

Tea Smallholders in Sri Lanka: Issues and Challenges in Remote Areas

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Abstract

This study investigated the issues and challenges faced by tea smallholders in Sri Lanka. The smallholders are the largest contributors to Sri Lanka's tea production. Smallholders have access to support from the tea Small Holders Development Authority and the Sri Lanka Federation of Tea Smallholders. The study finds despite there being state sponsored and independent support, smallholders in difficult regions have minimal access to these resources and they are unevenly distributed. A survey carried out among smallholders in Walapane elicits that access to tea extension services and other institutional support is limited. Case studies of selected farmers clearly demonstrate smallholders lack basic training in tea cultivation techniques, harvesting and sustainable agriculture. Further, the study finds a gap among market realities, production interests and government policies. This has resulted in low levels of productivity, leaf rejection, loss of profit, occupational hazards and environmental damage. Given the demand for high volumes of quality Sri Lankan tea, institutional support should take the challenges identified in the study into consideration and design inclusive strategies to reach small holders in an even manner.

Keywords: Tea smallholders, Walapane, Sri Lanka, Tea industry, Plantation sector

1. Introduction

For a number of developing countries like Sri Lanka, tea is an important agricultural commodity in terms of employment and export earnings. Tea production techniques are labour intensive and the tea sector provides around 10 percent employment opportunities to Sri Lankans today. Tea was first introduced in 1824 and again in 1839 to Sri Lanka and Ceylon tea received special attention from around 1900 in the world tea market.

In 2013, tea production reached an all-time high in Sri Lanka amounting to 340.3 million kg. It is a 4.3 percent growth compared to the previous year of 2012. The increase in tea production is due to various factors that include favourable weather conditions, higher prices received at the Colombo Tea Auction and increase in export demand. The growth of production is reported in medium grown elevation, followed by low grown and high grown elevations.

The contribution of tea smallholders who are largely based in low grown areas, to the total national tea production has increased to 248 million kg in 2013 from 234 million kg in 2012. This increase is due to favourable weather conditions, increased usage of fertiliser, and higher price received for green leaves throughout the year of 2013. At present, 60 percent of the total tea land is cultivated by smallholders in Sri Lanka. There are several definitions for a tea smallholder in Sri Lanka, and tea lands less than 10 acres are considered "Tea Small Holdings" as stated in the Tea Control Act. At times, the Sri Lanka Tea Board has implemented development activities pertaining to lands between 10 and 50 acres as smallholder development. Overall, there are variations in the definition of a land area of a Tea Smallholder.

The general cost of production per kg of green leaf in this sector was Rs49.71 in 2013 though this differs depending on region and other factors. Tea smallholders are governed by the tea smallholders Development Authority (TSHDA). All tea smallholders are also members of the Sri Lanka Federation of Tea Smallholder Development Societies also known as Tea Shakthi. Under this federation, there are village level societies that provide a range of support to its members. However, remote villages have limited access to the services provided by them. Table 1 presents the importance of smallholders to the national tea production in Sri Lanka.

According to Table 1, the share of smallholders' contribution to total tea production in Sri Lanka has gradually increased. It was above 70 percent during the period 2010-2013 and has continued to increase up to 76 percent. In detail, tea smallholders produce 95 percent of low country, 59 percent of middle country and 15 percent of up country tea in Sri Lanka. Table 2 highlights some of the important features of Tea Smallholders in Sri Lanka.

There are two other factors that contribute to growth of tea production in Sri Lanka which are increase in cultivated land area and increase in productivity growth of tea smallholders. In 2012, the average productivity of tea smallholders is 2001 kg per hectare and few districts like Kaluthara, Kandy, Nuwaraeliya and Rathnapura are above this average level.

However, real primary producer prices have fallen sharply over the past decades and this is observed in the tea sector as well. Low agricultural prices damages the sustainability of the tea sector, negatively affecting the livelihood of the plantation workers and leading to poor working conditions. The figure below presents the relationship between average price, average cost and average profit margin of tea smallholders in Sri Lanka.

According to the above figure 1, the average profit margin for tea smallholders is 10 Rs per kg during the period 2005-2012. Another research, carried out by the Tea Research Institute of Sri Lanka, identifies the production cost of one kg of green leaf for a Smallholder as Rs43.19 and the price received by them as 40 Rs per kg, making a loss for the smallholders in the industry (Samaraweera et al, 2013). Given the disturbing picture presented by the discrepancies in profits and profit margins recorded by various studies, it is important to investigate further into factors that limit profitability among smallholders and to identify the challenges that they face.

2. Objective of the Study

The main objective of the study is to recognize issues and challenges faced by tea smallholders in Sri Lanka through a primary survey.

3. Literature Review

Extant literature on tea smallholders in Sri Lanka identifies several constraints related productivity, technology and government support. Studying issues related to business development of tea smallholders in Sri Lanka linked to technology transfer, Samaraweera et al (2013) find that level of technical knowledge was very poor among tea smallholders. The study is a survey of a highly productive area of Matara district, which consists of the highest number of tea smallholders. Only 20 percent of the tea smallholders in the study sample had received technical training related to various aspects of cultivation. The study finds that tea smallholders had minimal knowledge related to pest and disease management, planting material selection and nursery management, which are vital for achieving high productivity. Poor extension service in the tea smallholder sector was also a key drawback identified in this study.

Lack of return on investment due to the low level held by the smallholder in the tea supply chain is identified as a key issue by the Intergovernmental Group on Tea. The group identifies that smallholders are left to the "vagaries of an unorganized imperfect market", where there is no regulations and institutions to intervene. The group states Sri Lanka implements a successful regulatory system, where the factory shares the tea prices with the smallholder at the ratio of 68:32, monitored by tea inspectors. The role of the Tea Small Holder Development Authority (TSHDA) is recognized by the group as a successful institutional arrangement that has prevailed upon the issues of the smallholders to provide a supportive system. Wijesuriya et al (2007) identifies among rubber smallholders issues similar to the tea smallholders such as low quality in produced rubber, low involvement in societies, improper marketing and low adoption of recommended technologies. Problems related to tea extension services are also identified by Karunadasa and Garforth (1997), who find due to poor extension services smallholders lack up-to-date knowledge related to tea cultivation. Surveying tea smallholders in Central and Southern Sri Lanka on the variables fertilizer application, pest and disease control, weed control, plucking and pruning, the study concludes that the rate of adoption of innovations in the smallholding sector is far behind that of the estate sector. The study points to lack of knowledge as one of the major constraints in adopting innovations in the smallholding sector, requiring increased extension services.

4. Methodology

To understand the issues and challenges experienced by tea smallholding sector, a structured survey questionnaire was provided through field assistants to gather relevant information and in-depth interviews were conducted with selected smallholders by the principal researcher.

The interviews are presented as brief case studies to demonstrate issues faced by the smallholders. The questionnaire was designed to gain insight on productivity, tea cultivation practices, access to resources and training opportunities. The survey was carried out among 100 smallholders from the Walapane region in the Nuwara Eliya District of Sri Lanka. These tea cultivators were selected to highlight the challenges faced by tea smallholders, located in inaccessible terrains such as Walapane. The Walapane Divisional Secretariat is a demanding geographical region in Sri Lanka with high levels of poverty and low social indicators.

5. Findings

5.1 Household Background

All of the households seem to have a good standard of living with 100 percent of the households having basic facilities of housing, water, electricity and sanitation. Some tea smallholders shared informally that they struggle with water facilities for cultivation purposes. This is reflected in the section on farming practices as tea smallholders report that they do not regularly irrigate their tea garden.

Most male tea smallholders are in the age range between 50 to 80 years of age. The women tea smallholders are in the age range of 30 to 60 year of age. Majority of tea growers responded that there are 2 to 4 family members in each family, while a significant number stated family size as between 4 to 6. The majority 53 percent of small tea growers shared that they have 1 child. Therefore, tea smallholders appear to have identified extended family when giving the family size.

5.2 Gender, Land Ownership and Division of Labour

Research data indicate men farmers dominate small tea growers, accounting 62.8 percent of the study sample while women farmers constitute only 37.2 percent. In Sri Lanka landowner ship is dominated by men who are also considered as the head of the household. Therefore, most survey participants list the name of the land owner/head of the household as the land is owned by men. Nevertheless, in the division of labour, women play a lead role in actual maintenance and cultivation of the tea garden. These factors create issues when trainings and other resources are channeled to the tea small growers, since the head of the household/the named cultivator who most of the time happens to be a man is expected to obtain these resources, while the actual work is carried out by the women.

5.3 Income Source

A common perception is that unlike Sri Lanka's low country tea smallholders, tea smallholders in the high grown areas cultivate tea as a supplementary source of income rather than the main sources of income. The study indicated that 48 percent, a significant number of tea smallholders from the sample, considered tea as their main source of income, while they had supplementary income sources including paddy cultivation, vegetable cultivation, carpentry and other occupations. Interestingly, during interviews smallholders indicated that their focus on tea was limited due to lack of knowledge and support related to various aspects of tea, which had a negative impact on the income they received from tea.

5.4 Land Area

Most of the tea smallholders cultivate a land area of around 0.5 acres or less making them marginal tea cultivators. However, many of these smallholders have significant portions of uncultivated land or land used for other purposes. Figure 2 and Figure 3 discuss the land size and the area of the tea plantation in Sri Lanka.

5.5 Green Leaves Production and Prices

Farmers, in general, pluck between 30 and 60 kg per month with seasonal variations. The lowest amount recorded for a month in the survey was 6kg and the highest recorded was 300 kg. Many tea smallholders recorded the price of green leave in a range from Rs46 up to Rs62. Prices for tea are given by the factory according to the black tea selling price at the tea auction. However, due to the involvement of various collectors and buyers, there is a slight variation between these prices and the prices given by the factory. It is the prerogative of the tea cultivators to choose the price and the buyer.

5.6 Total Cost of Production per kg of Green Leaves

The average total cost of production per kg of tea was recorded as Rs25 by 58 percent of the tea smallholders. This is lower than the earlier mentioned average national cost of production as Rs49.71 per kg of tea. Other than cost at start up, tea smallholders had invested very little on input such as fertilizer or even regular irrigation. Large proportion of the total cost was attributed to labour.

98 percent of the tea smallholders state that the major cost of the production is labour. Significantly, family labour is not counted while calculating cost of production and hence the tea smallholders are not in a position to identify the actual cost. Therefore, tea smallholders are unable to provide data to calculate total cost of production due to lack of data on labour cost and the informal nature of labour usage. Total Cost for production is shown in the figure 4.

5.7 Market for Green Leaves

Unstable price and market often forces tea smallholders to sell tea leaves to different factories. However, more than 70 percent of the tea smallholders in the survey reported that they are selling green leaves to one factory regularly. Although this may indicate a stable market, there are many suppliers/agents who collect tea leaves from the tea smallholders and provide them prices varying on the level of the supplier. In general the market varies from region to region and from village to village. The tea smallholders stated that a system should be evolved to determine the price based on the quality of the green leaves and the factory should communicate the price directly to the small tea growers. There is little dependence on tea societies for marketing green leaves and smallholders did not associate the societies with a role in leaf collection.

5.8 Productivity

The survey collected data on total production of green leaves and area of tea gardens; however data on labour hours/working days and all other inputs used in the production and cultivation process was not clear. This is mainly due to the fact that tea smallholders do not maintain records and are not aware of the significance of these factors. Generally, they are unable to provide the necessary information for the accurate calculation of productivity related concepts.

5.8.1 Land Productivity of Small Tea Growers

Land productivity is measured as yield per acre/hectare. According to the baseline study data, land productivity of the tea smallholders in this area is 78 kg per acre (180 per hectare), which is considerably low when compared with other smallholder tea cultivated land areas, which record 250 kg–300 kg per acre. However, this is not surprising considering the data obtained in the study shows that these tea smallholders have depended heavily on unstructured agricultural knowledge and practices.

5.8.2 Pattern of Labour use and Labour Productivity

Results from the study indicate that 50 percent of the tea smallholders rely on family members for plucking green leaves from their garden. While around 36 percent of tea smallholders depended on both family and hired workers, only 7 percent of the smallholders reported that they rely on hired labour to pluck the green leaves. Apart from the fact that relatively fewer smallholders depend on hired workers, the number of hired workers engaged by them is relatively small. Almost 59 percent of smallholders hired less than 2 workers in the month prior to which the survey was conducted, while almost 25 percent engaged 2–4 workers. It is likely that more hired workers are employed in smallholdings where the participation of family labour is low. Interestingly, 65 percent of the hired workers are temporary employees, and all of them are local workers.

Labour productivity, which is measured as output per employed person is difficult to quantify for the tea smallholders due to the nature of informal activities such as use of family labour and irregular use of outside labour. This problem is compounded by lack of proper records and data to share with a primary research such as this baseline study. However, within these limitations this study finds that based on the daily payments that labour productivity among tea smallholders is higher than the average agricultural labour productivity of Rs388 per person in Sri Lanka. This correlates with data from the Central Bank on average daily wages in the informal sector that records the daily wages for men in December 2013 as Rs794 and daily wages for women in December 2013 as Rs599.

5.9 Business Practice

In order to understand whether tea smallholders maintain any records to monitor their agricultural practices and financial transactions they were asked about their documentation habits. Maintaining records regarding day to day activities of plantation, cost of production and returns would enable the marginal farmer to become a business farmer. However, in the survey only 2.43 percent maintain records of their cultivation practices. 97.56 percent stated they do not have records of their cultivation related costs or income. Aforementioned challenges in measuring productivity arose due to the lack of record keeping and inadequate business practice.

This appears as a unique issue among smallholders that creates a large gap between market realities, production interests and government policies. During the process of the survey, many tea smallholders declared that they are interested in maintaining records and appreciate any guidance in this direction.

5.10 Quality of Green Leaves

Tea smallholders have little awareness on the importance of quality of leaves and as the price they obtain for the leaf does not depend on leaf quality there is little incentive to maintain quality. 80 percent of tea smallholders reported maintaining their garden regularly. Due to lack of awareness on harvesting techniques, leaf rejection is a key impediment identified by small growers in attaining a good price for their tea. In addition to plucking mature leaf other than the recommended two leaves and a bud, leaves are crammed into bags to increase weight; this damages the leaf and reduces quality. Another crucial factor that determines quality of tea is the speedy removal of the leaves to the factory for processing. Survey results indicate that most of the tea smallholders hardly adopt any time management practices to minimize the time gap in collecting the leaves and delivering it to collection centres/agents.

The delay occurs due to two factors: suppliers do not have a regular timetable to collect the leaves from the plantation and suppliers take a long time to transport leaves to the factory. There needs to be intervention in this front as any delay in transporting the leaves to the factory will adversely affect the quality of the green leaves. As revealed in the survey, slightly more than half of the tea smallholders reported taking 8–12 hours in collecting the leaves from the gardens and delivering it to the collection centres/agents. A significant percentage of 37.2 percent does it within 4–8 hours. Moreover, a majority of the tea smallholders, 39 percent, transport the leaf to the factory in less than an hour and another 45 percent does it within 1–2 hours. Around 14 percent of tea smallholders take 3–4 hours in delivering the leaf to the factory, and as this is a significant share, there is scope for improvement. The tea smallholders reported that there is no collection/storage centre at their locality to keep the green leaves before selling it to the suppliers.

5.11 Soil Testing, Land Protection and Irrigation

Soil testing is crucial for tea cultivation to gauge the acidity of the land, which is usually balanced through the application of minerals prior to cultivation of tea. Very few smallholders had done soil testing, and those who had done the testing were sharing information about the initial soil testing implemented with the support of TSHDA. It is troubling to see that despite doing a soil test at the beginning; they hardly get an opportunity for follow up training or instructions on good agricultural practices for tea cultivation based on the quality and status of their soil.

Terracing and boxing techniques were identified as the most common methods of protecting and improving fertility of the soil. 50 percent of tea smallholders utilize terracing and given the mountainous land terrain of the region this is not surprising.

Less than 3 percent of tea smallholders have the practice of regularly irrigating their tea plantation and the rest irrigate from time to time or rely only on rainwater. It is often noted that prolonged drought directly affects the productivity of the tea cultivation in the small tea sector. Figure 5 of this text discusses with the soil test conditions and Table 6 identifies the immigration stuck in the country.

5.12 Use of Fertilizer and Pesticides

Tea smallholders are not trained on adopting good cultivation practices such as the use of fertilizers according to the differences of soil in their plantation. Though tea smallholders are not trained on any fertilizer application practices, 69 percent of tea smallholders in the area use fertilizer on their tea cultivation. In most cases the use of fertilizer is determined by its availability, which is distributed directly by the State, and also the long-term practice of applying organic fertilizers. In this context, it is imperative to provide tea smallholders training on fertilizer application to improve productivity in the plantations. However the tea smallholders who are relying on fertilizer seem to be majorly relying on Zinc either alone or in combination with copper.

Among the tea smallholders included in the survey majority are not using any pesticide to manage their tea plantation. However, the limited 4.3 percent who use pesticides received no advice on any products classified by any authorities. Moreover, from the small number of tea smallholders who use pesticides, the majority gathered information from different sources on which products to use.

5.13 Environmental Protection

The findings do not reveal that small tea growers have implemented specific activities to conservative, protect and enhance biodiversity on and around the farm. Fortunately, all tea smallholders confirmed that they take action to protect water streams and sources on the farm from contamination and pollution. No attempts to convert forest land or other cultivable land into tea were recorded during the study. The most popular conservation practice among the tea smallholders is the planting of shade trees. Giliseeriya and Savikku are the most common among the shade trees.

5.14 Training and Access to Services

Respondents clearly stated that they have no training in tea cultivation and practices. Majority of the tea smallholders had little knowledge about simple measures that can improve the productivity of their land and ultimately provide them with better income. Many tea smallholders were unable to provide clear responses to questions on cost of production, income, monthly labour cost and other data that help ascertain total productivity of their tea gardens. Overall, the data illustrates low levels of knowledge, skills, practice and training in key areas of tea cultivation such as pruning, plucking, soil management, use of fertilizer and crop protection techniques.

Although Tea Smallholder are expected to avail themselves with services provided by the TSHDA and the Sri Lanka Federation of Tea Smallholder Development, the study reveals that only a small segment of society members benefit from these resources. According to the 2012 Annual Report result no 04, the TSHDA is to take the following actions to support tea smallholders.

1. Distributing tea fertilizer, provision of support services such as providing planting material, utensils and transport facilities
2. Implementing extension and advisory services
3. Establishing society leaf collecting centres
4. Taking steps for the welfare of the people engaged in converting produce of tea small holdings and registering of tea smallholder development societies with the objective of accepting them as legal organizations and creating regulations on their activities
5. Strengthening tea smallholder development societies as community based organizations and directing smallholders to additional income earning activities.

In the Walapane region, distribution of various resources and services has been uneven. Fertilizer subsidiary has not been given although authorities maintain that smallholders receive fertilizer at a subsidized rate. A tea inspector is expected to visit the tea smallholders on a regular basis as part of official tea extension services to train and monitor the practice of tea cultivation. However, due to the inaccessibility of the region, regular visits are not carried out by the tea inspectors. Evidence from the survey indicates that there is considerable scope to improve workers' skills and their working conditions. Majority of the tea smallholders do not have training on crop protection products and fail to follow health and safety measures in general or while handling pesticides. The lists of banned pesticides by the TRA are not available to the tea smallholders. During interaction in the field, several tea smallholders expressed a strong need to receive adequate training on better agricultural practices to improve productivity and safe handling of fertilizers and pesticides for better living conditions and environmental problems.

5.15 Case Studies

Case Study 1

Nimal, a tea smallholder with tea cultivation area of 2.3 acres has been cultivating tea since 2000. With a total quantity of 600 kg green leaves he makes Rs20,000 (US\$153.8) a month by supplying leaves to the nearby tea factory. He spends about Rs25 (US\$0.2) as total cost of production per kg of green leaves. He comments that the major portion of the cost of production is labour. Leaf plucking is done using both workers and family labour. He has used 2 female temporary workers in the previous month and he pays a daily wage of around Rs400 (US\$3.1) per worker. He irrigates his land regularly and uses a nominal amount of crop protection products. Nimal does not keep any records of monthly labour and other input costs or records of workers' safety/working conditions. He has no training on techniques to improve quality of tea leaves, so he could not provide any training to his workers. He has had no training on handling hazardous substances and does not provide protective clothing or equipment to workers when necessary and only provides workers access to facilities for cleaning hands and eating. Nimal reflects he can vastly improve productivity, income and work conditions in his tea garden with some level of guidance from the government.

Case study 2

Anoma cultivates tea in 1 acre from her total land area of 2 acres. She also cultivates vegetables and her main source of income is vegetable farming. From her tea land, she plucks a total of 35 kg of green leaves per month. With this she earns Rs2000 (US\$15) a month. During the previous months she obtained Rs57–Rs62 (US\$0.43–0.47) for a kg of tea. She supplies tea to the factory near by her home, and although she has a regular buyer she changes buyers depending on price variations. According to Anoma, it takes 1 hour to deliver the leaves to the collection centre, but she does not know the transport time taken for the green leaves to reach the factory.

Anoma shares that she does not take any measures to maintain hygiene or to retain the quality of green leaves. Adding organic fertilizer to the soil is the only measure she has taken to improve productivity thus far. Using family labour, during the high yielding season leaves are collected four times a week and during low season leaves are collected once in two weeks. Anoma comments that she has not received any training related to tea cultivation, although she is a registered member of her village tea society. She would like to learn about pruning, harvesting, soil management and the overall tea cultivation process. She shares that she would also like to maintain records of her income and productivity related data.

Case Study 3

Sunil farms tea in 1 acre of land from a total of 2 acres he owns. Although tea is his main source of income, he also engages in the cultivation of coffee and pepper. He produces around 300 kg of green leaves in total. He gains an income of around Rs10,000 (US\$77) per month and supplies leaves to the nearby factory. He reflects that he has cultivated tea with traditional knowledge obtained from family and other farmers. He observed that the tea inspector scarcely visited the area due to its remoteness.

Sunil does not use regular irrigation and only uses terracing to maintain and improve soil structure and fertility. Regarding soil management and fertilizer practices, Sunil says that he does not use any chemicals regularly. Although he uses the chemical fertilizer U709 from time to time, he does not know the ratio of the fertilizer to be used and has received no training on fertilizer application. He selected the fertilizer with the advice from the local tea society and spray applies the fertilizer without using any personal protective equipment.

6. Conclusions

This study identifies several key issues and challenges that constrain the contribution of tea smallholders including lack of awareness and training on tea cultivation techniques, poor business practices, low productivity, and lack of access to services and weak perception of sustainable agriculture. Although the TSHDA and the Sri Lanka Federation of Tea Smallholder Development/Tea Shakthi have support structures in place, the respondents in the study had limited access to services provided by them. While these structures are hailed as successful (FAO,2012), the study establishes that these have limited out reach.

Significantly, majority of farmers had received little or no direct training and relies on traditional cultivation knowledge passed down from the families. In some cases smallholders had obtained advice from the village level tea societies, fertilizer sellers and from fellow smallholders. Therefore, the TSHDA and the Federation should offer alternative or modify the existing strategies to address the capacity building needs of tea smallholders, especially those who reside in difficult regions. Such training may lead to vast improvement in crop quality and maintenance, minimize leaf rejection, increase volumes, escalate profitability of these tea smallholdings and develop the overall supply chain.

Weak knowledge of business management and market realities is also a significant reason that prevents tea smallholders from monitoring their profit or losses. Training on business principles will assist them to keep records of basic data on production, input, cost and marketing. The study demonstrates that there is considerable room to improve the tea small holding sector in Sri Lanka by addressing the existing constraints and revive interest among tea smallholders to expand their cultivable land for tea.

7. Table and Figures

Table 1: Tea Smallholders' Percentage Contribution to National Tea Production-2005-2013

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013
Percentage	64.9	68.3	67.5	67.4	69.3	69.4	69.9	71.7	72.9

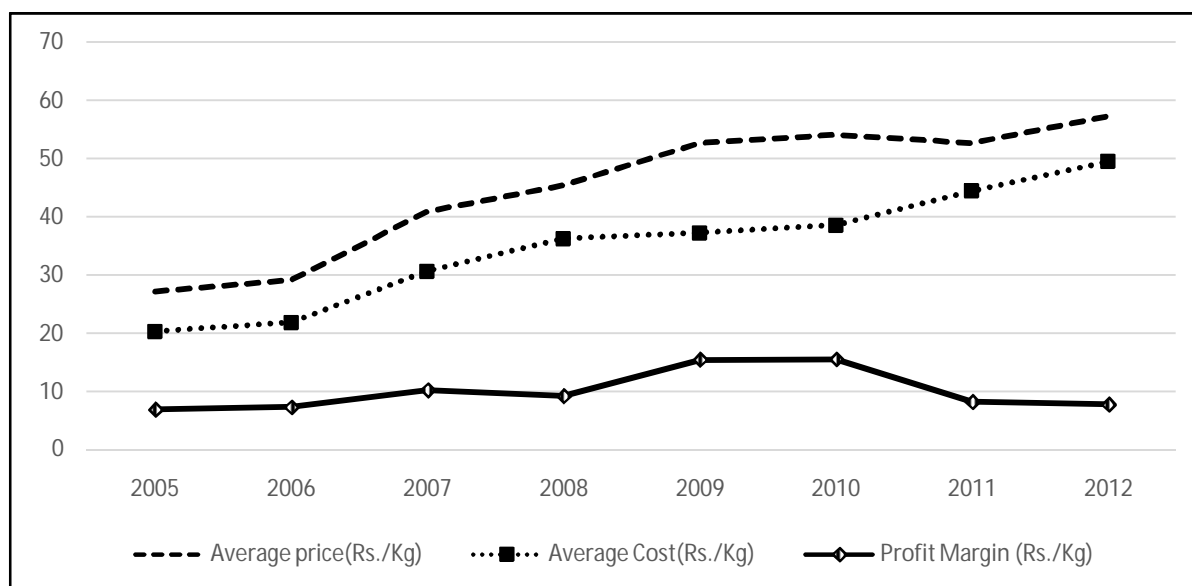
Source: Author's own calculation based on Annual Reports, Various Years, Central Bank of Sri Lanka.

Table 2: Important Features of Tea Smallholders in Sri Lanka

	2010	2011	2012
Extent of Tea Smallholdings (Hectares)	120324	120664	120955
Number of Tea Smallholders	338645	389561	390346
Production of Tea (Smallholdings/Mn.Kg)	230.1	229	234
Productivity (Kg. of Tea/Hectare)	1976	1966	2001
Price (a kilo of Green Leaf-Rs.)	54.11	52.63	57.27

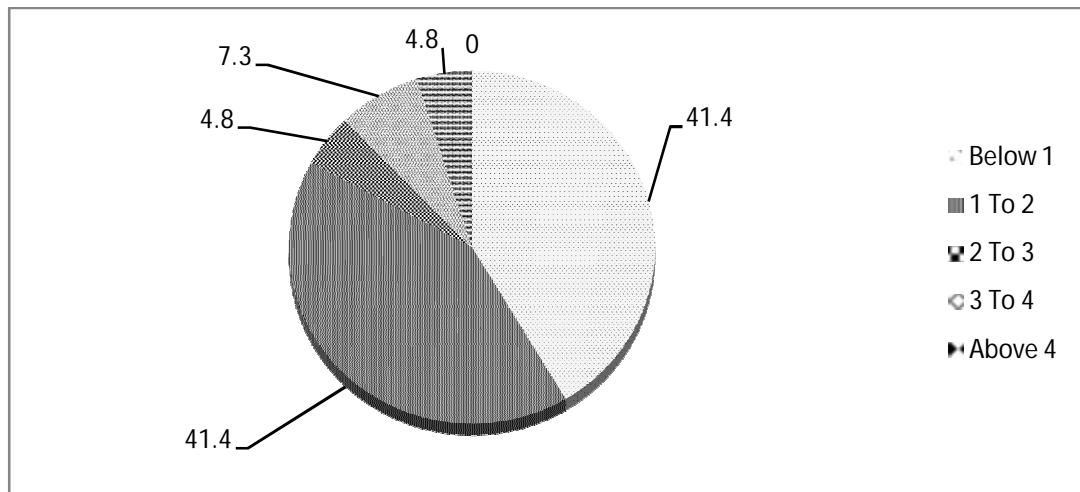
Source: Performance Indicators of Tea Small Holding sector, 2012 and Annual Report, Central Bank of Sri Lanka, Various Issues.

Figure 1: Relationship between Average Price, Average Cost and Average Profit Margin of Tea Smallholders in Sri Lanka



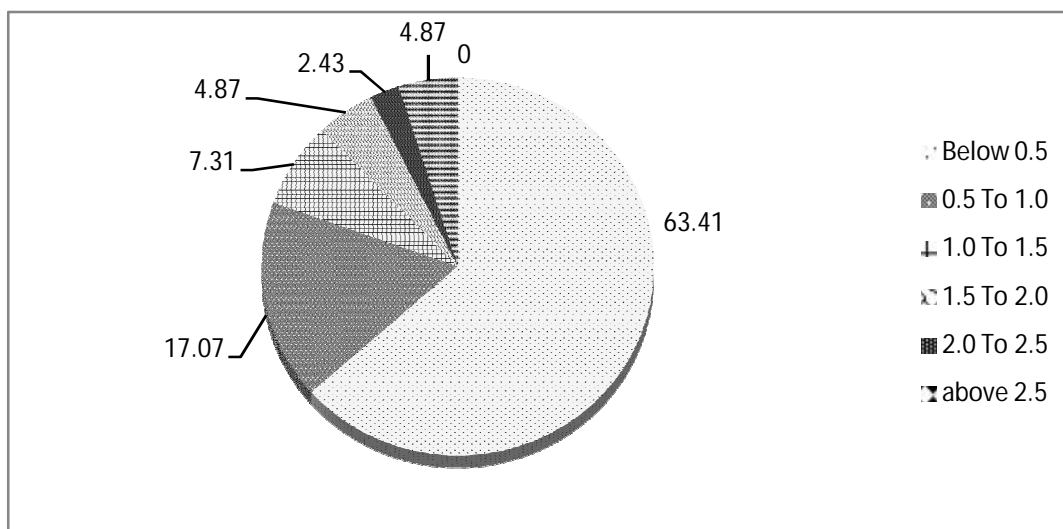
Source: Author's own calculation based on Performance Indicators of Tea Small Holding sector, 2012.

Figure 2: Land Size

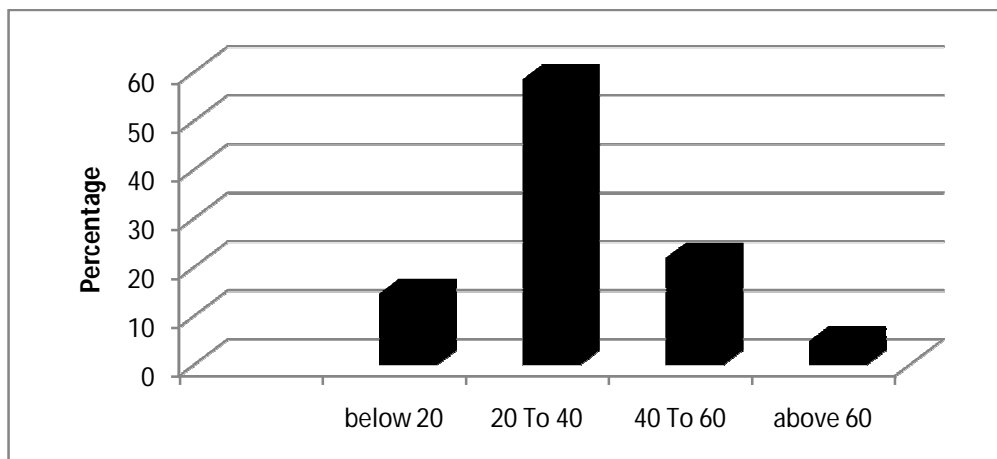


Source: Author's own calculation.

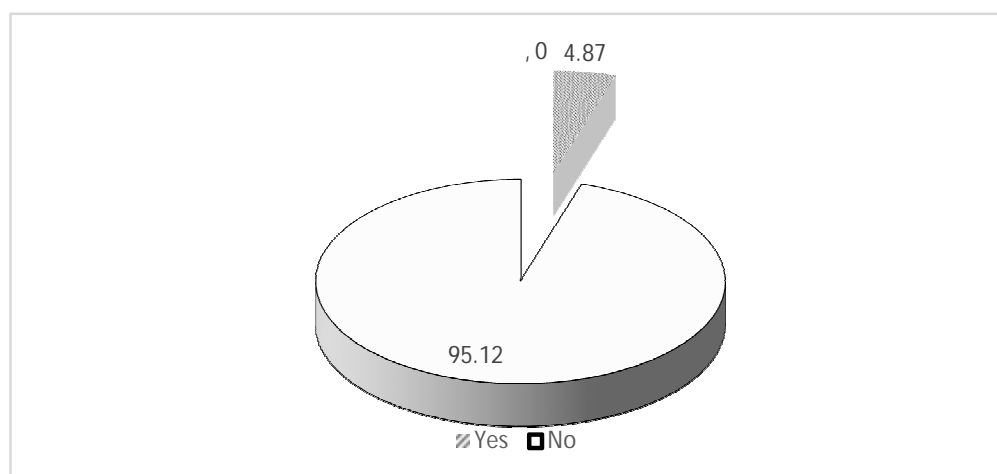
Figure 3: Area of the Tea Garden



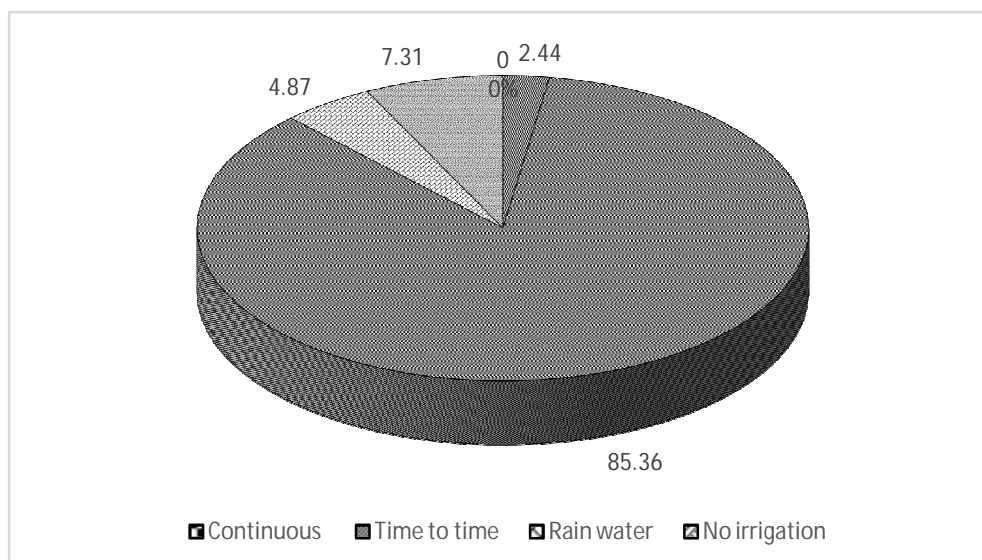
Source: Author's own calculation

Figure 4: Total Cost for Production of 1 kg of Green Leaves

Source: Author's own calculation

Figure 5: Soil Test Conditions

Source: Author's own calculation.

Figure 6: Irrigation Status

Source: Author's own calculation.

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