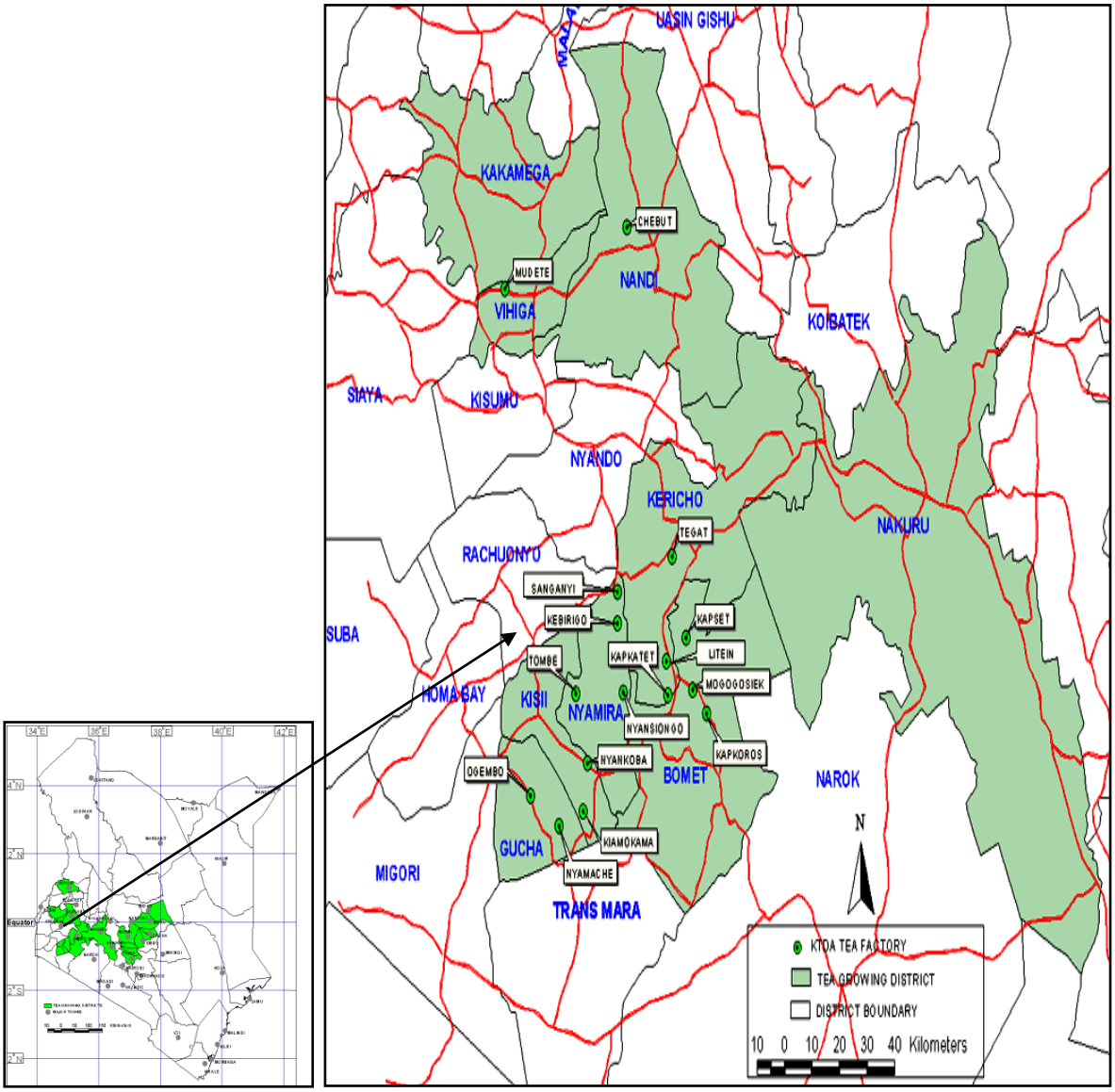
56. What is the estimated cost of conducting an FFS for 12 months? Use the table below.

Item	Unit cost (Ksh)	No	Total cost
Hiring a venue			
Paying for stationery			
Paying (a) Researcher-led facilitator (b) Extension-led facilitators (c) Farmer-led Facilitator			
Operational costs (e.g. for transport and refreshments)			
Fertilizer,			
Pruning saws			
Watering cans			
Others (Specify)			
Total costs			

57. Give two challenges that you have faced as an FFS member?
    a) _____
    b) _____

58. Give two challenges that you have faced in the process of being RA Certified?
    a) _____
    b) _____

APPENDIX B
A Map of Kenya Showing KTDA Tea Factories and Counties West of Rift Valley



Source: Kenya Tea Development Agency, 2004

APPENDIX C

Research Permit

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THIS IS TO CERTIFY THAT:
Prof./Dr./Mr./Mrs./Miss/Institution
Betty Chelangat Busses
of (Address) Egerton University
P.O.Box 536-20115, Egerton.
has been permitted to conduct research in

Location
District
Rift Valley Province

on the topic: The role of scaling up rainforest alliance certification and farmer field schools on sustainable tea production among small scale tea producers West of Rift Valley.

for a period ending: 31st May, 2012.

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Research Permit No. *NCST/RCD/10/012/11*
Date of issue *26th April, 2012*
Fee received *KSH. 1,000*

.....
Applicant's Signature

.....
Secretary
National Council for Science &Technology

CONDITIONS

1. You must report to the District Commissioner and the District Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit
2. Government Officers will not be interviewed with-out prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2)/four(4) bound copies of your final report for Kenyans and non-Kenyans respectively.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

RESEARCH CLEARANCE PERMIT

GPK6055t3mt10/2011

(CONDITIONS–see back page)