

## ASSESSING THE RESILIENCE OF CEYLON CINNAMON (*CINNAMOMUM ZEYLANICUM*) PLANT ESTABLISHMENT ACROSS 15 DISTRICTS IN SRI LANKA: INSIGHTS FROM THE 2022 DISTRIBUTION PROGRAM

R.K.W. Ranketh Kumbura\*<sup>1</sup>

\*<sup>1</sup>Department Of Export Agriculture, Peradeniya, Sri Lanka.

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### ABSTRACT

Ceylon cinnamon (*Cinnamomum zeylanicum*), often referred to as "true cinnamon," is a vital crop in Sri Lanka, where it holds significant economic importance. The country is the world's largest producer and exporter of Ceylon cinnamon, contributing around 85% of the global supply. In 2022, Sri Lanka produced 25,232 metric tons of cinnamon, generating export earnings of USD 330.93 million. The cinnamon industry supports the livelihoods of over 300,000 stakeholders and plays a critical role in the country's economy. Between 2021 and 2022, 44.22 million cinnamon plants were distributed across Sri Lanka, contributing to an estimated 4,913.51 hectares of new cultivation. This study analyzes the establishment rates of cinnamon plants distributed in 2022 across 15 districts, focusing on the impact of climatic factors, including the severe drought experienced in early 2023. Data collected from 94 farmers through telephone interviews revealed overall survival rate of 91.5%, showcasing the resilience of Ceylon cinnamon under challenging conditions. Colombo district recorded the highest survival rate (99.67%), while Ampara had the lowest (47.2%). These findings underscore the need for enhanced cultivation practices, such as proper land preparation, timely planting, and adequate post-planting care. In particular, Ampara district should adopt enhanced water management techniques and ensure farmers receive adequate training to increase survival rates. Despite challenges, farmers adhered to best practices reported high survival rates and expressed satisfaction with the new planting program. This research provides valuable insights for improving the sustainability of Sri Lanka's cinnamon industry, which is crucial for the country's economy.

**Keywords:** Ceylon Cinnamon, Plant Establishment Rate, Sri Lanka, Climate Resilience.

### I. INTRODUCTION

Cinnamon, often referred to as the "golden spice," holds a prominent place in the global spice trade due to its unique flavor, aroma, and health benefits. Among the various types of cinnamon, Ceylon cinnamon (*Cinnamomum verum*), commonly known as "true cinnamon," is globally recognized for its superior quality and lower coumarin content compared to its counterpart, cassia cinnamon. Sri Lanka is the world's largest producer and exporter of Ceylon cinnamon, contributing approximately 85% of the global supply. This spice is deeply intertwined with the country's agricultural heritage and plays a significant role in its economy, particularly in export earnings and rural livelihoods.

In 2022, Sri Lanka produced 25,232 metric tons (Mt) of cinnamon, generating an export income of USD 330.93 million (1). The production further increased in 2023 to 26,677 Mt, yielding an export income of USD 364.02 million (1). Export volumes also saw an increase from 18,298.19 Mt in 2022 to 19,676.55 Mt in 2023 (1). This steady growth underscores the global demand for high-quality Ceylon cinnamon, driven by its extensive use in the food, beverage, pharmaceutical, and cosmetics industries. Additionally, the number of operators engaged in cinnamon production over 300,000 (2), highlighting its importance as a livelihood source for many rural communities in Sri Lanka.

Despite the growing demand, several challenges persist in expanding and sustaining cinnamon cultivation. In 2022, the estimated extent of cinnamon cultivation, calculated based on the number of plants distributed (18,281,374), was 2,031.26 hectares (ha) (3). This was a decline from 2,882.25 ha in 2021, when 25,940,210 plants were distributed (3). These figures highlight the importance of understanding the establishment rates of distributed plants to ensure optimal utilization of resources and land.

## II. PURPOSE OF THE STUDY

In the first half of 2023, severe drought conditions were experienced to varying extents across Sri Lanka. This research focuses on analyzing the establishment rate of Ceylon cinnamon plants distributed in 2022, based on data collected from 15 districts across Sri Lanka. The study aims to assess the impact of climatic factors, particularly severe drought periods, after plant establishment and survival, alongside other activities and practices influencing the successful cultivation of cinnamon. By identifying gaps in the cultivation process, such as training adherence and land preparation, the study provides insights into improving cinnamon production sustainability. Ultimately, the research contributes to developing strategies to increase plant survival rates and enhance the economic viability of cinnamon cultivation in Sri Lanka.

## III. MATERIALS AND METHODS

The study utilized a quantitative approach to collect data from 94 farmers across 15 districts in Sri Lanka. The farmers were selected based on their participation in the government's cinnamon plant distribution program in 2022. Data collection involved surveying farmers to gather information on the number of cinnamon plants issued, the number that survived, and the number that died, along with relevant demographic and environmental factors. Farmers were also asked about their adherence to recommended cultivation practices, such as land preparation, participation in training programs, and follow-up visits by agricultural officers.

Data analysis was conducted using descriptive statistics, with the survival rate of cinnamon plants calculated for each district. The survival rate was defined as the percentage of plants that survived after being distributed to the farmers. The data was also examined for any correlation between adherence to recommended practices and plant survival.

## IV. RESULTS

The findings of this study demonstrate a high overall survival rate of 91.5% across the surveyed districts, reflecting the resilience of Ceylon cinnamon plants, even in the face of adverse climatic conditions such as drought. The survival rates varied across districts, with Ampara district showing the lowest survival rate at 47.2%, where 4,250 plants survived out of 9000 distributed. In contrast, Colombo district reported the highest survival rate at 99.7%, with only 50 plants dying out of 15,300 issued. While the highest survival rates reported Colombo, Kalutara reported 98.2%, and Kegalle 98.4%.

The data revealed that most farmers adhered to recommended cultivation practices, such as proper land preparation and attending training sessions, which contributed to the overall high survival rates. Only a small percentage of farmers failed to follow all the recommended guidelines, indicating that these practices play a crucial role in ensuring the successful establishment of cinnamon plants.

**Table 1:** Number of Plants Issued, Survived, Died, and Survival Rate by District (2022)

District	Issued Plants	Survived	Died	Survival Rate (%)
Anuradhapura	15,300	15,000	300	98.0
Ampara	9,000	4,250	4,750	47.2
Kalutara	25,200	24,757	443	98.2
Kegalle	26,100	25,697	403	98.4
Kurunegala	22,500	20,451	2,049	73.4
Colombo	15,300	15,250	50	99.7
Gampaha	11,700	10,800	900	92.3
Galle	22,050	20,200	1,850	91.6
Polonnaruwa	18,900	17,670	1,230	93.5
Badulla	4,500	3,000	1,500	66.7
Kandy	9,900	8,645	1,255	87.4
Matara	36,450	35,800	650	98.2

Matale	22,500	18,688	3,812	83
Monaragala	9,000	7,399	1,601	82.2
Rathnapura	13,500	12,600	900	93.3
Hambantota	16,200	14,200	2,000	87.6
<b>Grand Total</b>	<b>278,100</b>	<b>254,407</b>	<b>23,693</b>	<b>91.5</b>

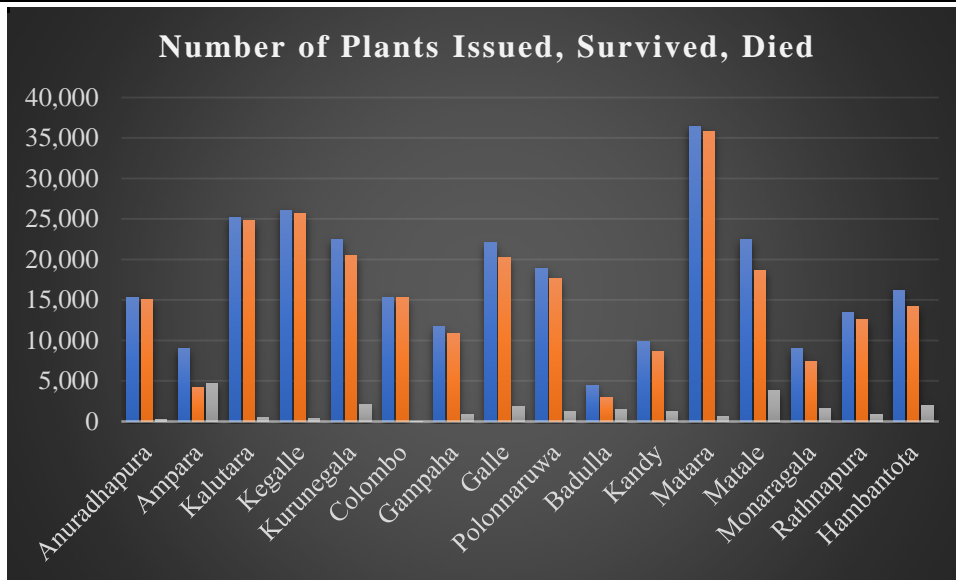


Figure 01: Number of Plants Issued, Survived and Died

### V. DISCUSSION

The study's results underscore the resilience of Ceylon cinnamon plants, with an overall survival rate of 91.5%. Even in regions that experienced severe drought conditions, such as Ampara, where survival rates were lower, the survival of cinnamon plants remained relatively high. The high survival rates can be attributed to effective land preparation, adherence to training guidelines, and ongoing support from export agricultural officers. These results highlight the importance of maintaining and enhancing such practices to further improve the survival rate of cinnamon plants.

Despite the challenging climatic conditions, especially during dry periods, the majority of farmers followed the recommended guidelines, which suggests that these measures are vital for the successful establishment of cinnamon plants. Additionally, the study's findings show that more favorable climatic conditions could further increase survival rates, emphasizing the need for adaptive farming practices in the face of climate change.

### VI. CONCLUSION

This study demonstrates the significant resilience of cinnamon plants to climatic challenges, particularly during periods of severe drought. The high overall survival rate of 91.5% is indicative of the effectiveness of the Export Agriculture Department's cinnamon plant distribution program and the support provided to farmers. By identifying the factors that influence plant establishment and survival, this research provides actionable insights for improving cultivation practices and supporting the long-term sustainability of cinnamon production in Sri Lanka. The findings will contribute to strengthening Sri Lanka's position as the world's leading supplier of true Ceylon cinnamon and supporting the livelihoods of farmers involved in its cultivation.

### VII. REFERENCES

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