

## SUPPLY CHAIN AND LOGISTIC OPTIMIZATION: ANALYSIS OF THE SUPPLY CHAIN FOR TEA SILVER TIPS PRODUCTION IN LOW COUNTRY

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**ABSTRACT** – This is a qualitative research conducted to study the supply chain optimization for tea silver tips production and analyze the supply chain for Silver Tips production in low country and how to optimize the logistics. The study will be targeting 13 major tea factories in low country and 20 tea smallholder growers in Deniyaya area. Face-to-face interviews and focus group discussions were conducted and the data was collected using a questionnaire. Secondary data was collected from previous literature. Data process and analysis was done using descriptive analysis. As for the outcome, study was able to emphasize the issues in the silver tip value chain as well as the suggestions given by the farmers. Growing low yielding varieties, re-exporting tea, poor transportation services and financial support, lack of developmental research and knowledge dissemination to farmers. Growers and the producers suggested to broadening the research and new variety development on tea, updating the growers with the latest technical knowledge, policy implementation, encouraging farmers to use plastic crates and providing financial support in order to maximize the yield.

**Keywords:** Ceylon Tea, Logistics optimization, Low Country, Silver tips, Supply chain.

### 1. INTRODUCTION

Tea Silver Tips is a type of Ceylon tea made from minimally processed buds of the unique cultivar “TRI 2043” [1]. It is a novel type of tea that has been found to contain high levels of  $\gamma$ -Aminobutyric acid (GABA), an important bioactive component of tea that acts as a major inhibitory neurotransmitter and is considered to influence other physiological processes in humans as well as in plants [1]. The low country region of Sri Lanka is one of the major tea growing regions in the country, and it is known for producing high-quality teas, including Silver Tips tea. The production of Silver Tips tea is a delicate process that requires great skill and attention to detail. The production of Silver Tips tea in the low country region is highly dependent on weather conditions and other environmental factors. Therefore, the production of Silver Tips tea is limited, and it is considered to be one of the rarest and most expensive teas in the world. The value chain of Tea Silver Tips involves the harvesting of the buds, and the minimal processing of the buds to produce the tea. The tea is then subjected to hot water infusion, equivalent to the traditional method of brewing tea [1]. The unique cultivar “TRI 2043” is grown in Sri Lanka, which is one of the largest tea-producing countries in the world [1]. The production of Tea Silver Tips provides an opportunity for Sri Lanka to differentiate itself in the global tea market by offering a unique and high-value product. The tea supply chain in Sri Lanka faces several

challenges, including non-structural logistics management, lack of traceability, and inefficiencies. Inefficient supply chain management can lead to losses for tea producers. Also, it reduces the quality and value of the tea in the market. Therefore, optimizing the logistics of Silver Tips tea supply chain is crucial for ensuring its competitive nature and survival [2].

## **2. MATERIALS AND METHODS**

Deniyaya area in Low country was selected as the research area purposely considering high production capacity in the area. The primary data for this study was obtained from in-depth interviews and target group discussions. 13 Factory production officials from 13 major tea factories and 20 smallholder producers of silver tips in Deniyaya area were selected as the sample. The selection was done due to their average production. The sample represents factories that produce over 15kg/year of silver tips and smallholder producers that produce over 5kg/year. The data contains information about silver tips production, processing and marketing. Descriptive statistics were used to explore the characteristics of the data. Frequencies and percentages were also calculated for categorical variables. MS Office Excel was used in analyzing the data.

## **3. RESULTS AND DISCUSSION**

Silver tip is considered the highest tea grade among other popular tea grades such as BOPF, FBOP, Dust and Peckoe. It is an exquisite and rare type of tea that is made by subjecting to minimum process and entirely handmade tea only from the unopened tender tea buds/tips. Usually, these buds are called silver needles or tips because of their appearance. The silver color comes from the hairy layer on the leaf underside. Harvesting the buds from tea plants is the first step in silver tip production. The trained hand pickers hand pick just the buds from tea shoot in the early morning before sunrise, which is called imperial plucking, to preserve the quality of the tips. Hand picking is time consuming and only slightly curved buds are sent for processing. After plucking, silver tips are transported in separate containers which are a more effective less damage and minimum wastage method and handed over to the factory where the sorting is done manually by the same pluckers to remove unwanted things such as matured leaves, stem parts.

Finally, these tips are dried in order to wither and develop a distinct silver tip appearance and taste. Methods of drying differ according to the manufacturer. Some dry the buds under the sun to dry while preventing oxidation and maintaining flavor. Others use the natural mild breeze until the buds become silver in colour. Tips that are not perfectly coloured are sprayed with tea paint to get the desired colour. Buds which are plucked by the farmers are processed in the factories where value addition is done. The products are then introduced to the Colombo Tea Auction through a broker or producers can sell their products to a private buyer. In those times, the price increases to the peak level because the supply has no much potential. It costs around Rs. 27,000/= per 1kg of silver tips tea. Mostly these are processed as an export oriented, because there is not enough demand in the local market due to the low availability and high price fluctuations. The demand for the silver tips varies from time to time. It's because of the season of the tourists and in the festival seasons of countries in the middle east region and in China which exhibit a higher demand for silver tips. There is an increased demand for silver tips around May but at the times of cropping season, there is higher production in Silver tips thus reducing the price temporarily. Bangladesh, Kenya, Vietnam, India and some other are the other competitors for the global silver tip market. The supply chain captures 32% for the primary producer (grower) and 68% for the collective of other stakeholders.

Identified issued in the study are; lack of developmental research and knowledge distribution services from the government and private entities is one of the major issues faced in the Silver tip supply chain. Tea Research Institute, Pallekale (TRI) have been the only institute that has been providing technical support and new

varieties for the growers yet TRI 2043 which is also being one of the varieties introduced by TRI produces comparatively less buds for silver tip production. Producers reports that there hasn't been any new improvement in the production systems or in the introduction of new varieties to growers in a considerable amount of time and due to the poor support that the growers receive from the extension officers, there have been issues in their tea lands like gradual degradation of soils to acidic soils and overuse of fertilizers. Poor financial support and encouragement the growers and the producers get have also become a cause to spread the discouragement among them tea which has led to move towards more economically beneficial crops as a trend lately. Especially growers show a reluctance towards pruning the tea shoots, which should be practiced at least twice a year as tea is their main source of income. Because of the poor transport systems, the time taken to bring the harvested tea to the factory is too long and it causes the withering process to be much longer than expected. It makes the quality of the tea reduced. According to the producers, it is advised to deliver the tea leaves to be processed within 7 – 8 hours after plucking. The longer it takes to deliver to the factory, higher the quality of the preserved quality of the tea leaves and also the final products. Malpractices while transporting the leaves like overfilling of sacks with leaves and stacking them on top of each other causes a significant physical damage to the leaves while initiating the chemical reactions that should happen during the production processes. With the current economic crisis manufacturers themselves are facing educated labour force and high transportation and utility costs. Re-exporting of tea is another threat to the Ceylon tea market as the buyers import tea from foreign countries for lower prices and export them for reduced values than Ceylon tea, it reduces the demand for locally grown and processed tea.

As for the suggests proposed by the farmers, providing a subsidiary scheme during the pruning seasons would encourage the farmers to carry out recommended management practices that would result in increased yields which should be organized as a provision from the government. Meanwhile, growing African oil palm could be an ideal income source at the times of pruning. Similarly, government should be implementing policies to stop Re-exporting tea and to promote the local and international market for Ceylon tea. Encouraging the farmers to use plastic crates for the transportation of plucked leaves and also providing them at subsidized prices would be an effective alternative. Benefits from the implications are as follows. Diversified Income Streams will be encouraging farmers to grow African oil palm during pruning seasons provides an additional income source for them. Implementing policies to stop re-exporting tea and promoting the local and international market for Ceylon tea can boost the tea industry's growth and profitability. These suggestions have the potential to improve agricultural practices, enhance farmers' income, promote sustainable agriculture, and boost the tea industry and rural economies.

#### **4. CONCLUSION**

Lack of developmental research and knowledge distribution services from the government and private entities, re-exporting of tea, poor financial supports and encouragement, unsafe transport systems, crop management malpractices are some of the major issues faced in the silver tip supply chain. To increase yields, farmers should be encouraged to use plastic crates and provide them at subsidized prices. They also should be educated with the latest technical and management knowledge.

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